

# POTRERO YARD MODERNIZATION PROJECT

**INFRASTRUCTURE FACILITY  
DESIGN-BUILD-FINANCE-OPERATE-MAINTAIN AGREEMENT<sup>1</sup>**

**BETWEEN**

**THE CITY AND COUNTY OF SAN FRANCISCO  
ACTING BY AND THROUGH THE  
SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY**

**AND**

**[PRINCIPAL PROJECT COMPANY]<sup>2</sup>**

**DATED AS OF [\_\_\_\_\_, 2025]**

---

**TABLE OF CONTENTS**

	<b><u>Page</u></b>
ARTICLE 1. DEFINITIONS; CONTRACT DOCUMENTS; ORDER OF PRECEDENCE; OTHER DOCUMENTS .....	3
1.1 Definitions and Interpretation .....	3
1.2 Contract Documents; Rules to Reconcile Conflicting Provisions .....	5
1.3 Conflicts, Ambiguities or Inconsistency in Principal Project Company’s Management Plans .....	7
1.4 Reference Documents .....	7
ARTICLE 2. NATURE OF AGREEMENT; TERM .....	9
2.1 Nature of Agreement; PDA Status Under This Agreement .....	9
2.2 Right of Entry; Condition of Site .....	9
2.3 Term .....	10
2.4 Title .....	10
2.4.1 General .....	10
2.4.2 Possessory Interest Tax .....	10
2.4.3 Passage of Title .....	12
2.4.4 Intellectual Property .....	12
2.4.5 Documents of Title .....	12
2.4.6 Care, Custody and Control Responsibilities .....	12
2.5 Limitation on Principal Project Company’s Rights .....	12
ARTICLE 3. FINANCIAL CLOSE .....	13
3.1 Requirements for Financial Close .....	13
3.1.1 Obligation to Achieve Financial Close .....	13
3.1.2 Date of Financial Close .....	13
3.2 Financial Close Requirements and Deliverables .....	13
3.2.1 Delivery of Financing Agreements and Other Documents .....	13
3.2.2 City Deliverables .....	14
3.2.3 Base Interest Rate Fluctuation and Credit Spread Risk Mitigation .....	15
3.2.4 Conditions Precedent to Financial Close .....	16
3.2.6 Mandatory Terms of Project Debt, Financing Agreements and Other Documents .....	18
3.3 Post-Financial Close Requirements and Deliverables .....	18
3.4 Potential Adverse Events and Mitigation .....	19
3.5 Permitted Excuses from Achieving Financial Close .....	21
3.6 No-Fault Termination .....	22
3.7 Principal Project Company’s Failure to Achieve Financial Close .....	23

---

ARTICLE 4.	PRINCIPAL PROJECT COMPANY FINANCING; LENDERS’ RIGHTS; REFINANCING; PRIVATE CAPITAL INVESTMENTS; FINANCIAL MODEL .....	24
4.1	Principal Project Company Right and Responsibility to Finance .....	24
4.2	No City or City Responsibility for Project Debt .....	24
4.3	Lenders’ Rights.....	25
4.4	Refinancing.....	25
4.4.1	Right of Refinancing .....	25
4.4.2	Notice of Refinancing .....	25
4.4.3	Refinancing Limitations, Requirements and Conditions.....	27
4.5	Refinancing Gain .....	27
4.6	Equity Requirements .....	27
4.7	Financial Model and Financial Model Updates.....	28
4.7.1	Model Update Event.....	28
4.7.2	Updates to the Financial Model .....	28
4.7.3	Replacement of Financial Model .....	30
4.7.4	Financial Model Audits .....	31
4.8	Escrow of Financial Model and Cost and Pricing Data.....	31
ARTICLE 5.	SUBMITTALS; MANAGEMENT SYSTEMS AND OVERSIGHT.....	33
5.1	Submittal Review Terms and Procedures .....	33
5.1.1	Terms and Procedures.....	33
5.1.2	Conflicting Provisions .....	33
5.1.3	Limitations on Principal Project Company’s Right to Rely.....	33
5.2	Project Management Plan.....	34
5.3	Quality Assurance, Quality Control, Generally .....	35
5.4	Oversight, Inspection and Testing.....	35
5.5	Testing and Test Results .....	37
5.6	Meetings.....	38
5.7	Reporting.....	38
5.7.1	Relating to the Work.....	38
5.7.2	Financial Reporting .....	38
ARTICLE 6.	GENERAL PRINCIPAL PROJECT COMPANY OBLIGATIONS .....	40
6.1	Planning and Engineering Activities.....	40
6.2	Project Site Conditions .....	40
6.3	Regulatory Approvals .....	40
6.3.1	CEQA Approval and NEPA Approval .....	40
6.3.2	Regulatory Approvals other than the CEQA Approval and the NEPA Approval.....	42
6.3.3	Copies to City.....	42
6.3.4	Certain Risks Relating to Regulatory Approvals .....	42
6.3.5	Changes to Regulatory Approvals .....	43
6.3.6	City Assistance with Regulatory Approvals.....	43
6.3.7	Regulatory Approvals in City’s Name .....	44
6.3.8	Major Approval Delay .....	44

6.4	Compliance with Laws .....	47
6.4.1	Applicable Laws .....	47
6.4.2	Environmental Compliance.....	47
6.5	Compliance with Regulatory Approvals.....	47
6.6	Communication and Public Outreach.....	47
6.7	Coordination, Cooperation and Access.....	47
6.8	Intentionally Deleted .....	48
6.9	Safety Compliance.....	48
6.10	Law Enforcement and Security .....	49
6.10.1	Law Enforcement Services.....	49
6.10.2	Security .....	49
6.11	Warranties .....	49
6.11.1	Warranties for SFMTA O&M Facilities .....	49
6.11.2	Contractor Warranties and Guaranties .....	51
6.11.3	Warranties for Utility Owners and Authorities Having Jurisdiction.....	51
6.12	Maintain Good Standing .....	52
<b>ARTICLE 7.    DESIGN AND CONSTRUCTION .....</b>		<b>53</b>
7.1	General Obligations of Principal Project Company Concerning D&C Work.....	53
7.2	Performance, Design and Construction Standards .....	54
7.3	Design Implementation .....	54
7.4	Schedule, Deadlines, Notices to Proceed and Commencement of Work .....	54
7.4.1	Project Schedule .....	54
7.4.2	Float.....	55
7.4.3	Commencement of Non-Construction Work .....	55
7.4.4	Commencement of Construction Work .....	55
7.4.6	Work Before NTP 1 .....	56
7.5	Acquisition of Real Property.....	56
7.5.1	Additional Acquisitions .....	56
7.5.2	Temporary Interests in Property .....	58
7.5.3	Property Acquisitions and Scheduling Work .....	58
7.6	Utilities, Utility Adjustments and Utility Delay .....	59
7.6.1	Utilities to Serve Facility .....	59
7.6.2	Principal Project Company’s General Responsibilities.....	59
7.6.3	Avoiding Utility Adjustments and Minimizing Costs.....	60
7.6.4	Allocation of Work Responsibility.....	60
7.6.5	Utility Adjustment Costs .....	60
7.6.6	Incidental Utility Work.....	61
7.6.7	Bonds and Insurance; Security for Utility Adjustment Costs .....	62
7.6.8	Utility Investigation by Principal Project Company .....	62
7.6.9	Claims for Inaccuracies in Utility Information .....	62
7.6.10	Changes in Design.....	63
7.6.11	Utility Betterments.....	64
7.6.12	Failure of Utility Owners to Cooperate .....	64
7.6.13	Utility Delays .....	66
7.6.14	Utility-Related Claims; Additional Restrictions on Change Orders Relating to Utility Adjustments.....	67
7.6.15	FTA Requirements .....	68
7.7	Hazardous Materials Management; Risk Allocation .....	68

7.7.1	Hazardous Materials Management.....	68
7.7.2	Additional Hazardous Materials Obligations of Principal Project Company.....	70
7.7.3	Hazardous Materials Generator Responsibilities .....	70
7.8	Substantial Completion.....	71
7.9	Final Acceptance .....	73
7.10	Responsibility for Loss or Damage .....	74
7.11	Nonconforming Work.....	74
7.11.1	Obligation to Replace Nonconforming Work.....	74
7.11.2	Remedial Plan for Nonconforming Work.....	74
7.11.3	City’s Remedies .....	75
7.12	Design and Construction of Joint Development Alternatives .....	75
7.13	FF&E During D&C Period .....	75
7.13.1	Selection and Procurement of PPC-Furnished FF&E .....	75
7.13.2	Selection of City-Furnished Equipment and Existing FF&E .....	76
7.13.3	Installation of PPC-Furnished FF&E.....	76
7.13.4	Installation of City-Furnished IT/Comms FF&E.....	77
7.13.5	Commissioning of FF&E for Substantial Completion .....	77
7.14	Move-In .....	77
7.14.1	General .....	77
7.14.2	Move-In Subcommittee .....	78
7.14.3	Move-In Resource.....	78
<b>ARTICLE 8. INFRASTRUCTURE FACILITY MAINTENANCE.....</b>		<b>79</b>
8.1	General.....	79
8.1.1	General Obligations.....	79
8.1.2	Changes in Standards and Specifications .....	80
8.1.3	Hazardous Materials Management.....	80
8.1.4	Utility Accommodation.....	80
8.2	Principal Project Company Inspection, Testing and Reporting.....	80
8.3	Responsibility for Loss or Damage .....	81
8.4	Renewal Work; IFM Management Plan.....	81
8.4.1	Performance of Renewal Work.....	81
8.4.2	IFM Management Plan .....	82
8.5	Handback .....	82
8.5.1	Handback Condition .....	82
8.5.2	Independent Engineer .....	83
8.5.3	Handback Reserve Amount.....	83
8.5.4	Joint Technical Review and Handback Inspections and Report.....	84
8.5.5	Handback Assessment.....	85
8.5.6	City Right to Self-Perform and Recover Costs.....	86
8.5.7	Spare Parts .....	86
8.6	Handback Requirements Reserve Account .....	86
8.6.1	Establishment.....	86
8.6.2	Funding .....	87
8.6.3	Use of Handback Requirements Reserve Account.....	88
8.6.4	Disbursement of Handback Requirements Reserve Account on Completion of Handback Renewal Work or Earlier Termination .....	88
8.6.5	Handback Requirements Letters of Credit.....	88

---

8.6.6	Coordination with JDA Project Companies and Joint Development Alternatives .....	89
8.7	IFM Operations Committee .....	90
8.8	FF&E During IFM Period.....	90
8.8.1	Title and Responsibility for Risk.....	90
8.8.2	Maintenance and Replacement of FF&E During IFM Period .....	90
8.9	Energy Management .....	92
8.9.1	Independent Energy Auditor.....	92
8.9.2	External Energy Auditor .....	93
8.9.3	Failure to meet LEED Requirements .....	94
<b>ARTICLE 9. CONTRACTING AND LABOR PRACTICES .....</b>		<b>95</b>
9.1	Disclosure of Contracts and Contractors.....	95
9.2	Responsibility for Work, Contractors and Employees.....	95
9.3	Key Contracts; Contractor Qualifications .....	96
9.3.1	Key Contract Approvals, Amendments and Termination; Use of and Change in Key Contractors .....	96
9.3.2	Key Contract Provisions .....	96
9.4	Prompt Payment to Contractors.....	96
9.5	Key Personnel .....	97
9.5.1	Key Personnel Deductions .....	98
9.5.2	Limitations on Deductions for Unavailability of Key Personnel.....	99
9.5.3	Skilled Personnel; Removal at City Direction.....	99
9.6	DBE Participation.....	100
9.7	Contracts with Affiliates .....	103
9.8	Labor Standards .....	104
9.9	Local Hiring Requirements for Construction Work and Renewal Work.....	105
9.10	First Source Hiring Program .....	105
9.11	SFMTA Employment Training Program .....	105
9.12	Deductions and Noncompliance Points Relating to Local Hire and SFMTA Training Program Requirements Development .....	106
9.13	Ethical Standards .....	106
<b>ARTICLE 10. INSURANCE; PAYMENT AND PERFORMANCE SECURITY; INDEMNITY.....</b>		<b>108</b>
10.1	Insurance.....	108
10.1.1	Insurance Policies and Coverage .....	108
10.1.2	General Insurance Requirements.....	108
10.1.3	Insurance Premium Benchmarking.....	112
10.1.4	Insurance Unavailability .....	115
10.1.5	Review of Insurance Unavailability Risks .....	116
10.1.6	Lender Insurance Requirements .....	117
10.1.7	Prosecution of Claims .....	118
10.1.8	Application of Insurance Proceeds .....	119
10.2	Performance Security .....	119
10.2.1	Equity Letter of Credit.....	119
10.2.2	D&C Performance Security .....	119
10.3	General Requirements for D&C Performance Security .....	120

---

10.4	Letters of Credit .....	121
10.4.1	General Provisions .....	121
10.5	Guarantees .....	123
10.6	Indemnities .....	124
10.6.1	General Indemnity .....	124
10.6.2	Design Defects .....	126
10.6.3	Limitations on Indemnification Obligations .....	127
10.6.4	Principal Project Company's Defense .....	127
10.7	Indemnities by Contractors .....	128
10.8	Notice of Claims by Third Parties .....	128
10.9	SFMTA O&M Facilities Warranty Bond .....	128
ARTICLE 11. PAYMENTS TO PRINCIPAL PROJECT COMPANY .....		130
11.1	Milestone Payment .....	130
11.2	Availability Payments .....	130
11.3	Pass-Through Costs .....	130
11.4	Invoice, Other Amounts and Payments .....	130
11.5	Disputed Amounts .....	131
11.6	Withholding from Payments .....	131
11.7	Interest on Late Payments and Overpayments .....	132
11.8	Taxes .....	132
11.9	Payment Not Evidence of Approval .....	132
11.10	Other Adjustments; Full Compensation .....	133
11.11	Appropriation; Certification of Funds .....	133
11.12	Allowances .....	134
ARTICLE 12. CITY CHANGE PROCESS; UNILATERAL CHANGE ORDERS; DEVIATIONS .....		138
12.1	General .....	138
12.2	City Changes .....	138
ARTICLE 13. GENERAL PROVISIONS APPLYING TO DELAY EVENTS AND RELIEF EVENTS .....		139
13.1	Interface with Other Portions of the Facility .....	139
13.2	Delay Event and Relief Event Process .....	139
13.3	Mitigation .....	140
13.4	Deductions for Relevant Events .....	140
13.5	Acts of a PPC-Related Entity .....	141
13.6	Notification; Delay in Notification .....	141
13.7	Multiple and Overlapping Claims .....	141
13.8	Burden of Proof and Mitigation .....	141
13.9	Sole Entitlement .....	141
13.10	Compensation .....	142
13.11	Waiver .....	142

---

ARTICLE 14.	COMPENSATION AND OTHER RELIEF FOR DELAY EVENTS AND RELIEF EVENTS .....	143
14.1	Relief During the D&C Period .....	143
14.1.1	Claim for Delay Event.....	143
14.1.2	Extension of Deadlines for Delay Events.....	144
14.1.3	Concurrent Delays.....	145
14.1.4	Costs Payable for Compensable Delay Events .....	145
14.1.5	Additional Limits Relating to Hazardous Materials Event During D&C Period.....	146
14.1.6	Costs Payable for Force Majeure Events During the D&C Term.....	146
14.1.7	Costs Payable for Unavoidable Delay Events During the D&C Term.....	147
14.1.8	Impact of Delay Event on Performance of D&C Work.....	147
14.1.9	Relief for Adverse Weather Event .....	147
14.2	Relief During the IFM Period.....	148
14.2.1	Overview .....	148
14.2.2	Claim for a Relief Event.....	148
14.2.3	Costs Payable for Compensable Relief Events .....	149
14.2.4	Costs Payable for Force Majeure During IFM Period.....	150
14.2.5	Additional Limits Relating to Hazardous Materials Event During IFM Period.....	150
14.2.6	Impact of Relief Event on Performance of IFM Services.....	151
14.3	Method of Payment of Compensation for Compensable Delay Events and Compensable Relief Events.....	151
14.4	Open Book Basis .....	151
14.5	Excavations; Public Contract Code 7104 .....	152
14.6	Loss or Damage Due to Force Majeure Event .....	152
ARTICLE 15.	DEDUCTIONS AND NONCOMPLIANCE POINTS .....	153
15.1	Failure Events.....	153
15.2	Deductions .....	153
15.3	Noncompliance and Failure Reporting, Notification and Cure Process .....	154
15.3.1	Noncompliance Database .....	154
15.3.2	Notification Initiated by City .....	155
15.3.3	Performance Reports .....	155
15.3.4	Response and Rectification Times .....	155
15.3.5	Notification of Response and Rectification .....	156
15.4	Assessment of Noncompliance Points.....	156
15.5	Performance Notice .....	157
15.6	Increased Oversight.....	158
15.7	Persistent PPC Default.....	159
15.8	Cure Plan for Persistent PPC Default .....	159
15.9	Amendment of IFM Period Performance Measurements Table.....	160
ARTICLE 16.	DEFAULT; REMEDIES .....	162
16.1	Default by Principal Project Company; Cure Periods .....	162
16.1.1	PPC Default .....	162

16.1.2	Default Notice and Cure Periods .....	165
16.1.3	Warning Notices .....	167
16.1.4	Principal Project Company to Comply with Default Notice and Provide Cure Plan .....	167
16.2	City Remedies for PPC Default .....	168
16.2.3	Immediate City Entry and Cure of Wrongful Use .....	168
16.2.4	Remedies for Failure to Meet Safety Standards or Perform Safety Compliance .....	169
16.2.5	City Step-in Rights .....	170
16.2.6	Damages; Offset .....	172
16.2.7	Performance Bond .....	173
16.2.8	Suspension of Work .....	174
16.2.9	Other Rights and Remedies .....	175
16.2.10	Cumulative, Non-Exclusive Remedies .....	175
16.3	Default by City; Cure Periods .....	176
16.3.1	City Default .....	176
16.3.2	Cure Periods .....	176
16.4	Principal Project Company Remedies for City Breach .....	176
16.4.1	Termination .....	176
16.4.2	Interest on Late Payment .....	176
16.4.3	Limitations on Remedies .....	177
16.4.4	Remedies at Law and in Equity .....	177
16.4.5	Principal Project Company Right to Suspend .....	177
16.5	No Duplicative Payment .....	178
16.6	Limitation on Consequential Damages .....	178
<b>ARTICLE 17. TERMINATION .....</b>		<b>179</b>
17.1	Termination for Convenience; Condemnation .....	179
17.2	Termination for Force Majeure Termination Events or Insurance Unavailability .....	180
17.2.1	Notice of Conditional Election to Terminate – Force Majeure Termination Events .....	180
17.2.2	No Right to Termination Election .....	180
17.2.3	Principal Project Company Options Upon City Notice .....	181
17.2.4	City Options Upon Principal Project Company Notice .....	181
17.2.5	No Waiver .....	182
17.2.6	Termination for Insurance Unavailability .....	182
17.2.7	Concurrent Notices .....	183
17.2.8	Termination Compensation for Force Majeure Termination Events and Insurance Unavailability .....	183
17.3	Termination for PPC Default .....	183
17.3.1	PPC Defaults Triggering City Termination Rights .....	183
17.3.2	Compensation to Principal Project Company .....	184
17.3.3	Finality .....	185
17.4	Principal Project Company Rights to Terminate .....	185
17.4.1	Termination for City Default .....	185
17.4.2	Termination for Suspension of Work .....	185
17.4.3	Termination Due to Court Ruling .....	186
17.5	Termination if Financial Close Fails to Occur .....	186
17.6	Termination Procedures and Duties .....	186

17.6.1	Performance of Work Pending Early Termination Date .....	186
17.6.2	Transition Plan .....	186
17.6.3	Relinquishment and Possession of Project.....	187
17.6.4	Continuance or Termination of Key Contracts Before Work Completion.....	188
17.6.5	Other Close-Out Activities .....	189
17.6.6	Calculation of Compensation.....	190
17.7	Payment of Termination Compensation .....	191
17.8	Effect of Termination.....	192
17.9	Liability after Termination; Final Release .....	193
17.10	Exclusive Termination Rights.....	193
17.11	Access to Information .....	193
<b>ARTICLE 18. PARTNERING; CONTRACT DISPUTE PROCEDURES .....</b>		<b>194</b>
18.1	Introduction.....	194
18.2	Partnering.....	194
18.2.1	Collaborative Partnering.....	194
18.2.2	Confidentiality.....	194
18.3	Contract Dispute Procedures.....	194
18.3.1	Disputes Generally .....	194
18.3.2	Notice of Contract Dispute.....	196
18.3.3	Contract Dispute .....	196
<b>ARTICLE 19. REPRESENTATIONS AND WARRANTIES.....</b>		<b>199</b>
19.1	Principal Project Company Representations and Warranties .....	199
19.2	City Representations and Warranties.....	202
19.3	Special Remedies for Mutual Breach of Warranty.....	203
<b>ARTICLE 20. ASSIGNMENT AND TRANSFER .....</b>		<b>204</b>
20.1	Restrictions on Equity Transfers and Change of Control.....	204
20.2	Standards and Procedures for City Approval .....	204
20.3	Restrictions on Assignment, Subletting and Other Transfers of PPC's Interest or the Project .....	206
20.4	Assignment by City .....	206
20.5	Change of Organization or Name .....	207
<b>ARTICLE 21. RECORDS AND AUDITS; INTELLECTUAL PROPERTY .....</b>		<b>208</b>
21.1	Maintenance and Inspection of Records .....	208
21.2	Audits .....	209
21.3	Public Records Act and San Francisco Sunshine Ordinance .....	210
21.4	Intellectual Property .....	211
21.4.1	Developed IP.....	211
21.4.2	Principal Project Company IP.....	212
21.4.3	Third Party IP .....	212
21.4.4	City IP and City Data .....	213
21.4.5	Delivery of IP Materials .....	214

---

21.4.6	Payments Inclusive .....	214
21.5	Intellectual Property Escrows.....	214
21.6	City’s Use of IP Materials.....	215
ARTICLE 22. ADVERTISING AND OTHER BUSINESS OPPORTUNITIES.....		216
22.1	Rights and Interests in the Project and Project Site .....	216
22.2	Advertising and Business Opportunities.....	216
22.3	Remedies .....	217
ARTICLE 23. MISCELLANEOUS.....		218
23.1	Standard for Approvals .....	218
23.2	Amendments .....	218
23.3	Waiver .....	218
23.4	Independent Contractor; No Joint Venture or Partnership.....	218
23.5	Successors and Assigns.....	219
23.6	Designation of Representatives; Cooperation with Representatives .....	219
23.7	Survival.....	219
23.8	Limitation on Third Party Beneficiaries.....	220
23.9	Governing Law; Venue .....	220
23.10	Notices and Communications .....	220
23.11	Severability.....	221
23.12	Construction and Interpretation of Agreement.....	222
23.13	Further Assurances .....	223
23.14	Entire Agreement.....	223
23.15	Counterparts.....	223

**LIST OF EXHIBITS**

Exhibit 1	Abbreviations and Definitions
Exhibit 2	Project Management Plan
Exhibit 3	Implementation Proposal
3A	Financial Proposal
3B	Technical Proposal Elements
Exhibit 4	Payment Mechanism
4A	Milestone Payment Mechanism
4B	Availability Payment Mechanism
Exhibit 5	Finance Documents
5A	List of Initial Financing Documents

5B	Form of Direct Agreement
5C	Calculation of Refinancing Gain
5D	Form of Opinion from City's Legal Counsel
5E	Form of Opinion from Principal Project Company's Legal Counsel
5F	Base Capital MaxAP Adjustment for Base Interest Rate Fluctuation and Credit Spread Risk Mitigation
5G	Financing Document Terms
Exhibit 6	Forms of Payment, Performance and Warranty Security
6A	Financial Close Security
6B	Form of D&C Payment Bond
6C	Form of D&C Performance Bond
6D	Form of Multiple Obligee Rider for D&C Payment Bond
6E	Form of Multiple Obligee Rider for D&C Performance Bond
6F	Form of SFMTA O&M Facilities Warranty Bond
Exhibit 7	Insurance Requirements
Exhibit 8	Form of Interface Agreement <b><i>[TO FOLLOW FROM PNC ONCE FINALIZED]</i></b>
Exhibit 9	Change Procedures
Exhibit 10	Initial Designation of Authorized Representatives
Exhibit 11	Submittals Review Process
Exhibit 12	Energy Management
Exhibit 13	Costs Schedule
Exhibit 14	Key Contract Provisions
Exhibit 15	Conditions Precedent
15A	Conditions to NTP 1 – Commencement of Non-Construction Work
15B	Conditions to NTP 2 – Commencement of Construction Work
15C	Conditions to Substantial Completion

15D	Conditions to Final Acceptance
Exhibit 16	Federal, State and City Requirements
16A	Federal Requirements
16B	State Requirements
16C	City Requirements
16D	SFMTA's Surveillance Technology Policy
Exhibit 17	Section 3.6 Invoice
Exhibit 18	Technical Requirements
Exhibit 19	Initial Schedule
Exhibit 20	List of Key Personnel

---

**INFRASTRUCTURE FACILITY DESIGN-BUILD-FINANCE-OPERATE-MAINTAIN  
AGREEMENT**

**POTRERO YARD MODERNIZATION PROJECT**

This Design-Build-Finance-Operate-Maintain Agreement (this “**Agreement**”) is made and entered into this [\_\_] day of [\_\_\_\_\_], 2025 (the “**Effective Date**”), by and between the City and County of San Francisco (“**City**”), a municipal corporation acting in its proprietary capacity by and through the San Francisco Municipal Transportation Agency (“**SFMTA**”), and [\_\_\_\_\_] (“**Principal Project Company**” or “**PPC**”), a [\_\_\_\_\_], with reference to the following facts:

A. City, under the jurisdiction of the SFMTA, owns the real property commonly known as 2500 Mariposa Street in San Francisco, California, which is a 4.4-acre site comprised of Assessor’s Block No. 3971-001, bounded by Bryant Streets, 17<sup>th</sup> Street, Hampshire Street, and Mariposa Street (“**Project Site**”).

B. The Facility to be constructed at the Project Site is comprised of (i) a transit operations component (“**Bus Yard Component**”), (ii) a Joint Development Alternative; and (iii), and the common infrastructure shared by the two components (“**Common Infrastructure**”).

C. This Agreement addresses the design, construction, financing, operations and maintenance of the Bus Yard Component and Common Infrastructure (collectively, the “**Infrastructure Facility**”), and the integration of the Infrastructure Facility, and its interface with, a future Joint Development Alternative (together, the “**Project**”). If implemented, (i) one or more Housing and Commercial Components will be delivered by a JDA Project Company, under one or more separate agreements; and (ii) the Paratransit Facility will be delivered by Principal Project Company pursuant to a Change Order or by Principal Project Company or another entity under a separate agreement. The Infrastructure Facility and the Joint Development Alternative are, collectively, the “**facility**”.

D. On March 16, 2021, the Board of Supervisors of the City and County of San Francisco (“**Board of Supervisors**”) adopted Ordinance No. 38-21 (“**Ordinance**”), which codifies SFMTA’s authority to procure the Facility under a joint development approach.

E. On April 9, 2021, City issued a request for proposals to design, build, finance, and maintain the Infrastructure Facility and design, build, finance, operate and maintain the Housing and Commercial Component at the Project Site (“**RFP**”), and on September 12, 2022, City determined that the proposal submitted by Potrero Neighborhood Collective LLC (“**PNC**”) offered the best value to City for the development of the Facility.

F. On November 2, 2022, City and PNC, a limited liability company organized under the laws of the State of Delaware, entered into a Predevelopment Agreement for the Potrero Yard Modernization Project (as amended, the “**Predevelopment Agreement**”).

G. City and PNC agreed upon the terms provided in this Agreement for the development of the Infrastructure Facility pursuant to the processes described in the Predevelopment Agreement. On [\_\_\_\_\_], 2025, PNC formed the Principal Project

Company as a special purpose entity to enter into this Agreement. Principal Project Company is ***[insert ownership structure – wholly owned by Equity Members of PNC?]***.

H. The SFMTA Board of Directors and the Board of Supervisors of the City have authorized the Work for the Project, as specified in the Contract Documents.

NOW, THEREFORE, for good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, the Parties agree as follows:

**ARTICLE 1. DEFINITIONS; CONTRACT DOCUMENTS;  
ORDER OF PRECEDENCE; OTHER DOCUMENTS**

**1.1 Definitions and Interpretation**

**1.1.1** Definitions for certain acronyms, abbreviations and terms used in this Agreement and the other Contract Documents are contained in Exhibit 1 (Abbreviations and Definitions).

**1.1.2** Unless the context otherwise requires, in this Agreement:

- (a) The words “including”, “includes” and “include” will be read as if followed by the words “without limitation”;
- (b) The meaning of “or” will be that of the inclusive “or”, that is meaning one, some or all of a number of possibilities;
- (c) A reference to any Party or Person includes each of their legal representatives, trustees, executors, administrators, successors, and permitted substitutes and assigns, including any Person taking part by way of novation;
- (d) References to days are references to calendar days, provided that if the date to perform any act or provide any Notice falls on a non-Business Day, such act or Notice may be timely performed on the next Business Day. Notwithstanding the foregoing, requirements contained in this Agreement relating to actions to be taken in the event of an emergency and other requirements for which it is clear that performance is intended to occur on a non-Business Day, shall be required to be performed as specified, even though the date in question may fall on a non-Business Day;
- (e) A reference to any Governmental Entity, institute, association or body is:
  - (i) if that Governmental Entity, institute, association or body is reconstituted, renamed or replaced or if the powers or functions of that Governmental Entity, institute, association or body are transferred to another organization, a reference to the reconstituted, renamed or replaced organization or the organization to which the powers or functions are transferred, as applicable; and
  - (ii) if that Governmental Entity, institute, association or body ceases to exist, a reference to the organization which serves substantially the same purposes or objectives as that Governmental Entity, institute, association or body;
- (f) A reference to this Agreement or to any other deed, agreement, document, or instrument includes a reference to this Agreement or such other deed, agreement, document or instrument as amended, revised, supplemented or otherwise modified from time to time;

- (g) A reference to any legislation or to any section or provision of it includes any amendment to or re-enactment of, or any statutory provision substituted for that legislation, section or provision;
- (h) Words in the singular include the plural (and vice versa) and words denoting any gender include all genders;
- (i) Headings are for convenience only and do not affect the interpretation of this Agreement;
- (j) The captions of the articles, sections and subsections in the Contract Documents are for convenience only and are not to be treated or construed as part of this Agreement;
- (k) Where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;
- (l) All monetary amounts and obligations in the Contract Documents are expressed and payable in U.S. dollars;
- (m) Each party must perform its obligations in accordance with this Agreement at its own cost, unless expressly provided otherwise;
- (n) If this Agreement requires calculation of an amount payable to a party there must be no double counting in calculating that amount;
- (o) A reference to time is a reference to Pacific Time Zone in the United States;
- (p) In the event of an ambiguity in or dispute regarding the interpretation of this Agreement, this Agreement shall not be interpreted or construed against the Person who prepared this Agreement, and, instead, other rules of interpretation and construction shall be used;
- (q) The Parties acknowledge and agree that: (a) the Contract Documents are the product of an extensive and thorough, arm's-length exchange of ideas, questions, answers, information and drafts during the PDA Term; (b) each Party has been given the opportunity to independently review the Contract Documents with legal counsel; and (c) each Party has the requisite experience and sophistication to negotiate, understand, interpret and agree to the particular language of the provisions of the Contract Documents. Accordingly, in the event of a conflict, ambiguity or inconsistency in or Contract Dispute regarding the interpretation of the Contract Documents, the Contract Documents shall not be interpreted or construed against the Party preparing it, and instead the Contract Dispute resolver shall consult other customary rules of interpretation and construction;
- (r) Unless otherwise expressly stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meaning;

- (s) A reference to a Section or Article is a reference to the section or article in the document or Exhibit where that Section or Article appears.

## **1.2 Contract Documents; Rules to Reconcile Conflicting Provisions**

**1.2.1** The term “Contract Documents” shall mean this Agreement and all its exhibits, including the Technical Requirements, as listed in Section 1.2.2. Each of the Contract Documents is an essential part of the agreement between the Parties. The Contract Documents are intended to be complementary and to be read together as a complete agreement.

**1.2.2** Unless the context otherwise requires and except as provided otherwise in Sections 1.2.3 and 1.2.4, in the event of any conflict, ambiguity or inconsistency between any terms or provisions within the Contract Documents, the order of precedence, from highest to lowest, shall be as follows:

- (a) For Design Work and other non-Construction Work:
  - (i) Change Orders and Unilateral Change Orders directing Principal Project Company to implement a City Change in accordance with this Agreement and amendments to this Agreement;
  - (ii) Article 1 (Definitions; Contract Documents; Order of Precedence; Other Documents) through Article 23 (Miscellaneous) and Exhibit 1 (Abbreviations and Definitions);
  - (iii) the Exhibits to this Agreement (excluding Exhibit 1 (Abbreviations and Definitions and Exhibit 18 (Technical Requirements));
  - (iv) Exhibit 18 (Technical Requirements);
  - (v) Principal Project Company’s Implementation Proposal identified in Exhibit 3 (Implementation Proposal); provided that if City determines, in its sole discretion, that the Implementation Proposal contains a provision that is more beneficial to City than is specified elsewhere in the Contract Documents, then that provision shall take precedence; and
  - (vi) Project Management Plan.
- (b) Without limiting Section 1.2.2(a), for Construction Work, the same order of precedence shall apply as for non-Construction Work in subsection (a), except that the Final Design Documents shall also be considered part of this Agreement and shall be included as Section 1.2.2(a)(vii) in the order of precedence subject to the following:
  - (i) Specifications have precedence over plans; and
  - (ii) Any other Deviations contained in the Final Design Documents take priority over conflicting requirements of other parts of this Agreement

but only to the extent that Principal Project Company specifically identifies the conflicts to City and City approves such Deviations by Notice to Principal Project Company.

**1.2.3** In the event of any conflict, ambiguity or inconsistency within the Contract Documents, the following rules of interpretation shall apply:

**1.2.3.1** If the Contract Documents contain differing provisions on the same subject matter and within the same order of precedence pursuant to Section 1.2.2, the provisions that provide greater detail or establish a higher quality, manner or method of performing the Work or use more stringent standards shall prevail.

**1.2.3.2** Additional details in a lower priority Contract Document shall be given effect except to the extent they irreconcilably conflict with requirements, provisions and practices contained in the higher priority Contract Document.

**1.2.3.3** If the Contract Documents contain differing provisions on the same subject matter that cannot be reconciled by applying the rules in Section 1.2.3.1 or 1.2.3.2, then the provisions contained in the document of higher order of precedence shall prevail over the provisions contained in the document of lower order of precedence, unless City, in its good faith discretion, approves or directs otherwise in writing.

**1.2.3.4** In the event of an irreconcilable conflict between specific provisions of the Contract Documents and any standards, criteria, requirements, conditions, procedures, specifications or other provisions applicable to the Project established by reference to a manual or publication within a lower priority Contract Document, the specific provision of the higher priority Contract Document shall prevail over said standards or other provisions established by reference, to the extent of the irreconcilable conflict, unless City, in its good faith discretion, approves or directs otherwise in writing.

**1.2.3.5** In the event of a conflict among any standards, criteria, requirements, conditions, procedures, specifications or other provisions applicable to the Project, established by reference to a manual or publication within a Contract Document or set of Contract Documents with the same order of priority, the standard, criterion, requirement, condition, procedure, specification or other provision offering the higher quality, manner or method or performing will apply unless City, in its good faith discretion, approves or directs otherwise in writing.

**1.2.3.6** In the event of a conflict among the standards, criteria, requirements, conditions, procedures, specifications or other provisions of the Technical Requirements and those established by reference to a manual or publication, the Technical Requirements shall prevail.

**1.2.3.7** In all other respects, in the event of a conflict, ambiguity or inconsistency within the Contract Documents, general rules concerning construction of contracts in the State shall be applicable.

**1.2.4** This Section 1.2 (Contract Documents; Rules to Reconcile Conflicting Provisions) shall not apply to provisions in the Technical Requirements that are erroneous, create a potentially Unsafe Condition, or may be inconsistent with Good Industry Practice or applicable Law. Instead, such provisions shall be reconciled under Section 7.2.3.

**1.2.5** Principal Project Company acknowledges and agrees that it had the opportunity and obligation to review the terms and conditions of this Agreement and to bring to the attention of City any conflicts, ambiguities or inconsistencies of which it is aware contained within this Agreement.

**1.2.6** Incorporation into this Agreement of any part of the Implementation Proposal shall not (a) limit, modify, or alter City's right to review and approve any Submittal included in the Implementation Proposal, or submitted to City after the Implementation Proposal (including any Project Schedule), or (b) be deemed as acceptance or approval of any part of the Implementation Proposal by City that conflicts with this Agreement or the Technical Requirements.

**1.2.7** If Principal Project Company becomes aware of any error or any conflict, ambiguity or inconsistency between or among the documents forming this Agreement, Principal Project Company shall promptly provide Notice to City, including the item Principal Project Company considers should apply based on the applicable rules in Section 1.1.2(p). Except as expressly stated in this Agreement, if (a) the conflict, ambiguity, inconsistency or error cannot be reconciled by applying the applicable rules or (b) the Parties disagree about (i) which rule applies and/or (ii) the results of the application of such applicable rule(s), then City will determine, in its reasonable discretion, which of the conflicting items is to apply and provide Notice to Principal Project Company before Principal Project Company proceeds with the applicable aspect of the Work.

### **1.3 Conflicts, Ambiguities or Inconsistency in Principal Project Company's Management Plans**

In the event of any conflict between or among the Principal Project Company's Project Management Plan and any of the Contract Documents, or if any provisions in Principal Project Company's Project Management Plan are in conflict, ambiguous or inconsistent, Principal Project Company shall modify the Project Management Plan, as applicable, to be consistent with the Contract Documents or cure the ambiguity or inconsistency in a manner satisfactory to City.

### **1.4 Reference Documents**

**1.4.1** City has provided the Reference Documents to Principal Project Company for the purposes of disclosure and, in the case of general industry and general governmental manuals and publications, for guidance regarding Good Industry Practice. Reference Documents are for information only, and are not mandatory or binding on Principal Project Company, except to the extent that the Contract Documents incorporate specific provisions of the Reference Documents by reference.

**1.4.2** Principal Project Company acknowledges and agrees that City does not give any warranty, representation or undertaking in respect of the Reference Documents including that the Reference Documents:

- (a) Are complete, accurate or fit for purpose;

- (b) Are in conformity with the requirements of the Contract Documents, Regulatory Approvals or Laws; or
- (c) Represent all of the information in City's possession or power relevant or material in connection with the Project; provided, however, that City represents and warrants that it has not affirmatively and intentionally provided a Reference Document that is knowingly (based solely on City's Actual Knowledge) and materially false with the intent to mislead Principal Project Company.

**1.4.3** Principal Project Company acknowledges and agrees that, except as provided in this Agreement:

- (a) It has, before Commercial Close, conducted its own analysis and review of the Reference Documents upon which it places reliance;
- (b) Any use or reliance on such Reference Documents by Principal Project Company shall be solely at its own risk;
- (c) Except to the extent that the Contract Documents incorporate specific provisions of the Reference Documents by reference, no PPC-Related Entity is entitled to make any Claim, cause of action or Loss against City in connection with the Reference Documents, including on the grounds:
  - (i) of any misunderstanding or misapprehension in respect of the Reference Documents;
  - (ii) of any conclusions any PPC-Related Entity may draw from or any action or forbearance in reliance on the Reference Documents;
  - (iii) of any failure to disclose or make available to any PPC-Related Entity any information, documents or data or to review or update the Reference Documents; or
  - (iv) that the Reference Documents were inaccurate, incomplete, or not fit for purpose; and
- (d) The Reference Documents may include interpretations, extrapolations, analyses, and recommendations about data, design solutions, technical issues and solutions, construction and installation means and methods, and maintenance means and methods. Such interpretations, extrapolations, analyses, and recommendations are (i) preliminary in nature and, in many cases, obsolete, (ii) not intended to express the views or preferences of City, or represent any statement of approval or acceptance thereof by City, and (iii) not intended to form the basis of Principal Project Company's design solutions, technical solutions, construction or maintenance means and methods.

---

## ARTICLE 2. NATURE OF AGREEMENT; TERM

### 2.1 Nature of Agreement; PDA Status Under This Agreement

2.1.1 City hereby grants to Principal Project Company the exclusive right, and Principal Project Company accepts the obligation and agrees, during the Term, to:

- (a) design, build, and finance the Infrastructure Facility, and operate and maintain certain elements of it; perform Renewal Work, and perform and undertake handback of the Infrastructure Facility at the end of the IFM Period; and
- (b) perform all other activities relating to the Infrastructure Facility not specifically retained by City for the Infrastructure Facility as specified in this Agreement.

2.1.2 Principal Project Company acknowledges and agrees that the Predevelopment Agreement does not apply to this Agreement or the Parties' obligations hereunder, and that any deliverables provided by Lead Developer to City pursuant to the Predevelopment Agreement, or approvals obtained from City pursuant to the Predevelopment Agreement, do not apply to this Agreement unless any such deliverable, or approved plan or submittal, is expressly incorporated into this Agreement. The foregoing shall not apply to any obligations of the Parties under the Predevelopment Agreement that survive the completion or termination thereof, as more particularly set forth in the Predevelopment Agreement.

### 2.2 Right of Entry; Condition of Site

2.2.1 Subject to Section 7.5 (Acquisition of Real Property), PPC-Related Entities shall have the right to enter onto the Project Site from and after the Financial Close Date (the "**Access Date**") and throughout the remainder of the Term to carry out Principal Project Company's obligations under this Agreement; provided, however, that construction Work may not be mobilized or undertaken until the later of (i) 90 days after the Access Date; or (ii) the date on which Principal Project Company has completed the City Relocation Scope. After the Termination Date, PPC-Related Entities may enter onto the Project Site to perform post-termination obligations either based on the right of entry granted in Section 17.6.3 (Relinquishment and Possession of Project) or under a separate right of entry provided by City in writing. Without otherwise limiting the rights of the Principal Project Company to relief under this Agreement, Principal Project Company shall comply with, and shall ensure that PPC-Related Entities comply with, all agreements, easements, rights of entry, covenants, conditions, restrictions and other instruments applicable to the Project Site.

2.2.2 Within 90 days after the Financial Close Date, City shall ensure that the Project Site is in the City Ready for Move Condition. The Principal Project Company is responsible for notifying all Utility Owners and City in advance to turn off the Utilities and to obtain all required approvals prior to demolition. Additionally, if any power, water, and or other Utilities need to be maintained during demolition, such lines should be temporarily relocated as necessary and or protected by Principal Project Company. Should any furniture or portable equipment remain at the Project Site after City vacates the Project Site and after Principal Project Company fully performs the City Relocation Scope, those items shall be removed and/or disposed of by Principal Project Company. Removal of any Hazardous Materials, Utility infrastructure, walls, fixtures, flooring, paint, tanks, and or any other building features that currently exist and, upon

vacation by the City of the Project Site, will not be removed by City, are deemed released to Principal Project Company and are the responsibility for Principal Project Company in connection with demolition.

## **2.3 Term**

This Agreement shall take effect on the Effective Date and shall remain in effect until 30 years after the Substantial Completion Deadline, subject to the right of the Parties to terminate this Agreement earlier in accordance with the terms of this Agreement.

## **2.4 Title**

### **2.4.1 General**

The Parties acknowledge and agree that:

- (a) Principal Project Company is not the legal or equitable owner or lessee of the Project Site or the Infrastructure Facility improvements for any purpose;
- (b) Principal Project Company's rights under this Agreement are derived solely from its status as an independent contractor under this Agreement, and not as tenant, lessee, easement holder, optionee, lienor, mortgagee, purchaser or owner of any other interest in real property; and
- (c) The payments to be received by Principal Project Company under this Agreement are for services to be performed by Principal Project Company, and are not payments in the nature of rent, fees with respect to real property, or purchase price of real property.

### **2.4.2 Possessory Interest Tax**

**2.4.2.1** City hereby informs Principal Project Company, in accordance with California Revenue and Taxation Code section 107.6, that, notwithstanding Section 2.4.1 (General), (i) this Agreement may create one or more possessory interests, (ii) any possessory interest created by this Agreement may be subject to property taxation, and (iii) Principal Project Company may be subject to payment of property taxes levied on such possessory interest. Accordingly, Principal Project Company shall comply with the reporting requirements of San Francisco Administrative Code sections 23.38 and 23.39, and report (on behalf of the City) to the County Assessor the information required by California Revenue and Taxation Code section 480.5, and timely provide any information that City may request to ensure compliance with such requirements.

**2.4.2.2** If it is determined that a possessory interest is created by this Agreement and the County Assessor seeks to levy an assessment or tax on such possessory interest, then:

- (a) Principal Project Company shall (i) provide Notice to City not later than 3 Business Days after it becomes aware of the assessment or tax bill, and (ii) deliver copies of all documentation relating thereto no later than 3 Business Days following receipt;

- (b) Principal Project Company shall cooperate and consult regularly with City, and follow City's reasonable directions, concerning tax protest, litigation strategy, refund claims and appeals process in any such circumstance. At City's request or in absence of a direction from the City sent to Principal Project Company no later than 10 days prior to any filing deadline, Principal Project Company shall timely (i) contest the assessment, and (ii) file refund claims.;
- (c) If the Board of Supervisor has specifically authorized and approved, by resolution, the City's assumption of the payment, in whole, of such possessory interest taxes under this Agreement, the City will make a payment of the tax liability on behalf of the Principal Project Company (including any penalties for late payment or nonpayment and interest imposed, to the extent such penalties or interest resulted from Principal Project Company's failure to comply or timely comply with Section 2.4.2.2(a) or (b)). To the extent that penalties and interest have been imposed as a result of Principal Project Company's failure to comply or timely comply with Section 2.4.2.2(a) or (b), Principal Project Company will reimburse City for any such payment of penalties and interest, including Recoverable Costs. If Principal Project Company receives any refund of the tax (including a refund of any penalties and interest) pursuant to a claim for refund or other appeal, Principal Project Company shall pay to City an amount equal to such refund within 15 days of receipt (but only to the extent of payments previously made by City pursuant to this Section 2.4.2.2(c));
- (d) Principal Project Company shall submit to City an invoice (in a format acceptable to City) on a monthly basis in arrears for all actual and reasonable costs and expenses incurred by Principal Project Company in opposing the imposition of any such possessory interest tax, together with detailed, supporting documentation evidencing same. If Principal Project Company is awarded attorneys' fees in connection with any related appeal or litigation, such costs will not also be reimbursed by the City to Principal Project Company. Within 30 Business Days of receipt of such invoice and supporting documentation, subject to Section 11.5 (Disputed Amounts), City will reimburse Principal Project Company for such invoiced amount; and
- (e) City reserves the right to direct Principal Project Company to assign to the City any appeals rights available under applicable Law in order for City to directly assume the property tax appeal or litigation. Any such assignment shall be effected through an agent's authorization or similar document acceptable to both Principal Project Company and the City.

Nothing in the foregoing constitutes a notification to Principal Project Company of whether a potential possessory interest could be created under any HCC Agreement, the Housing and Commercial Component, any Housing and Commercial Component share of the Common Infrastructure, or any interest that Principal Project Company may acquire under Section 7.5.2 (Temporary Interests in Property).

### **2.4.3 Passage of Title**

Title to all materials, equipment, tools and supplies furnished under the Contract Documents for incorporation into the Project or that are required for operation or maintenance of the Project shall pass to City, free and clear of all liens or other charges of any kind or nature, upon incorporation into the Project or, for items that will not be incorporated into the Project, upon delivery to the Project Site.

### **2.4.4 Intellectual Property**

Except for PPC Intellectual Property and Third Party IP, title to any Intellectual Property to the extent made, conceived, prepared or reduced to practice as part of the Work, incorporated into the Project, including any improvements, modifications, enhancements or derivative works to or of the City IP shall vest in City at the earliest of creation, conception, preparation or reduction to practice.

### **2.4.5 Documents of Title**

Principal Project Company shall furnish or execute all necessary documents of title within 90 days of receiving a written request from City.

### **2.4.6 Care, Custody and Control Responsibilities**

Passage of title to City shall not affect Principal Project Company's care, custody and control responsibilities. Principal Project Company shall be responsible for care, custody and control of all components of the Project, including all materials, equipment, tools and supplies described in Section 2.4.3 (Passage of Title), until the Termination Date, except Principal Project Company shall be responsible for care, custody and control of (i) all elements of the Project that will be owned by Utility Owners or Authorities Having Jurisdiction until acceptance of such elements by the relevant Third Party; and (ii) the SFMTA O&M Facilities until the Substantial Completion Date.

## **2.5 Limitation on Principal Project Company's Rights**

Notwithstanding anything to the contrary in the Contract Documents, Principal Project Company has no power or authority to make any commitments on City's behalf or to execute agreements in the name of or on behalf of City. Principal Project Company shall not enter into any agreement with any Governmental Entity, Utility Owner, property owner or other Third Party having regulatory jurisdiction over any aspect of the Project or Work or having any property interest affected by the Project or the Work that in any way purports to obligate City, or states or implies that City has an obligation to carry out any installation, design, construction, maintenance, repair, operation, control, supervision, regulation or other activity during or after the end of the Term, unless City otherwise approves.

---

## ARTICLE 3. FINANCIAL CLOSE

### 3.1 Requirements for Financial Close

#### 3.1.1 Obligation to Achieve Financial Close

Subject to the Parties' respective rights to terminate this Agreement before Financial Close pursuant to Sections 3.6 (No-Fault Termination) and 3.7 (Principal Project Company's Failure to Achieve Financial Close), Principal Project Company shall achieve Financial Close by no later than the Financial Close Deadline.

#### 3.1.2 Date of Financial Close

Subject to Section 3.4.2(a), Principal Project Company shall determine the date of Financial Close (the "**Scheduled Financial Close Date**"), which shall be subject to a minimum 60 calendar days' prior Notice to City and no later than the Financial Close Deadline. After such determination, Principal Project Company shall have the right to modify the Scheduled Financial Close Date, provided that (i) Principal Project Company must provide City with prompt Notice of any such change; (ii) Principal Project Company shall not modify the Scheduled Financial Close Date within 14 days of such date without City's approval, in its reasonable discretion; (iii) the new date for the Scheduled Financial Close Date shall not be sooner than 10 days after delivery of Notice to City; and (iv) the modified Scheduled Financial Close Date shall be no later than the Financial Close Deadline.

### 3.2 Financial Close Requirements and Deliverables

#### 3.2.1 Delivery of Financing Agreements and Other Documents

**3.2.1.1** Not later than 30 days before the Scheduled Financial Close Date (or Delayed Financial Close Date, as applicable), Principal Project Company shall deliver to City, for City's review and comment, near final drafts of the Initial Financing Documents, Direct Agreement, Equity Members Funding Agreements, D&C Contract and IFM Contract. Such drafts shall be sufficiently advanced such that all material terms are incorporated into the applicable Principal Project Document or Financing Document. Principal Project Company shall also deliver to City, for City's review and comment, a list of other Key Contracts, and a draft of the model audit report related to the proposed Financial Model Update in accordance with Section 4.7.4 (Financial Model Audits). City will review the list of other Key Contracts and may request, and Principal Project Company shall promptly provide to City, substantially final drafts of the Key Contracts. In the event any material term included in the drafts of the Principal Project Documents or Financing Documents provided to City under this Section 3.2.1.1 is amended prior to Financial Close, Principal Project Company shall deliver to City, for City's review, comment and approval, a copy of such proposed amendment(s), such submittal to be no later than 10 days before the Scheduled Financial Close Date. For purposes of this Section 3.2.1.1, a material amendment shall include the following: (i) a change that differs materially from any commitments or provisions set forth in the Finance Plan; (ii) a change which would alter the risk allocations in this Agreement or any Key Contract; (iii) a change which could increase the liability of City for termination compensation in the event of a termination; (iv) a change that would modify the gearing of the financing; (v) a change that would result in an Affordability Event; (vi) a change that would cause a Delayed Financial Close Date; (vii) a change in any of

---

the Security Documents; (viii) a change in the funding sources of Common Infrastructure; and/or (ix) a change under any of the conditions precedent to Financial Close under the Financing Documents.

**3.2.1.2** City will provide its comments on any initial submission of these documents no later than 10 Business Days after their submission and on any amendments to such documents no later than 5 Business Days after their submission, with such comments, in each case, being limited to addressing (i) changes in these documents from those approved by City during the PDA Term; (ii) changes in this Agreement or the commercial or legal structure of the Project; (iii) changes arising out of changed circumstances, new events or occurrences or additional information after the date of approval by City during the PDA Term; (iv) clarifications, errors, ambiguities or conflicts in such documents; (v) the relationship and interface of the Infrastructure Facility and the Joint Development Alternative; (vi) the impacts and implications of any decision by Principal Project Company to bifurcate the Financial Close for the Infrastructure Facility and the Joint Development Alternative; (vii) changes in applicable Law or Standards and Specifications; (viii) any change to a material term, as set forth in Section 3.2.1.1); and (ix) inconsistencies between such documents and the terms of this Agreement (including the risk allocations).

### **3.2.2 City Deliverables**

To support the Principal Project Company's achievement of Financial Close, City shall:

- (a) on or before 30 days before the Scheduled Financial Close Date and in connection with the issuance of any bonds:
  - (i) provide and authorize Principal Project Company to include, in the preliminary and final official statement for such bonds or any other capital markets issuance with respect to the Project, SFMTA's most recent audited financial statements together with economic information with respect to SFMTA, and provide such documents and information as required to comply with disclosure requirements under applicable Laws, provided that Principal Project Company has provided City with a list of required documents and information at least 15 Business Days before such documents and information are required;
  - (ii) agree to customary continuing disclosure as reasonably acceptable to City and the underwriter of any Project Debt; and
  - (iii) provide customary certificates as reasonably requested by Principal Project Company and as reasonably acceptable to City;
- (b) on or before three Business Days prior to the Scheduled Financial Close Date, deliver each of the following items to Principal Project Company subject to customary escrow terms and to City's approval to release from escrow:
  - (i) an executed legal opinion of the City's Attorney's Office substantially in the form attached hereto as Exhibit 5D (Form of Opinion from City's Legal Counsel);

- (ii) an executed certificate updating, as of the date of Financial Close, City's representations and warranties set forth in Section 19.2 (City Representations and Warranties); and
- (iii) a counterpart signature page for the Direct Agreement executed on behalf of City;
- (c) take any reasonably required authorizing actions in a reasonably timely manner; and
- (d) provide customary documents, certificates or undertakings (or, as applicable, a copy of the same certified by City as true, complete and accurate) that Principal Project Company may reasonably request from City as necessary to comply with (i) disclosure requirements under applicable Laws, or (ii) customary underwriter requirements, in each case in connection with issuance of bonds or any other capital markets issuance; provided, however, that none of the documents supplied in accordance with this Section 3.2.2(d) shall be construed as providing a legal opinion binding on City.

### **3.2.3 Base Interest Rate Fluctuation and Credit Spread Risk Mitigation**

**3.2.3.1** If Principal Project Company has complied with the submittal requirements under Section ● (Selection of Base Interest Rate(s)) of the Finance Plan], City will adjust the Base Capital MaxAP to offset 100% of the impact of fluctuations (increases and decreases) in the Base Interest Rates used in the Finance Plan that have occurred during the Bank Debt Rate Protection Period and/or the Bond Rate Protection Period, as applicable.

**3.2.3.2** If Principal Project Company has complied with the submittal requirements under Section ● (Credit Spread Risk Mitigation) of the Finance Plan], City will adjust the Base Capital MaxAP to offset a portion of the impact of fluctuations (increases and decreases) in the credit spreads for any Bond Financing proposed in the Finance Plan that have occurred during the Bond Rate Protection Period. Subject to the limitations described in Section ● of the Finance Plan and set forth in Exhibit 5F (Base Capital MaxAP Adjustment for Base Interest Rate Fluctuation and Credit Spread Risk Mitigation)], the credit spread risk sharing between City and Principal Project Company will be implemented on an 50:50 basis, with City assuming 50% of the credit spread fluctuation risk (relative to the Baseline Credit Spreads) and Principal Project Company assuming 50% (the "**Credit Spread Risk Mitigation**"). City will not provide Credit Spread Risk Mitigation with respect to Private Placements (except offerings under Rule 144A and Regulation S of the Securities Act of 1933), Bank Debt or any other debt facilities for which committed credit spreads or margins are available. City shall not accept increases in credit spreads in respect of bonds which are part of Principal Project Company's financing resulting from the final credit rating of such bonds being lower than the indicative investment grade rating(s) of such bonds provided in the Finance Plan.

**3.2.3.3** Adjustments to the Base Capital MaxAP and Original Equity IRR related to Base Interest Rates fluctuations and Credit Spread Risk Mitigation, as applicable, shall be implemented in accordance with Exhibit 5F (Base Capital MaxAP Adjustment for Base Interest Rate Fluctuation and Credit Spread Risk Mitigation).

---

### 3.2.4 Conditions Precedent to Financial Close

**3.2.4.1** Financial Close will occur upon Principal Project Company's satisfaction of each of the following conditions:

- (a) Principal Project Company has delivered to City, in form and substance similar to the drafts submitted to City pursuant to Section 3.2.1.1 and including any changes made pursuant to City's comments under Section 3.2.1.2, fully executed versions of:
  - (i) Initial Financing Documents;
  - (ii) Direct Agreement(s);
  - (iii) Equity Members Funding Agreements; and
  - (iv) Key Contracts, together with an updated list of Key Contracts;
- (b) Principal Project Company has delivered a certification signed by its chief financial officer or equivalent officer, certifying to the following:
  - (i) Principal Project Company has satisfied (or upon Financial Close, will satisfy) all conditions precedent to the effectiveness of commitments of the Lenders under the Initial Financing Documents or such conditions have been waived if not satisfied, as applicable;
  - (ii) each of the documents delivered by Principal Project Company to City pursuant to Section 3.2.4.1(a) is a true, complete and accurate copy of the original;
  - (iii) all representations and warranties of Principal Project Company under the Contract Documents remain true as of the Financial Close Date, except for any representation or warranty made as of a specified date, in which case such representation or warranty shall be true as of the specified date and Principal Project Company shall provide Notice to City if any such representation is not true and correct as of the Financial Close Date; and
  - (iv) Principal Project Company has performed and complied with all covenants and obligations of Principal Project Company under the Contract Documents to have been performed or complied with as of the Financial Close Date;
- (c) Principal Project Company has delivered to City, on or before one Business Day prior to the date of Financial Close, an interim Financial Model Update consistent with Section 4.7 (Financial Model and Financial Model Updates) that incorporates any proposed amendments to the Base Case Financial Model agreed to by the Parties on or before such date, including those agreed to pursuant to any preliminary calculations under Section 3.2.3 (Base Interest

Rate Fluctuation and Credit Spread Risk Mitigation), together with the related Financial Modeling Data;

- (d) Principal Project Company has delivered to City (i) one or more legal opinion(s) of Principal Project Company's in-house or external counsel substantially in the form attached hereto as Exhibit 5E (Form of Opinion from Principal Project Company's Legal Counsel) and with customary qualifications and assumptions reasonably acceptable to City;
- (e) A Financial Model in accordance with Section 4.7 (Financial Model and Financial Model Updates) which reflects, to City's reasonable satisfaction, evidence of a Construction Equity Ratio greater than or equal to 5%;
- (f) Certificate from an insurer that meets the requirements in Section 10.1.2.1 (Insurers), certifying that all Insurance Policies required to be effected and maintained in accordance with this Agreement in connection with the Work to be performed during the D&C Period (whether City is required to be an insured or not) are in force and effect (or will be in full force and effect following receipt of the insurance premium payable from the proceeds of Financial Close), and such evidence as is necessary to demonstrate the compliance of each such policy with the requirements of this Agreement;
- (g) Evidence that all Deferred Equity Amounts are secured by an Equity Letter of Credit (which may be annually renewable) in accordance with the approved equity contribution agreement guaranteeing the provision of the committed amount by a date which is not later than the Final Acceptance Date, and that Equity Letter of Credit has been issued and is in full force and effect; and
- (h) Each Payment Bond and Performance Bond required under Section 10.2 (Performance Security) has been obtained, meets the requirements of Section 10.2 (Performance Security) and is in full force and effect, and Principal Project Company has delivered to City originals or copies, as required, of each Payment Bond and Performance Bond.

### **3.2.5 Waiver of Conditions Precedent to Financial Close**

**3.2.5.1** A condition precedent is only waived if the Party for whom the benefit of the condition precedent is provided gives Notice to the other Party of the waiver prior to the Financial Close Deadline.

**3.2.5.2** When all of the Principal Project Company conditions precedent to Financial Close have been satisfied by Principal Project Company or waived by City, City shall provide Notice to Principal Project Company confirming that all of the Principal Project Company conditions precedent have been satisfied or waived and the date upon which the last of the conditions precedent was satisfied or waived.

**3.2.5.3** When all of the City conditions precedent to Financial Close have been satisfied by City or waived by Principal Project Company, Principal Project Company shall provide Notice to

City confirming that all of the City conditions precedent have been satisfied or waived and the date upon which the last of the City conditions precedent was satisfied or waived.

**3.2.5.4** Upon satisfaction of all conditions precedent to Financial Close, City will provide Notice to Principal Project Company confirming the date upon which Financial Close was achieved.

### **3.2.6 Mandatory Terms of Project Debt, Financing Agreements and Other Documents**

The Project Debt and Financing Documents (including the Initial Financing Documents) shall comply with the Financing Document Terms.

### **3.3 Post-Financial Close Requirements and Deliverables**

**3.3.1** Principal Project Company shall deliver to City, on or before two Business Days following Financial Close, each of the items required under Section 4.7.3 (Replacement of Financial Model) replacing the Base Case Financial Model with a Financial Model Update that reflects all changes agreed by the Parties as of the date of Financial Close, as well as:

- (a) a Financial Model Update that includes any final revisions to the interim Financial Model Update delivered under Section 3.2.4.1(c) to incorporate the Base Interest Rates and credit spreads applicable on the date of Financial Close under the Initial Financing Agreements and any other agreed upon revisions;
- (b) a model audit report related to the proposed Financial Model Update in accordance with Section 4.7.4 (Financial Model Audits); and
- (c) a form of written amendment that (i) effects the replacement of the Financial Model in effect with the proposed Financial Model Update, and (ii) addresses all other related amendments to this Agreement required as a result of the amended Financial Model, including any amendments to the definitions of Base Capital MaxAP, Base IFM MaxAP, Equity IRR and Key Ratios, as applicable.

**3.3.2** Upon the satisfaction of each of the conditions precedent to Financial Close set forth in Section 3.2.4 (Conditions Precedent to Financial Close), and the delivery and mutual approval of the Financial Model Update and documents required by Section 3.3.1, City and Principal Project Company shall enter into the amendment.

**3.3.3** At Financial Close, Principal Project Company shall pay to City the amount of **[\$●]** to reimburse City for PDA-Related Costs, including all amounts paid by City to Principal Project Company or Lead Developer pursuant to any Early Works Agreement. ***[Note: City to confirm prior to Commercial Close whether any such reimbursement will be required and, if so, the amount.]***

**3.3.4** City shall return to Principal Project Company the Financial Close Security within five Business Days after reaching Financial Close, provided that Principal Project Company has delivered the items required under this Section 3.3 (Post-Financial Close Requirements and Deliverables).

---

### 3.4 Potential Adverse Events and Mitigation

**3.4.1** The Parties acknowledge that any one or more Adverse Events may occur during the period between the Effective Date and the Scheduled Financial Close Date. If any such Adverse Event is the sole cause for Principal Project Company's failure or inability to satisfy any of its obligations under Section 3.2.4 (Conditions Precedent to Financial Close) by the Financial Close Deadline or Delayed Financial Close Date, as applicable, then Section 3.4.2 shall apply.

**3.4.2** Each Party will promptly provide Notice to the other Party if an Adverse Event has occurred ("**Adverse Event Notice**"). The Party provide an Adverse Event Notice may indicate in the notice the potential impact of the event on the schedule for Financial Close. City may elect, in its sole discretion, to consult and work with Principal Project Company to mitigate the actual or anticipated impacts of the occurrence of such event(s). City will provide Notice to Principal Project Company of City's decision to either take mitigation actions, or to not take mitigation actions, within 15 days of the Adverse Event Notice. If City elects mitigation, the Parties will negotiate in good faith to mutually agree on the actual mitigation actions to be undertaken by each Party. City anticipates that the Parties may take one or more of the following actions to mitigate the impacts and for Principal Project Company to be able to achieve Financial Close:

- (a) City may agree to delay Financial Close to a date not later than 120 days after the Scheduled Financial Close Date (the "**Delayed Financial Close Date**"), in which case, if the Delayed Financial Close Date is after the last day of the original Finance Plan Validity Period, then:
  - (i) Principal Project Company shall extend the validity of its Financial Close Security to a date no earlier than 15 days later than the Delayed Financial Close Date;
  - (ii) If the Adverse Event was an Adverse Event set forth in clauses (a)-(h) of the definition of "Adverse Event", City shall compensate Principal Project Company for the actual cost of extending the validity of its Financial Close Security to the Delayed Financial Close Date within 45 days after receiving Principal Project Company's request and supporting documentation for such payment;
  - (iii) If the Adverse Event was an Adverse Event set forth in clauses (a)-(h) of the definition of "Adverse Event", Principal Project Company shall be entitled to escalate its D&C Contract Amount to adjust for escalation of labor, materials and equipment costs, if any, based on the change in:
    - (1) the average of the BCI published each calendar month during the 12 calendar months preceding the Scheduled Financial Close Date;
    - and (2) the average of the BCI published each calendar month during the 12 calendar month period preceding the Financial Close Date; and
  - (iv) Principal Project Company shall prepare a Financial Model Update in accordance with Section 4.7.2 (Updates to the Financial Model);

- (b) City may change the amount or timing of the Milestone Payment, provided that Principal Project Company shall be entitled to recover from City the reasonably incurred costs associated with such process;
- (c) City may increase the Base Capital MaxAP and/or Base IFM MaxAP by an amount required to mitigate the relevant Adverse Event, including by an amount greater than 10% of the aggregate of the Base Capital MaxAP and Base IFM MaxAP;
- (d) Principal Project Company may:
  - (i) conduct negotiations for at least 30 days with any or all of Principal Project Company's existing Lenders to increase, renew or extend their commitments, as applicable, provided that, any material deviations from the terms and conditions of the original commitments in Principal Project Company's Financial Proposal may be accepted by Principal Project Company only with City's approval; or
  - (ii) conduct a timely, competitive process to obtain new financing commitments (a "**Project Debt Competition**") to supplement or replace any of the original financing commitments in Principal Project Company's Financial Proposal; in which case, any such negotiations or Project Debt Competition (A) shall be transparent and open to City and its advisors, and (B) shall have the key objective of obtaining debt financing for the Project at the lowest-cost commercially available (given the terms and conditions of the Contract Document) and on terms and conditions otherwise reasonably acceptable to Principal Project Company and City;
- (e) upon the occurrence of an Affordability Event, Principal Project Company may elect to assume the cost and expense of that portion of the increase in the aggregate of the Base Capital MaxAP and Base IFM MaxAP that exceeds 10%; and/or
- (f) either Party may take any other action mutually agreed upon by City and Principal Project Company.

**3.4.3** The Parties acknowledge that the objective of the mitigation actions described in Section 3.4.2, and any others mutually agreed upon by the Parties, is to create circumstances allowing Financial Close to be achieved on terms that at a minimum will allow Principal Project Company to satisfy its obligation to obtain all financing required for the Project on terms and conditions substantially similar to those in its Financial Proposal. The Parties further acknowledge that if an Adverse Event set forth in clauses (i)-(j) of the definition of "Adverse Event" occurs, the objective of the time extension and mitigation actions described in Section 3.4.2 and any others mutually agreed upon by the Parties is for Principal Project Company to have an opportunity to address the impacts of such Adverse Event with its Lenders in order for Principal Project Company to comply with its obligations to achieve Financial Close by the Delayed Financial Close Date.

### **3.5 Permitted Excuses from Achieving Financial Close**

**3.5.1** With respect to an Adverse Event set forth in clauses (a)-(h) of the definition of “Adverse Event”, Principal Project Company’s obligation to achieve Financial Close by the Financial Close Deadline shall be excused if one or more events described in Section 3.4.1 has occurred, provided that:

- (a) City notifies Principal Project Company that it will not take any action described under Section 3.4.2;
- (b) City fails to provide Notice to Principal Project Company within 15 days of receipt of the Adverse Event Notice from Principal Project Company of City’s decision to either take mitigation actions, or to not take mitigation actions;
- (c) the Parties undertake one or more actions under Section 3.4.2, but the effect of such actions does not allow Principal Project Company to satisfy its obligation to obtain all financing required for the Project on terms and conditions substantially similar to those in its Financial Proposal;
- (d) Principal Project Company has made good faith efforts to take the action described under Section 3.4.2(d) and Principal Project Company has diligently and timely conducted negotiations with existing Lenders and/or the Project Debt Competition but was unable to obtain sufficient financing to satisfy its obligations under this Agreement on terms and with conditions reasonably acceptable to the Parties; or
- (e) Principal Project Company has negotiated in good faith with City to mutually agree on mitigation actions, but the Parties fail to agree on any action under Section 3.4.2.

**3.5.2** With respect to an Adverse Event set forth in clauses (i)-(j) of the definition of “Adverse Event”, Principal Project Company’s obligation to achieve Financial Close by the Financial Close Deadline shall be excused if, following the occurrence of such Adverse Event until the Delayed Financial Close Date, a new Adverse Event set forth in clauses (a)-(h) occurs (in which case, the provisions of Section 3.5.1 shall apply to such new Adverse Event (but not with respect to the original Adverse Event set forth in clauses (i)-(j) of the definition of “Adverse Event”).

**3.5.3** With respect to an Adverse Event set forth in clauses (a)-(h) of the definition of “Adverse Event”, Principal Project Company has no obligation to reach Financial Close during the period between delivery of an Adverse Event Notice and agreement of the Parties on the mitigation actions to be undertaken by each Party to achieve Financial Close. With respect to an Adverse Event set forth in clauses (i)-(j), Principal Project Company has no obligation to reach Financial Close during the period between delivery of an Adverse Event Notice and up to 120 days after such delivery, but otherwise shall remain obligated to reach Financial Close unless excused pursuant to Section 3.5.2.

### **3.6 No-Fault Termination**

**3.6.1** City may, by delivering to Principal Project Company a Notice specifying City's election to terminate and its effective date, terminate this Agreement prior to Financial Close if City determines, in its sole discretion, that termination is in City's best interest.

**3.6.2** Either Party may terminate this Agreement, without fault or penalty, upon 15 days prior Notice to the other Party, if Financial Close is not achieved by the Financial Close Deadline or Delayed Financial Close Date, as applicable, and such failure is excused pursuant to Section 3.5 (Permitted Excuses from Achieving Financial Close).

**3.6.3** With respect to a termination under Section 3.6.1 or Section 3.6.2:

- (a) City shall return the Financial Close Security within five Business Days after termination; and
- (b) Principal Project Company shall be entitled to Termination Compensation in an amount not to exceed \$9,990,000 based on commercially reasonable evidence of Principal Project Company's costs incurred during (i) the PDA Term, and (ii) from the period commencing on the Effective Date and ending on the Early Termination Date, as indicated in City's Notice delivered pursuant to Section 3.6.1. Such payment shall be the exclusive compensation payable by City to Principal Project Company under this Agreement for a termination under Section 3.6.1 or Section 3.6.2.

**3.6.4** Payment of Termination Compensation in accordance with Section 3.6.3(b) is conditioned upon City's receipt from Principal Project Company, within 30 days of termination of this Agreement under Section 3.6.1 or Section 3.6.2, of (i) a complete and compliant invoice requesting payment in the form set forth in Exhibit 17 (Section 3.6 Invoice); and (ii) all work product set forth in Section 3.6.5. Such Termination Compensation shall be due and payable no later than 30 Business Days following City's receipt of such invoice.

**3.6.5** Payment of Termination Compensation in accordance with Section 3.6.3(b) is in consideration for ownership and title to all work product (including, subject to the terms of Section 21.4 (Intellectual Property), any Developed IP) produced by Principal Project Company related to the Project along with all IP Materials generated as of the date of Notice provided pursuant to Section 3.6.1 or Section 3.6.2, including (a) all written and electronic correspondence, exhibits, photographs, reports, printed material, tapes, disks, designs, concepts, ideas, technology, techniques, methods, processes, drawings, plans, specifications and other graphic and visual aids generated or developed by or on behalf of Principal Project Company during the Project procurement process and during the PDA Term, including aesthetic design concepts, interim design submittals, and other items delivered or submitted in any medium, media or format by or on behalf of Principal Project Company to City during the Project procurement process, during the PDA Term, or in connection with the Technical Proposal, and (b) all design, planning, materials, equipment, tools, supplies and other Work developed in connection with the Contract Documents.

### **3.7 Principal Project Company's Failure to Achieve Financial Close**

**3.7.1** If Financial Close is not achieved by the Financial Close Deadline or Delayed Financial Close Date, as applicable, then, unless such failure is excused under Section 3.5 (Permitted Excuses from Achieving Financial Close), City shall have the right to:

- (a) terminate this Agreement in its entirety by written Notice to Principal Project Company with immediate effect; and/or
- (b) draw and retain the full amount of the Financial Close Security, as City's sole remedy against Principal Project Company under this Agreement for Principal Project Company's failure to achieve Financial Close; provided, however, that, nothing herein shall prejudice any rights or remedies City may have for actions or breaches, other than failure to achieve Financial Close, caused by Principal Project Company under this Agreement or the Early Works Agreement, if any.

**3.7.1.2** Exercising either remedy under this Section 3.7.1 will not prejudice any rights or remedies the City may have for other actions or breaches Principal Project Company causes under this Agreement or, if applicable, any Early Works Agreement.

**3.7.2** City's right to draw upon the Financial Close Security is not intended to constitute a penalty, but is intended to be, and shall constitute, liquidated damages to compensate City for the cost of foregoing alternative opportunities and for other costs incurred by City in reliance upon Principal Project Company's agreement to enter into the transactions contemplated hereby.

**ARTICLE 4. PRINCIPAL PROJECT COMPANY FINANCING; LENDERS' RIGHTS;  
REFINANCING; PRIVATE CAPITAL INVESTMENTS; FINANCIAL MODEL**

**4.1 Principal Project Company Right and Responsibility to Finance**

**4.1.1** Principal Project Company is solely responsible for obtaining and repaying, at its own cost and risk and without recourse to the City or SFMTA, all financing necessary for the Work that is the Principal Project Company's responsibility under the Contract Documents. Principal Project Company shall take all appropriate action to obtain the Project Debt and Committed Investment as described in the Financial Proposal on or before the Financial Close Deadline. If the Finance Plan includes any other tax-exempt financing, Principal Project Company bears all risks relating to securing a Conduit Issuer, receiving the necessary approvals and compliance with applicable federal requirements.

**4.1.2** Principal Project Company may grant security interests in or assign the entire PPC's Interest (but not a portion of such interest) to Lenders for purposes of securing the Project Debt, subject to the terms of the Contract Documents. Principal Project Company shall not pledge or encumber the PPC's Interest, or any portion of such interest, to secure any indebtedness of any Person other than (a) Principal Project Company, (b) any special purpose entity that owns Principal Project Company but no other assets and has purposes and powers limited to the Project and Work, (c) a special purpose entity subsidiary owned by either Principal Project Company or an entity described in clause (b) of this Section 4.1.2, or (d) a Conduit Issuer.

**4.1.3** Except as otherwise provided in Section 3.2.3 (Base Interest Rate Fluctuation and Credit Spread Risk Mitigation), Principal Project Company bears all risk of any changes in the interest rate, payment provisions, collateral requirements, financing charges, make whole amounts, hedge agreements, prepayment premiums, breakage charges or the other terms of Project Debt and Committed Investment.

**4.1.4** Notwithstanding the foreclosure or other enforcement of any security interest created by a Security Document, Principal Project Company shall remain liable to City for the payment of all sums owing to City under this Agreement and the performance and observance of all of Principal Project Company's covenants and obligations under the Contract Documents.

**4.2 No City or City Responsibility for Project Debt**

**4.2.1** All Project Debt or other obligations issued or incurred by a PPC-Related Entity in connection with this Agreement or the Project shall be issued or incurred only in the name of a PPC-Related Entity or a Conduit Issuer or other entity acting on behalf of a PPC-Related Entity as the ultimate obligor. Except as otherwise expressly provided in this Agreement, the City shall have no obligation to pay debt service on any Project Debt or any other debt issued or incurred by a PPC-Related Entity. The City shall have no obligation to join in, execute or guarantee any note or other evidence of indebtedness of a PPC-Related Entity, any other Financing Agreement or any Security Document (other than the Direct Agreement). Project Debt does not constitute indebtedness, or a pledge of the faith and credit, of City or any department of the City. The Lenders, individually or collectively, have no right to have taxes levied or compel appropriations by City, including the Board of Supervisors, for the payment of any or all of the amount of such principal of, premium, if any, and interest on Project Debt.

**4.2.2** Except for a violation by City of its express obligations to Lenders in any Direct Agreement, no Lender is entitled to pursue any remedy against City, including any right to seek any damages or other amounts from the City, whether for Project Debt or any other amount.

**4.2.3** Section 4.2.2 does not affect City's liability to Principal Project Company under Article 17 (Termination) for Termination Compensation that is measured in whole or in part by reference to outstanding Project Debt.

**4.2.4** City shall have no obligation to any Lender under the Contract Documents, except to the extent of any express obligations of City to Lenders under any Direct Agreement or in any other instrument or agreement signed by City in favor of such Lender or Collateral Agent. This Section 4.2.4 does not preclude Lender enforcement of this Agreement against City where the Lender has succeeded to the PPC's Interest, whether by way of assignment or subrogation.

### **4.3 Lenders' Rights**

**4.3.1** This Agreement is exclusively for the benefit of City and Principal Project Company, and shall not provide any Lender with any remedy, claim, liability, reimbursement, cause of action or other right, except for the rights of any Lender as provided in any Direct Agreement.

**4.3.2** The rights of City under Article 16 (Default; Remedies) and Article 17 (Termination) are subject to the terms of any Direct Agreement.

### **4.4 Refinancing**

#### **4.4.1 Right of Refinancing**

City's prior written approval is required for all Refinancings other than Exempt Refinancings and Rescue Refinancings. City shall have no obligations or liabilities in connection with any Refinancing other than its obligations relating to Lender's rights in any Direct Agreement. If the Refinancing is with a new Lender, the new Lender may be added to an existing Direct Agreement or City shall enter into a new Direct Agreement with the new Lender, if such Lender so elects.

#### **4.4.2 Notice of Refinancing**

**4.4.2.1** At least 60 days before the proposed date for closing any proposed Refinancing (except an Exempt Refinancing under clause (b), (c) or (d) of the definition of Exempt Refinancing), Principal Project Company shall submit to City a summary of the proposed Refinancing, together with a schedule setting forth the various activities, each with schedule durations, to be accomplished from commencement through the close of the proposed Refinancing.

**4.4.2.2** Principal Project Company shall provide at least 30 days' advance Notice to City of any intended Exempt Refinancing under clause (b), (c) or (d) of the definition thereof, including facts and documents of such Exempt Refinancing which shall include, at a minimum, the documents described in Section 4.4.2.4 and the reason Principal Project Company considers it to be an Exempt Refinancing.

**4.4.2.3** Within 20 days after receipt of the materials required under Section 4.4.2.2, City will review and provide Notice to Principal Project Company as to whether, in its opinion, the proposed Refinancing is an Exempt Refinancing.

**4.4.2.4** At least 45 days before the proposed date for closing any Refinancing (except an Exempt Refinancing under clause (b), (c) or (d) of the definition of Exempt Refinancing), Principal Project Company shall:

- (a) provide draft proposed Financing Agreements and Security Documents (or term sheets therefor, if drafts are not then available), available Refinancing Data, and any other submittals required by Exhibit 5C (Calculation of Refinancing Gain); and
- (b) if applicable, provide Notice to City setting out the facts to support the basis for characterization of the transaction as an Exempt Refinancing or Rescue Refinancing.

**4.4.2.5** Within 15 days after receipt of the materials required under Section 4.4.2.4, City will provide Notice to Principal Project Company of City's determinations regarding the following:

- (a) whether the proposed Refinancing is an Exempt Refinancing or Rescue Refinancing;
- (b) if the proposed Refinancing is neither an Exempt Refinancing or Rescue Refinancing, whether to approve or disapprove the proposed Refinancing; and
- (c) if City will approve the proposed Refinancing, whether the Refinancing Gain requirements apply.

**4.4.2.6** City's failure to deliver to Principal Project Company Notice of the determinations and selection within the time period set forth in Section 4.4.2.5 shall not prejudice City's right to disapprove the proposed Refinancing, to receive any portion of Refinancing Gain, or its selection of the means for payment of such portion.

**4.4.2.7** At least 10 days before the proposed date for closing the Refinancing, Principal Project Company shall deliver to City substantially final drafts of the proposed Financing Agreements and Security Documents, together with updated versions of the Refinancing Data.

**4.4.2.8** Within five Business Days after close of the Refinancing, Principal Project Company shall deliver to City copies of all signed Financing Agreements and Security Documents in connection with the Refinancing, and the final Refinancing Data.

**4.4.2.9** Within 10 Business Days after close of the Refinancing, City and Principal Project Company shall meet and confer to agree upon the final calculation of the Refinancing Gain in accordance with Section 4.5 (Refinancing Gain). Once the final calculation is made, Principal Project Company shall pay City its portion of the Refinancing Gain in accordance with City's selected method of payment. If there is any dispute regarding the amount owing, Principal Project Company shall pay the undisputed amount to City and the amount in dispute shall be subject to resolution under the Contract Dispute Procedures.

---

### 4.4.3 Refinancing Limitations, Requirements and Conditions

**4.4.3.1** If City renders any assistance or performs any requested activity in connection with a Refinancing apart from delivering a consent and estoppel certificate under any Direct Agreement, then concurrently with close of the Refinancing, and as a condition precedent to Principal Project Company's right to close the Refinancing, Principal Project Company shall reimburse City for Recoverable Costs incurred in connection with the Refinancing. City will deliver to Principal Project Company a written invoice and demand before the scheduled date of closing. If for any reason the Refinancing does not close, Principal Project Company shall reimburse City for Recoverable Costs incurred in connection with the proposed Refinancing within 10 days after City delivers to Principal Project Company a written invoice and demand for such costs.

**4.4.3.2** Principal Project Company shall bear all risks for any Refinancing that negatively affects its Equity IRR, Key Ratios or financial performance.

### 4.5 Refinancing Gain

**4.5.1** City shall be entitled to receive 50% of any Refinancing Gain attributable to any Refinancing other than an Exempt Refinancing. The Refinancing Gain amount shall be, calculated in accordance with Exhibit 5C (Calculation of Refinancing Gain).

**4.5.2** Commencing at least 40 days before the proposed date for closing any Refinancing (except an Exempt Refinancing under clause (b), (c) or (d) of the definition of Exempt Refinancing), the Parties will negotiate in good faith to determine the method by which City will receive its portion of the Refinancing Gain, if applicable, which includes one or a combination of the following methods:

- (a) a single payment on or about the date of the Refinancing in an amount less than or equal to any Distribution made on or about the date of Refinancing;
- (b) a credit or payment by Principal Project Company to City that effectively reduces the Availability Payments over the remainder of the Term; or
- (c) a combination of clauses (a)-(b).

### 4.6 Equity Requirements

Principal Project Company shall have and maintain a Construction Equity Ratio totaling not less than 5% throughout the period between the Financial Close Date and the Substantial Completion Date, except to the extent:

- (a) City otherwise approves in writing, in its sole discretion;
- (b) Principal Project Company shall reduce the amount of the Construction Equity Ratio below 5% as part of a workout of a breach or default under the Initial Financing Agreements or Initial Security Documents; or

- 
- (c) the amount of Construction Equity Ratio is reduced below 5% because Principal Project Company incurs additional Project Debt pursuant to a Refinancing.

#### **4.7 Financial Model and Financial Model Updates**

##### **4.7.1 Model Update Event**

###### **4.7.1.1 Model Update Event means any of the following events:**

- (a) the implementation at Financial Close of the Base Interest Rate fluctuation and Credit Spread Risk Mitigation process pursuant to Section 3.2.3 (Base Interest Rate Fluctuation and Credit Spread Risk Mitigation);
- (b) the implementation of any mitigation actions set forth in Section 3.4.2;
- (c) a Compensable Delay Event or a Compensable Relief Event for which City owes Principal Project Company compensation pursuant to Sections 14.1.4 (Costs Payable for Compensable Delay Events), Section 14.1.6 (Costs Payable for Force Majeure Events During the D&C Term), Section 14.1.7 (Costs Payable for Unavoidable Delay Events During the D&C Term), or Section 14.2.4 (Costs Payable for Force Majeure During IFM Period), respectively, which City has elected to pay as an adjustment to the Availability Payments over the Term;
- (d) an event for which City is entitled to compensation from Principal Project Company pursuant to Section 16.2 (City Remedies for PPC Default);
- (e) a Refinancing resulting in a Refinancing Gain to which City is entitled to a share pursuant to Section 4.5 (Refinancing Gain); and
- (f) any amendments to the Contract Documents that the Parties agree has a material effect on the Financial Model, including any amendments agreed to by the Parties between the Finance Plan Due Date and Financial Close.

**4.7.1.2** Whenever a Model Update Event occurs (except as otherwise provided in this Agreement or where the Parties mutually agree otherwise), the financial consequence shall be determined in accordance with this Section 4.7 (Financial Model and Financial Model Updates).

##### **4.7.2 Updates to the Financial Model**

**4.7.2.1** In connection with any Model Update Event that entitles either Party to the payment of any amount, Principal Project Company may, in consultation with City, prepare an updated Financial Model in accordance with this Section 4.7.2 (Updates to the Financial Model) (each, a “**Financial Model Update**”) to reflect the financial impacts of such Model Update Event and calculate the amount due to either Party as a result of the Model Update Event. Principal Project Company may address more than one Model Update Event within a single Financial Model Update, provided that City may request interim versions of a Financial Model Update that address the impact of only a single Model Update Event. No Financial Model Update shall have any effect on the rights and obligations of the Parties under this Agreement until both Parties

have agreed in writing to accept it as an amendment to this Agreement pursuant to Section 4.7.3 (Replacement of Financial Model).

**4.7.2.2** Principal Project Company shall propose the Financial Model Update by Notice to City giving the proposed revised Financial Model together with full and complete details and explanation of the assumptions and calculations used to reflect the financial impacts of the Model Update Event which may only include changes to Principal Project Company's cash revenues and expenses that arise directly from the Model Update Event and consequential changes to the Project Debt draw down schedule, funding and release of reserves, financing costs, debt service schedule and amounts, Committed Investment draw down schedule and Principal Project Company's Distributions schedule and amounts or any other impacts or consequential changes mutually agreed by the Parties.

**4.7.2.3** A Financial Model Update:

- (a) may incorporate only the following revisions:
  - (i) changes to Principal Project Company's cash revenues and expenses that arise directly from the Model Update Event; and
  - (ii) consequential changes to the Project Debt draw down schedule, funding and release of reserves, financing costs, debt service schedule and amounts, Committed Investment draw down schedule and Principal Project Company's Distributions schedule and amounts; and
- (b) may not:
  - (i) incorporate other information or assumptions based on Principal Project Company's actual Project Financial Performance, except as permitted by Exhibit 5C (Calculation of Refinancing Gain) for a Financial Model Update related to a Refinancing; or
  - (ii) generally update projections through the end of the Term based on current market conditions.

**4.7.2.4** Principal Project Company may amend the logic or formulae incorporated in a Financial Model Update to the extent necessary to permit adjustments to the Financial Model in accordance with this Section 4.7 (Financial Model and Financial Model Updates). However, if any amendment is to be made to the logic or formulae in a Financial Model Update, the Key Ratios in the Financial Model Update must be maintained at levels that are neither lower nor higher than the Key Ratios existing in the Financial Model then in effect, and the difference in the Equity IRR after and immediately before making such amendment may not be greater than one basis point (being 0.01%) or as may be agreed upon by the Parties.

**4.7.2.5** Principal Project Company shall provide City with access, on an Open Book Basis, to the set of updated and revised assumptions and other data that comprise or are included in any Financial Model Update. Principal Project Company shall also provide a reconciliation and explanation of all the adjustments applied in the Financial Model Update. City may challenge the validity, accuracy or reasonableness of any Financial Model Update or any portion thereof

and may require Principal Project Company to correct any detected errors in the Financial Model Update or Financial Model, as applicable.

#### **4.7.3 Replacement of Financial Model**

**4.7.3.1** Following mutual agreement by Principal Project Company and City on interim versions of a Financial Model Update, Principal Project Company shall deliver to City, in form and substance reasonably acceptable to City:

- (a) the final version of the Financial Model Update and the related amended Financial Modeling Data, in the same form as the versions delivered pursuant to Section 3.3 (Post-Financial Close Requirements and Deliverables) or in such other form as may be agreed upon by the Parties;
- (b) an updated model audit report related to such Financial Model Update in accordance with Section 4.7.4 (Financial Model Audits); and
- (c) a form of written amendment that (i) effects the replacement of the then current Financial Model then in effect with the proposed Financial Model Update, and (ii) addresses all other amendments to this Agreement that may be required as a result of the Model Update Event and the amended Financial Model, including any required amendments to the definitions of Base Capital MaxAP, Base IFM MaxAP, Equity IRR and Key Ratios.

**4.7.3.2** Upon approval by City of the materials provided under Section 4.7.4.1 and execution of the written amendment by the Parties, the Financial Model Update shall become the Financial Model for the purposes of this Agreement until further amended, as applicable. Each Financial Model in effect under this Agreement shall be assigned an exclusive identification number, using chronological sequencing, and shall be clearly marked with Principal Project Company's name, date of submittal, contract number and the words, "Financial Model for Escrow".

**4.7.3.3** City reserves the right to approve any material changes in the debt structure (e.g., fixed or variable rate, bank financing or bond financing, call provisions) before Financial Close that constitute a deviation from the assumptions in Exhibit 3A (Financial Proposal). Material changes, as used in this Section 4.7.3.3, include (i) a change that differs materially from any commitments or provisions set forth in the Finance Plan; (ii) a change which would alter the risk allocations in this Agreement or any Key Contract; (iii) a change which could increase the liability of City for termination compensation in the event of a termination; (iv) a change that would modify the gearing of the financing; (v) a change that would result in an Affordability Event; (vi) a change that would cause a Delayed Financial Close Date; (vii) a change in any of the Security Documents; (viii) a change in the funding sources of Common Infrastructure; and/or (ix) a change under any of the conditions precedent to Financial Close under the Financing Documents.

**4.7.3.4** In the event of a Contract Dispute about the Financial Model, the Financial Model or the immediately preceding Financial Model Update (as applicable) that is not being disputed (or, if there has been no undisputed Financial Model Update, the Financial Model) will remain in effect until such Contract Dispute is resolved or a new Financial Model Update is issued and not disputed. If a proposed Financial Model or Financial Model Update (as applicable) has not been disputed, or if any such Contract Dispute has been so resolved, the proposed Financial Model

or Financial Model Update (as applicable) will serve as the Financial Model or the current Financial Model Update (as applicable).

#### **4.7.4 Financial Model Audits**

**4.7.4.1** Any model audit report delivered to City pursuant to Sections 3.3 (Post-Financial Close Requirements and Deliverables) and 4.7 (Financial Model and Financial Model Updates) shall be prepared by an independent audit firm with a nationally recognized reputation. The cost of a model audit report shall be paid solely by City if it is prepared in connection with a Financial Model Update related to a Model Update Event described in Section 4.7.1.1(c) or 4.7.1.1(f) when an amendment is proposed only by City. The cost of any other model audit report required hereunder shall be paid solely by Principal Project Company.

**4.7.4.2** Principal Project Company shall bear the entire risk of any errors or omissions contained in the Financial Model and shall not be entitled to any compensation or other relief from City in relation to any loss or damage that it suffers as a result of such error or omission.

#### **4.8 Escrow of Financial Model and Cost and Pricing Data**

**4.8.1** City and Principal Project Company shall, within 10 days after the Effective Date, jointly deposit the Base Case Financial Model in a locked cabinet at SFMTA or another location approved by City, with both Parties having a key to the cabinet. Replacement Financial Models shall be deposited within 10 days after the Parties have executed and delivered the amendment in accordance with Section 4.7.3 (Replacement of Financial Model).

**4.8.2** The Parties acknowledge that the Cost and Pricing Data has been placed into escrow as provided in Section 4.8.1. Concurrently with approval of each Change Order or other amendment to the Contract Documents, Principal Project Company shall deposit in the Cost and Pricing Data escrow one copy of all documentary information used by Principal Project Company in connection with pricing for the Change Order or other amendment, including quotations from Contractors.

**4.8.3** Principal Project Company represents and warrants that:

- (a) the material initially delivered into escrow constitutes the Base Case Financial Model and Cost and Pricing Data provided in connection with the Financial Proposal and an authorized officer of Principal Project Company has personally examined the contents of the electronic file and/or electronic storage media, as applicable, and they are complete; and
- (b) the Cost and Pricing Data constitutes all of the information used by Principal Project Company in determining the cost of the D&C Work, IFM Services and Renewal Work in preparation of the Implementation Proposal and, unless City agrees or directs otherwise, Principal Project Company shall not use any other Implementation Proposal preparation information in the negotiation of Change Orders or in connection with the potential resolution or settlement of Claims or Contract Disputes.

**4.8.4** Whenever Principal Project Company makes an additional deposit of any replacement Financial Models or Cost and Pricing Data into escrow, Principal Project Company

shall certify to City in writing at the time of deposit that: (a) the material deposited into escrow constitutes the true replacement Financial Models or Cost and Pricing Data, as applicable; (b) an authorized officer of Principal Project Company has personally examined the contents of the deposit; and (c) the deposit is complete.

**4.8.5** City may conduct a review of the Cost and Pricing Data in accordance with the procedure set forth in Section 4.8.6 to determine whether it is complete. In the event City determines that any Cost and Pricing Data is missing, City may request that Principal Project Company submit the missing data and Principal Project Company shall provide such Cost and Pricing Data within three Business Days of the request, and at that time it will be date stamped, labeled to identify it as supplementary information, and added to the escrowed Cost and Pricing Data. Principal Project Company shall have no right to add documents to the Cost and Pricing Data except as otherwise provided in this Section 4.8 (Escrow of Financial Model and Cost and Pricing Data).

**4.8.6** Each of City and Principal Project Company shall have the right to examine, through one or more designated representatives, any and all components of the Financial Model and Cost and Pricing Data during the SFMTA's normal business hours. The Party undertaking an examination need not have or state a specific reason to examine such material. Without limiting the foregoing, the Parties recognize that examination of the escrowed material may assist in the negotiation of Change Orders, or may assist in the potential resolution or settlement of Claims or Contract Disputes.

**4.8.7** City will provide Notice to Principal Project Company in writing at least two Business Days in advance of City's examination of escrowed material, and shall allow Principal Project Company to be present at the examination. City may make or retain copies of escrowed material, subject to terms reasonably necessary to protect the confidentiality and proprietary nature of the contents, as may be agreed upon by the Parties and subject to applicable Laws.

**4.8.8** Subject to applicable Laws, the escrowed material is, and shall remain, the property of Principal Project Company or its Contractors.

**4.8.9** Principal Project Company agrees that the Cost and Pricing Data is not part of the Contract Documents and that nothing in the Cost and Pricing Data shall change or modify the Contract Documents.

**4.8.10** Either Party may introduce escrowed material into evidence in accordance with the Contract Dispute Procedures. The Parties shall promptly abide by any request from the court or other dispute resolver to receive, review and utilize the Financial Model and Cost and Pricing Data to assist the dispute resolver in its deliberations.

**4.8.11** The escrow shall remain in effect throughout the Term and thereafter until final resolution of all Contract Disputes, subject to any mutual agreement of the Parties to retrieve and/or discard materials therein from time to time.

**4.8.12** Principal Project Company shall not be entitled to any additional payment for compilation of materials to be deposited into escrow or any other Principal Project Company expenses for complying with this Section 4.8 (Escrow of Financial Model and Cost and Pricing Data).

---

## ARTICLE 5. SUBMITTALS; MANAGEMENT SYSTEMS AND OVERSIGHT

### 5.1 Submittal Review Terms and Procedures

#### 5.1.1 Terms and Procedures

Principal Project Company shall comply with the terms and procedures for Submittals review set forth in Exhibit 11 (Submittals Review Process). Except as set forth in this Agreement, including Exhibit 11 (Submittals Review Process), the standard for review and approval of design and construction Submittals that comply with the Technical Requirements shall be reasonable discretion; provided, however, that decisions regarding waivers, releases, consents, acceptance of Nonconforming Work, Deviations, PPC Change Requests and other matters that are not consistent with or comply with the Contract Documents shall be within City's sole discretion.

#### 5.1.2 Conflicting Provisions

Exhibit 11 (Submittals Review Process) sets forth uniform terms and procedures for Submittals. In the event of any conflict between the provisions of Exhibit 11 (Submittals Review Process) and any other provisions of the Contract Documents or with the Project Management Plan concerning procedures with respect to submission, review, comment, approval, consent, determination, decision or other actions with respect to Submittals, Exhibit 11 (Submittals Review Process) shall exclusively govern and control the procedures, except to the extent that the conflicting provision expressly states that it supersedes Exhibit 11 (Submittals Review Process).

#### 5.1.3 Limitations on Principal Project Company's Right to Rely

**5.1.3.1** No action or failure to take action by or on behalf of City relating to Oversight (including review and approval of the Project Management Plan) or other act or omission of City shall:

- (a) constitute an approval or acceptance by City of Principal Project Company's performance of its obligations in accordance with the Contract Documents;
- (b) alter, waive, diminish, release or otherwise prejudice any rights, remedies or powers that City has under the Contract Documents or otherwise;
- (c) limit Principal Project Company's obligation to perform the Work in accordance with the Contract Documents; or
- (d) affect Principal Project Company's liabilities and obligations to fulfill the requirements of the Contract Documents (including its indemnity obligations).

**5.1.3.2** Principal Project Company acknowledges and agrees that Oversight, including review, comment, exception, objection, rejection, approval, disapproval, acceptance, concurrence, certification or failure to conduct any such activity by City:

- (a) is solely for the benefit and protection of City;

- (b) does not relieve Principal Project Company of its responsibility for the selection and the competent performance of all PPC-Related Entities;
- (c) does not relieve Principal Project Company from compliance with the requirements of the Contract Documents or create or impose upon City any liability, duty or obligation toward Principal Project Company to cause it to fulfill the requirements of the Contract Documents;
- (d) shall not be deemed or construed as any kind of warranty, express or implied, by City;
- (e) may not be relied upon by Principal Project Company or used as evidence in determining whether Principal Project Company has fulfilled the requirements of the Contract Documents;
- (f) shall not relieve Principal Project Company from liability for, and responsibility to replace, Nonconforming Work (including Work based on Design Documents to the extent that they include a change, deviation, modification, alteration or exception from the Technical Requirements not approved as a Deviation) and to cure PPC Defaults;
- (g) shall not be deemed or construed as any assumption of risk by City as to design, construction, equipping, supply, operations, maintenance, performance or quality of the Project or performance of the Work; and
- (h) may not be asserted by Principal Project Company against City as a legal or equitable defense to, or as a waiver of or relief from, Principal Project Company's obligation to fulfill the requirements of the Contract Documents.

**5.1.3.3** Notwithstanding the provisions of Sections 5.1.3.1 and 5.1.3.2, Principal Project Company may rely on Notices that City gives under this Agreement for purposes of confirming City's approval or consent to an event or matter, but without prejudice to any of City's other rights and remedies under this Agreement, including regarding compliance by Principal Project Company with the requirements of the Contract Documents.

**5.1.3.4** Notwithstanding the provisions of Sections 5.1.3.1 and 5.1.3.2, Principal Project Company shall be entitled to rely on City's written approval of specific Deviations.

**5.1.3.5** City's approval of Release for Construction Documents shall constitute approval of the design by City for purposes of Government Code section 830.6, but shall not be deemed to relieve Principal Project Company of liability for the design.

## **5.2 Project Management Plan**

**5.2.1** Principal Project Company shall comply with the Project Management Plan and its component parts, plans and other included at Exhibit 2 (Project Management Plan) and Good Industry Practice, including those requirements applicable to Quality Assurance and Quality Control.

**5.2.2** Principal Project Company shall submit to City, in accordance with the procedures and timeline described in the Technical Requirements, any proposed changes or additions to or revisions of the Project Management Plan and its component parts.

**5.2.3** Principal Project Company shall not commence any aspect of Construction Work before approval of the D&C Management Plan applicable to such Construction Work. Principal Project Company shall not commence any aspect of the IFM Services before approval of the relevant component parts, plans and other documentation of the IFM Management Plan applicable to the IFM Services.

**5.2.4** If any part, plan or other documentation of the Project Management Plan refers to, relies on or incorporates any manual, plan, procedure or like document, then all such referenced or incorporated materials shall be submitted to City for review, marked to identify relevant provisions.

**5.2.5** Principal Project Company shall monitor the Work and prescribe times for internal audits of the Project Management Plan, and shall carry out such internal audits at the times prescribed and shall promptly remedy all findings to City's satisfaction.

**5.2.6** Principal Project Company shall comply with and cause all Contractors to comply with applicable requirements of the Project Management Plan.

**5.2.7** Principal Project Company shall update the Project Management Plan in accordance with the Technical Requirements.

### **5.3 Quality Assurance, Quality Control, Generally**

Principal Project Company is primarily responsible for all Quality Assurance and Quality Control activities (including self-monitoring activities) necessary to manage the Project. Principal Project Company shall undertake the primary aspects of Quality Assurance and Quality Control for the Project and the Work in accordance with the Project Management Plan, the Technical Requirements (including Section 1.4 of Division 1 of the Technical Requirements), other applicable provisions of the Contract Documents, Good Industry Practice and applicable Law. The foregoing shall not limit City's Oversight rights and quality assurance/quality control verification, all as set forth in this Agreement.

### **5.4 Oversight, Inspection and Testing**

**5.4.1** City shall have the right at all times to conduct Oversight as provided in this Section 5.4 (Oversight, Inspection, and Testing) and Division 6 of the Technical Requirements. Such Oversight may include assessments regarding compliance with the Contract Documents, Project Management Plan, and requirements of applicable Governmental Entities and applicable Law. City may designate any Person or Persons to carry out any Oversight on City's behalf.

**5.4.2** City's Oversight rights include, at City's sole option, the following:

- (a) monitoring and auditing Principal Project Company and its Books and Records to determine compliance with requirements of the Contract Documents and the Project Management Plan, including (i) audit review of compliance with

- quality procedures and processes under PPC's Design Quality Plan, PPC's Construction Quality Plan and IFM Quality Management Plan, and (ii) audit review of Design Documents, Construction Documents, field work plans, land surveys, mapping, other data collection tasks, other Submittals and other Books and Records;
- (b) conducting audits of all design and pre-design activities for the Project as needed to ascertain and evaluate Principal Project Company's design quality and safety control processes, including (i) review of engineering calculations, engineering reports, and findings, (ii) review of the work of Principal Project Company's environmental compliance personnel with the Environmental Compliance Plan, and (iii) review of certifications that Principal Project Company's Quality Control checks of final Construction Documents have been performed and documented, and that the Construction Documents conform to the requirements of the Contract Documents;
  - (c) conducting audits of all construction-related activities for the Project as needed to audit Principal Project Company's construction quality and safety control processes, including (i) auditing the services of Principal Project Company's accredited laboratories and associated testing devices and equipment, (ii) reviewing Principal Project Company's construction quality procedures, including conducting field monitoring and inspections as needed for audit purposes of construction activities, materials, and system components, as indicated in the Contract Documents, (iii) auditing Principal Project Company's records of materials, materials tests, materials certifications, and performance tests for Project systems, (iv) reviewing and investigating Project progress, Project quality, Deviations, Defects, and repair and replacement of Nonconforming Work, and (v) conducting field monitoring and inspections;
  - (d) conducting inspection and testing of materials or software, including witnessing factory tests, off-site lab tests, and first article inspection of manufactured items to verify Principal Project Company's compliance with testing frequencies and requirements, including (i) performance and acceptance testing, in the Contract Documents, and the Project Management Plan, (ii) the accuracy of the tests, inspections and audits performed in accordance with PPC's Design Quality Plan and PPC's Construction Quality Plan, and (iii) compliance of materials incorporated into the Project with the applicable requirements, conditions and standards of the Contract Documents, Regulatory Approvals, the Project Management Plan, IFM Quality Management Plan and applicable Law;
  - (e) accompanying Principal Project Company on physical inspections associated with Principal Project Company's Performance Monitoring, conducting its own performance inspections, assessing and scoring Principal Project Company's IFM Records, and assessing and rating the condition of elements;
  - (f) attending and witnessing Principal Project Company's other on-site and off-site tests and inspections, including system start-up and acceptance tests and

- inspections, subject to the obligation to observe all applicable Safety Standards and requirements;
- (g) reviewing Principal Project Company's certification of Record Documents and surveys;
  - (h) investigating, analyzing and reporting on Safety Compliance and performance of Safety Compliance Orders; and
  - (i) monitoring and auditing Principal Project Company's detection, reporting, response times and time to respond to and rectify breaches and failures for which Noncompliance Points may be assessed in accordance with Article 15 (Deductions and Noncompliance Points) and Exhibit 4 (Payment Mechanism).

**5.4.3** City also has the right, but not the obligation, to conduct "over-the-shoulder" reviews of Design Documents and other Submittals. All such "over-the-shoulder" reviews conducted are for City's sole benefit.

**5.4.4** Nothing in the Contract Documents shall preclude, and Principal Project Company shall not interfere with, any review, inspection or oversight of Submittals or of Work that any Authority Having Jurisdiction may desire to conduct in accordance with its agreements with City or applicable Law.

## **5.5 Testing and Test Results**

**5.5.1** All tests shall be carried out in accordance with Division 6 of the Technical Requirements, this Section 5.5 (Testing and Test Results) and all other applicable provisions of and the Contract Documents.

**5.5.2** Principal Project Company shall develop a test recording system that permits ready retrieval of all test readings and shall provide information relating to tests proposed, test methodology and Test Reports to City on request.

**5.5.3** City may attend and witness any tests and verifications to be conducted with respect to the Project. Principal Project Company shall provide to City all test results and reports (which shall be provided in electronic format in accordance with the Technical Requirements) within 10 Business Days after Principal Project Company or its Contractor receives them. With respect to continuous testing operations (such as concrete quality, structural concrete strengths, aggregate quality, compaction tests and material quality), Principal Project Company shall provide to City at regular intervals (at least weekly unless otherwise agreed) test summary sheets and statistical analyses indicating strength and quality trends.

**5.5.4** Principal Project Company shall give City timely advance Notice (not less than 5 Business Days) of the date and specific location of such tests.

**5.5.5** City's Authorized Representative and any other designee may attend any test and will give advance Notice (not less than one Business Day) of their intent to attend the test. Any materials or plant that fail(s) such tests shall be rejected.

**5.5.6** Principal Project Company acknowledges that, where Principal Project Company's Work impacts a Utility or an element subject to the jurisdiction of an Authority Having Jurisdiction, then the affected Utility Owner or Authority Having Jurisdiction, as applicable, will have the same rights as City under this Section 5.5 (Testing and Test Results), subject to the same obligations that apply to City under Section 6.7.3.

## **5.6 Meetings**

**5.6.1** Principal Project Company shall conduct coordination and progress meetings with City, in accordance with Section 1.1.3 of Division 1 of the Technical Requirements during the course of design and construction, including any design and construction occurring during the IFM Period, and in accordance with the IFM Specifications during the performance of the IFM Services. At City's request, Principal Project Company shall require the Engineer of Record and Contractors responsible for or affected by such Work to attend the progress meetings. City and its designated representatives are authorized to attend all such meetings and are permitted to raise any questions, concerns or opinions without restriction.

**5.6.2** The Parties shall hold any other meetings, at such times, frequency and locations, as applicable, as stated in the Technical Requirements.

**5.6.3** City and Principal Project Company, through their respective Authorized Representatives, shall meet from time to time at the other Party's request to discuss and resolve issues relating to the Work.

**5.6.4** Principal Project Company shall schedule all meetings with City at a date, time and place reasonably convenient to both Parties.

## **5.7 Reporting**

### **5.7.1 Relating to the Work**

**5.7.1.1** Principal Project Company shall submit all reports relating to the Work in the form, with the content and within the time required under the Contract Documents.

**5.7.1.2** Principal Project Company shall make available to City information relating to the status of the Work, including non-proprietary information relating to the design, engineering and construction, estoppel certificates, and such other matters as City may reasonably request in accordance with the Technical Requirements.

### **5.7.2 Financial Reporting**

**5.7.2.1** On the first anniversary of the Effective Date and on every subsequent anniversary thereof during the Term, Principal Project Company shall deliver to City certified copies of (a) Principal Project Company's most recent annual audited financial statements and (b) any other reporting and notifications provided to Lenders regarding material events (including any draws on Principal Project Company's debt service reserve account) under the Financing Documents.

**5.7.2.2** From the Effective Date until the Final Acceptance Date, Principal Project Company shall deliver to City, on a monthly basis, certified copies of (a) Principal Project Company's draw requests to Lenders (including corresponding payment applications by Key Contractors to

Principal Project Company), and (b) the LTA's reports, which shall clearly state the D&C Percentage as of the date of the report, and the invoices approved by the LTA in connection with the foregoing, in each case, within two Business Days following delivery or receipt, as applicable, by Principal Project Company of the relevant documentation.

**5.7.2.3** During the IFM Period, Principal Project Company shall, concurrently with delivery to any Lender and at least annually, deliver to City a budget for IFM Services for the upcoming year, actual costs incurred in performance of the IFM Services during the preceding year, together with any updates required by or delivered to any Lender.

---

## ARTICLE 6. GENERAL PRINCIPAL PROJECT COMPANY OBLIGATIONS

### 6.1 Planning and Engineering Activities

Principal Project Company, through appropriately qualified and licensed design professionals, as identified in the Project Management Plan, shall furnish or cause to be furnished all planning and engineering activities appropriate for design and development of the Project in accordance with the Contract Documents and Good Industry Practice.

### 6.2 Project Site Conditions

6.2.1 Principal Project Company acknowledges and agrees that:

- (a) it has investigated and satisfied itself as to the conditions affecting the D&C Work, including those bearing upon transportation, disposal, handling and storage of materials, availability of labor, supplies, materials, equipment, water, electric power, roads and uncertainties of weather or similar physical conditions at the Project Site, the conformation and conditions of the ground, and the character of equipment and facilities needed in connection with the D&C Work;
- (b) it has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the Project Site, including the results of exploratory work (including investigations undertaken pursuant to the PDA) and other information publicly available or provided to Principal Project Company by City; and
- (c) any failure by Principal Project Company to acquaint itself with the available information relating to the conditions affecting the D&C Work will not relieve Principal Project Company from responsibility for estimating properly the difficulty or cost of successfully performing the D&C Work and shall not be the basis of a Relief Event claim.

6.2.2 During the progress of the Work, if Principal Project Company encounters any Hazardous Materials or other Project Site conditions that may entitle Principal Project Company to claim that a Relief Event has occurred, then Principal Project Company shall provide Notice to City of the specific condition promptly before it is disturbed, or as soon as practicable afterwards, and before the affected Work continues. City shall promptly investigate such conditions.

### 6.3 Regulatory Approvals

#### 6.3.1 CEQA Approval and NEPA Approval

6.3.1.1 The Parties acknowledge that City has obtained the CEQA Approval and Principal Project Company acknowledges receipt of a copy of the CEQA Approval. City is responsible for maintaining the CEQA Approval. City is responsible for costs of litigation relating to the CEQA Approval, subject to the exception provided in Section 6.3.4.2(d).

**6.3.1.2** Principal Project Company shall provide support to City and undertake additional efforts as specified in Section 6.3.6.1 with respect to any modifications, renewals and extensions of the CEQA Approval, including those required as the result of Principal Project Company's design and Relief Events.

***[Note: Assuming the NEPA Approval is obtained prior to Commercial Close, the below provisions will be deleted. If not, (i) these provisions shall remain; (ii) the Agreement or the TRs will include an assumed set of conditions, mitigations, etc.; and (iii) material changes in such assumed conditions, mitigations, etc. will be added as a Compensable Delay Event. PNC must include this type of language in its DB RFP and DB Contract as well]***

**6.3.1.3** The Parties acknowledge that City has not yet obtained the NEPA Approval. City is responsible for maintaining the NEPA Approval. City is responsible for costs of litigation relating to the NEPA Approval, subject to the exception provided in Section 6.3.4.2(d).

**6.3.1.4** Given that the City has not yet obtained the NEPA Approval, performance by either Party of its obligations under this Agreement shall not limit:

- (a) City's independent evaluation and sole discretion when conducting the environmental review process required for the NEPA Approval and preparing the NEPA environmental documents; or
- (b) City's sole discretion to withhold issuance of NTP 2.

**6.3.1.5** Principal Project Company acknowledges and agrees that City retains:

- (a) sole discretion, exclusive control and decision-making authority over the description of the Project and any identification or evaluation of alternatives or mitigation measures for the purposes of NEPA; and
- (b) sole discretion over whether to accept the Work, the Infrastructure Facility and Principal Project Company Submittals for purposes of the NEPA environmental review process.

**6.3.1.6** Nothing contained in this Agreement commits, or shall be construed to commit, City to any proposed project or any Project alternative, modification, or mitigation regarding the Project (including a no-build alternative) until, unless and before the NEPA Approval is obtained and City approves the Project, alternative, modification or mitigation.

**6.3.1.7** Principal Project Company shall have no right or obligation to perform, and shall not perform, any services or Work that would violate conflict of interest rules under NEPA regarding the preparation, review, revision and decisions on scope and content of the NEPA environmental documents. All references in this Agreement to Principal Project Company's involvement with the NEPA environmental review process or development of the NEPA environmental documents shall be subject to the limitation in the preceding sentence.

**6.3.1.8** Unless and before the NEPA Approval is obtained, Principal Project Company may not undertake final design or construction Work.

---

## **6.3.2 Regulatory Approvals other than the CEQA Approval and the NEPA Approval**

**6.3.2.1** Principal Project Company shall obtain and maintain all Regulatory Approvals required for the Project and the Work, other than the CEQA Approval and the NEPA Approval, and shall bear the risk of obtaining such approvals and any delay in obtaining such approvals, except as provided in Section 6.3.4.1, as well as the risk of conditions imposed on performance of the Work by such approvals. Principal Project Company shall conduct all necessary environmental studies and prepare all necessary environmental documents in compliance with applicable Environmental Laws as needed to obtain Regulatory Approvals other than the CEQA Approval and the NEPA Approval, and shall obtain all necessary modifications, renewals and extensions thereof.

**6.3.2.2** Principal Project Company shall pay all costs associated with obtaining Regulatory Approvals, other than the CEQA Approval and the NEPA Approval.

## **6.3.3 Copies to City**

Within 10 days of submitting any application for a Regulatory Approval to a Governmental Entity (or any proposed modification, renewal, extension or waiver of a Regulatory Approval or provision thereof), Principal Project Company shall submit an electronic copy of same, together with any supporting studies, analyses and data, to City. Principal Project Company shall deliver to City true and complete copies of all new or amended Regulatory Approvals, other than the CEQA Approval and the NEPA Approval.

## **6.3.4 Certain Risks Relating to Regulatory Approvals**

**6.3.4.1** Except to the extent required as a direct result of (a) a City Change, (b) a City Fault, or (c) Major Approval Delay, Principal Project Company shall not be entitled to any Extra Work Costs, Financing Delay Costs, Delay Costs, time extensions or any other relief associated with securing Regulatory Approvals.

**6.3.4.2** As between City and Principal Project Company, Principal Project Company shall bear all risk arising out of, relating to or resulting from:

- (a) any differences between Principal Project Company's design for any portion of the Project and the design that served as the basis for the application for a Regulatory Approval, except to the extent required as a direct result of a City Change;
- (b) any differences between the means and methods (including temporary works) Principal Project Company chooses for performance of the Work and those stated in, referred to or contemplated in the CEQA Approval and/or the NEPA Approval;
- (c) any change in the Project due to Principal Project Company's design, except to the extent that the change was directly attributable to a Relief Event; and
- (d) cost of litigation associated with Regulatory Approvals, including the CEQA Approval and the NEPA Approval, to the extent that the litigation arises, in

---

whole or in part, due to Principal Project Company's failure to comply with the requirements of the Regulatory Approval.

### **6.3.5 Changes to Regulatory Approvals**

If Principal Project Company wishes to obtain, modify, renew or extend any Regulatory Approvals, Principal Project Company shall first comply with, and obtain any consent or waiver required in accordance with, then-existing agreements between City and other Governmental Entities.

### **6.3.6 City Assistance with Regulatory Approvals.**

**6.3.6.1** Principal Project Company may, by Notice to City, request City's reasonable assistance and cooperation in obtaining modifying, renewing or extending any Regulatory Approvals (including any modification, renewal or extension of an existing Regulatory Approval required as the result of Principal Project Company's design or construction methods). Upon receipt of such a Notice and agreement of the Parties regarding the scope of, and budget for, assistance to be provided as described in Section 6.3.6.2, City will reasonably assist and cooperate with Principal Project Company in seeking to obtain the Regulatory Approvals, including joining in conferences and meetings with the Governmental Entities with jurisdiction, and providing Principal Project Company data, information and documents available to City and relevant to the application for the Regulatory Approvals

**6.3.6.2** City and Principal Project Company shall work jointly to establish a scope of work and budget for City's Recoverable Costs (which shall be limited to reasonable out-of-pocket costs) incurred in connection with the assistance and cooperation that City agrees to provide in connection with modifications to Regulatory Approvals under Section 6.3.6.1. Subject to an agreed upon scope of work and budget and to any rights of Principal Project Company in the case of a Relief Event, Principal Project Company shall fully reimburse City for such Recoverable Costs incurred in providing such assistance and cooperation, including those incurred to conduct further or supplemental environmental studies.

**6.3.6.3** Assistance provided by City under Section 6.3.6.1 shall not include any obligation to:

- (a) coordinate and work with elected and other public officials as necessary and appropriate;
- (b) act as the lead agency and directly coordinate with such Governmental Entities;
- (c) take a position which City believes to be inconsistent with the Contract Documents, the Project Management Plan, applicable Law, Regulatory Approval(s), the requirements of Good Industry Practice, or City policy;
- (d) take a position that is not usual and customary for City to take in addressing similar circumstances affecting its own projects (except for usual and customary arrangements that are incompatible with the Project's public-private contracting methodology);
- (e) take a position that increases the risk, obligations or liabilities of City; or

- (f) refrain from concurring with a position taken by a Governmental Entity if City believes that position to be proper.

**6.3.6.4** Notwithstanding any assistance provided by City in accordance with Section 6.3.6.1, Principal Project Company shall remain responsible for, and bear all risks and costs associated with, obtaining all Regulatory Approvals, except as otherwise expressly provided in the Contract Documents.

### **6.3.7 Regulatory Approvals in City's Name**

**6.3.7.1** Certain Regulatory Approvals are required to be applied for or issued in City's name and/or require City to directly coordinate with such Governmental Entities in connection with obtaining Regulatory Approvals. With respect to such approvals, City will assist and cooperate with Principal Project Company following receipt of a request under Section 6.3.6.1, and the Parties shall proceed in accordance with Section 6.3.6.2. Principal Project Company shall lead all actions and efforts to apply for and obtain the Regulatory Approval including: (a) conducting necessary field investigations, (b) preparing mitigation analyses and studies and plans, (c) preparing surveys and required reports, applications and other documents in form approved by City, and (d) joint coordination and joint discussions and attendance at meetings with the applicable Governmental Entity.

**6.3.7.2** Principal Project Company shall be solely responsible for obtaining all Regulatory Approvals required in connection with, and for compliance with applicable Laws with respect to, Temporary Areas.

### **6.3.8 Major Approval Delay**

**6.3.8.1** Principal Project Company shall make diligent efforts to obtain the cooperation of each Governmental Entity as necessary for the issuance of any Major Approval. Principal Project Company is responsible for verifying the progress of each Governmental Entity's review and progress towards granting such Major Approval. Principal Project Company shall provide Notice to City within five days after the occurrence of any of the following: (a) Principal Project Company reasonably believes for any reason that any Governmental Entity will not issue the Major Approval in a manner consistent with the timely completion of the Project or in accordance with Law, the Regulatory Approvals or the Contract Documents, (b) Principal Project Company becomes aware that any Governmental Entity is not cooperating in a timely manner to issue the Major Approval in accordance with the Contract Documents, or (c) any other dispute arises between Principal Project Company and such Governmental Entity with respect to the Major Approval, despite Principal Project Company's diligent efforts to obtain such Governmental Entity's cooperation or otherwise resolve such dispute. Such Notice may include a request that City assist in resolving the dispute or in otherwise obtaining the Governmental Entity's timely cooperation. Principal Project Company shall provide City with such information as City reasonably requests regarding the Governmental Entity's failure to cooperate and the effect of any resulting delay on the Project Schedule. After delivering Notice to City, Principal Project Company shall continue to use diligent efforts to pursue the Governmental Entity's cooperation.

**6.3.8.2** If Principal Project Company requests assistance of City pursuant to Section 6.3.8.1, the following provisions apply:

- (a) Principal Project Company shall provide evidence satisfactory to City, in its good faith determination, that (i) the time for obtaining the Major Approval in the Project Schedule (including any Major Approval Deadline) was, in its inception, a reasonable amount of time for completion of such work, (iii) Principal Project Company has made, and continues to make, diligent efforts to obtain the Governmental Entity's cooperation and commenced coordination at the earliest time, including during the PDA Term (including submitting and actively pursuing applications for the Major Approval, taking into account the Project Schedule), (iv) Principal Project Company has submitted a fully compliant and complete request and application to the applicable Governmental Entity in accordance with applicable Law and the policies and procedures of such Governmental Entity; (v) Principal Project Company has paid in full all fees and charges required for the review, consultation and issuance of the Major Approval by the applicable Governmental Entity; (vi) Principal Project Company has satisfied all other conditions to the commencement of review by the applicable Governmental Entity in accordance with applicable Law and the policies and procedures of such Governmental Entity; and (vii) the Governmental Entity is not cooperating (clauses (a)(i) through (v) above are referred to herein as the "Major Approval Conditions to Assistance").
- (b) Following receipt by City of satisfactory evidence, City shall take such reasonable steps as City may reasonably determine to obtain the cooperation of the Governmental Entity with respect to the Major Approval or resolve the dispute; provided, however, City shall have no obligation to prosecute any legal proceedings, or to exercise any other legal remedy available to it under Law or existing contract, unless City elects to do so in its sole discretion. City may, at its sole discretion, participate in the resolution of any dispute between Principal Project Company and such Governmental Entity, whether or not requested to do so by Principal Project Company.
- (c) Without limiting City's obligations under clause (b) above, if City holds contractual rights that might be used to enforce the Governmental Entity's obligation to cooperate, City shall have the right not to exercise those rights. The decision not to exercise those rights shall be in the sole discretion of City.

**6.3.8.3** Any assistance provided by City shall not relieve Principal Project Company of its sole and primary responsibility for the satisfactory compliance with its obligations under the Contract Documents and its obligations with respect to obtaining any Major Approval.

**6.3.8.4** Major Approval Delay shall only apply to an unreasonable and unjustified delay by a Governmental Entity in connection with a Major Approval beyond the Major Approval Deadline following receipt by City of proper Notice pursuant to Section 6.3.8.1, provided that all of the "Major Approval Conditions to Assistance" described in Section 6.3.8.2 have been satisfied.

**6.3.8.5** Notwithstanding the foregoing, the term "Major Approval Delay" does not include and is not intended to address (i) City Changes relating to a Major Approval, the impact of which will be addressed in a Change Order, (ii) any Governmental Approvals other than a Major Approval; (iii) additional work associated with a Project design change unless such design change is as a direct and sole result of a City Change, Compensable Delay Event or Unavoidable Delay Event

(excluding Major Approval Delay); (iv) any event which results from or arises out of the actions or omissions of any PPC-Related Entity or any PPC Fault; or (v) any delay or impact relating to or arising out of the failure by any PPC-Related Entity to undertake the coordination activities with the Governmental Entity contemplated by the Predevelopment Agreement or based on the results of a Reasonable Investigation (even if such delay otherwise would have been considered a Major Approval Delay but for such failure). Principal Project Company shall not rely upon any proposed schedules, durations or deadlines, if any, included in the Reference Documents with respect to a Major Approval, and Principal Project Company may not base any Claims for a time extension or additional compensation upon such proposed schedules, durations, and deadlines.

**6.3.8.6** Subject to the limitations and restrictions in this Section 6.3.8 (Major Approval Delay) and Articles 13 (General Provisions Applying to Delay Events and Relief Events) and 14 (Compensation and Other Relief for Delay Events and Relief Events), any Contract Deadline(s) affected by a Major Approval Delay shall be extended in accordance with, and subject to, Section 14.1.3.

**6.3.8.7** Principal Project Company shall not be entitled to extension of any Contract Deadline or other relief for a Major Approval Delay pursuant to Section 6.3.8 (Major Approval Delay) or otherwise unless all of the following conditions are satisfied (in addition to satisfaction of any conditions specified in Section 6.3.8 ((Major Approval Delay)):

- (a) Principal Project Company has timely satisfied the “Major Approval Conditions to Assistance” requirements described in Section 6.3.8.2;
- (b) Principal Project Company has provided evidence satisfactory to City that (i) Principal Project Company took advantage of Float available early in the Project Schedule for coordination activities with respect to the Governmental Entity to which the Major Approval relates, (ii) Principal Project Company has fulfilled its obligation to coordinate with the Governmental Entity to prevent or reduce such delays, and (iii) Principal Project Company has otherwise made diligent efforts to obtain timely performance by the Governmental Entity but has been unable to obtain such timely performance;
- (c) There exist no circumstances which have delayed or are delaying the Major Approval, other than those that fit within the definition of a Major Approval Delay; and
- (d) The delay is otherwise allowable under Articles 13 (General Provisions Applying to Delay Events and Relief Events) and 14 (Compensation and Other Relief for Delay Events and Relief Events).

**6.3.8.8** Principal Project Company shall not be entitled to any Extra Work Costs, Delay Costs or for any other increased costs or Claims attributable to delays described in this Section 6.3.8 (Major Approval Delay).

## **6.4 Compliance with Laws**

### **6.4.1 Applicable Laws**

**6.4.1.1** Principal Project Company shall comply with, and require that all Contractors comply with, all applicable Laws, including those set forth or described in Exhibit 16 (Federal, State and City Requirements).

**6.4.1.2** All provisions required by applicable Laws to be included in this Agreement are incorporated by reference in this Agreement.

### **6.4.2 Environmental Compliance**

**6.4.2.1** Without limiting the generality of Section 6.4.1.1, Principal Project Company shall comply with, and require that all Contractors comply with, all Environmental Laws.

## **6.5 Compliance with Regulatory Approvals**

Throughout the Term and the course of the Work, Principal Project Company shall:

- (a) comply with all commitments, obligations, responsibilities, conditions and requirements imposed by all Regulatory Approvals, except, with respect to Environmental Approvals only, those obligations, commitments and responsibilities of City that are expressly allocated to City or a Third Party and are expressly excluded from Principal Project Company's scope of Work;
- (b) undertake all actions required by, or necessary to maintain in full force and effect all Regulatory Approvals to be obtained by Principal Project Company; and
- (c) comply with and implement, and cause Contractors to comply with and implement, all mitigation, monitoring, and reporting measures listed in the CEQA MMRP and the NEPA document or associated decision document, as applicable.

## **6.6 Communication and Public Outreach**

**6.6.1** Principal Project Company shall prepare and implement City's Public Outreach Plan developed pursuant to Section 1.15 of Division 1 of the Technical Requirements and Division 9 of the Technical Requirements.

**6.6.2** Principal Project Company is prohibited from making any public announcement or disclosure with respect to the Project, whether for publication in the press, radio, television or any other medium, unless Principal Project Company has obtained City's prior written approval.

## **6.7 Coordination, Cooperation and Access**

**6.7.1** Principal Project Company shall coordinate and cooperate with City, Third Parties, Utility Owners, Other Contractors and Governmental Entities with jurisdiction in matters relating to the Work, including facilitating their Oversight of the Work, as applicable, including pursuant

to Sections 1.12 and 1.13 of Division 1 of the Technical Requirements. Principal Project Company shall coordinate and cooperate with Other Contractors that may be carrying out work within the Project Site or in the land adjoining or near the Project Site.

**6.7.2** Principal Project Company shall provide City and City's representatives with:

- (a) safe and unrestricted access to the Project Site and the Project at all times; and
- (b) safe access during normal business hours to Principal Project Company's Project offices, operations buildings, and Temporary Areas.

**6.7.3** Notwithstanding anything to the contrary in this Agreement, whenever City or its representatives are present on the Project Site and production facilities, including while conducting Oversight, they will abide by the applicable Contractor's reasonable, non-discriminatory safety policies and practices and will take appropriate measures to avoid unreasonable interference with normal construction activity or normal operation and maintenance activity.

**6.7.4** Principal Project Company shall not interfere with the work of or cause any delay to any Other Contractors that may be carrying out work within the Project Site or in the land adjoining or near the Project Site and will allow them reasonable access to the Project Site, provided that Principal Project Company shall not be in breach of this Section 6.7.4 for any temporary interruption to the work of any Other Contractors that (a) has been agreed to in advance in accordance with procedures agreed to by Principal Project Company, such contractor and any relevant Third Party; or (b) is reasonably necessary in accordance with Law and Good Industry Practice to respond to emergencies creating an immediate and serious threat to public health, safety, security or the Environment.

## **6.8 Intentionally Deleted**

## **6.9 Safety Compliance**

**6.9.1** City may from time to time issue Safety Compliance Orders to Principal Project Company with respect to the Project to implement Safety Compliance.

**6.9.2** Promptly upon City obtaining Actual Knowledge of any circumstance or information relating to the Project that, in City's reasonable judgment, is likely to result in a Safety Compliance Order, City will provide Notice to Principal Project Company regarding the issue. Except in the case of an Emergency, City will consult with Principal Project Company before issuing a Safety Compliance Order concerning the risk to public or worker safety, alternative compliance measures, cost impacts, and the availability of Principal Project Company resources to fund the Safety Compliance work.

**6.9.3** Where a Governmental Entity or other regulatory authority other than City directs a Safety Compliance Order, in order for Principal Project Company to comply with the Safety Compliance Order, City shall issue a corresponding Safety Compliance Order to Principal Project Company.

**6.9.4** Principal Project Company shall implement each Safety Compliance Order as expeditiously as reasonably possible following its issuance. Principal Project Company shall diligently prosecute the work necessary to achieve such Safety Compliance until completion.

## **6.10 Law Enforcement and Security**

### **6.10.1 Law Enforcement Services**

**6.10.1.1** Principal Project Company acknowledges and agrees that law enforcement agencies, including City in its regulatory capacity, are empowered to enforce all applicable Laws and to enter the Project, and that any person engaged by City to provide law enforcement services has the authority to enter the Project, at any and all times to carry out their duties. Principal Project Company shall ensure that law enforcement agencies have necessary access to the Project to carry out their duties, power and jurisdiction.

**6.10.1.2** City shall not have any liability or obligation to Principal Project Company arising out of, relating to or resulting from the failure of law enforcement agencies to provide services, or any of their, or their respective agents' or employees', acts, omissions, negligence or misconduct in providing services, except to the extent such failure, act, omission, negligence or misconduct otherwise qualifies as a Compensable Delay Event Relief under clause (i) of the definition thereof or a Compensable Relief Event under clause (d) of the definition thereof. The general indemnity in Section 10.6.1 (General Indemnity) shall not apply to the extent that a claim, cause of action, suit, legal or administrative proceeding or any other occurrence, loss or damage of the type listed in Section 10.6.1 (General Indemnity) is directly attributable to actions of a law enforcement agency designated by City to provide services for the Project, and is not due to any PPC Fault.

### **6.10.2 Security**

**6.10.2.1** Principal Project Company is responsible for the security of the Project and safety of the workers and public within the Project Site and the Infrastructure Facility during the performance of the D&C Work. During the IFM Period, Principal Project Company is responsible for protecting the Infrastructure Facility from damage and providing safe operation of the Infrastructure Facility.

**6.10.2.2** Principal Project Company shall comply with all rules, directives and guidance of the U.S. Department of Homeland Security and other comparable agencies, and shall coordinate and cooperate with all Governmental Entities providing security, first responder and other public emergency response services.

## **6.11 Warranties**

### **6.11.1 Warranties for SFMTA O&M Facilities**

**6.11.1.1** Principal Project Company warrants each SFMTA O&M Facility against Defects during the period commencing on Substantial Completion of the Project and ending two years thereafter. The general warranty contained in this Section 6.11.1.1 is in addition to any express warranties provided for elsewhere in the Contract Documents. Principal Project Company warrants with respect to the SFMTA O&M Facilities that:

- (a) the Construction Work shall be free of Defects, except to the extent that such Defects are inherent in prescriptive specifications included in the Contract Documents;
- (b) materials and equipment furnished by or on behalf of any PPC-Related Entity under the Contract Documents shall be of good quality and when installed, shall be new;
- (c) equipment furnished by or on behalf of any PPC-Related Entity shall be in good working condition;
- (d) the Work shall meet all of the requirements of the Contract Documents and Good Industry Practice;
- (e) the Work shall be free of Deviations that have not been approved by City; and
- (f) the Project shall be fit for use for the intended function as contemplated by the Contract Documents.

**6.11.1.2** Principal Project Company shall perform, at Principal Project Company's sole cost and expense, warranty Work for any SFMTA O&M Facilities Defect:

- (a) with respect to which City delivers written Notice to Principal Project Company within the applicable warranty period; or
- (b) of which Principal Project Company otherwise has Actual Knowledge before the expiry of the applicable warranty period.

**6.11.1.3** Principal Project Company shall commence the applicable SFMTA O&M Facility warranty Work within 14 days of written Notice of the relevant SFMTA O&M Facilities Defect from City or Principal Project Company's Actual Knowledge thereof, whichever is earlier; or such shorter period as may be designated by City for emergency repairs. Principal Project Company shall thereafter diligently complete the SFMTA O&M Facility warranty Work as soon as reasonably practicable and promptly provide Notice to City in writing of completion of same.

**6.11.1.4** If Principal Project Company fails to commence or pursue with diligence and complete the SFMTA O&M Facility warranty Work as required, City may provide written Notice of such failure to the Principal Project Company. If the Principal Project Company's failure continues for three Business Days after the City delivers this Notice, the City may, in its sole discretion, perform the SFMTA O&M Facility warranty Work, and Principal Project Company shall reimburse City within seven days after any written demand from City for Recoverable Costs incurred by City in connection with the performance of the SFMTA O&M Facility warranty Work, including any related reasonable attorneys' and consultants' fees and expenses.

**6.11.1.5** In the event of an emergency constituting an immediate hazard to health or safety of Building Occupants or City property due to an SFMTA O&M Facilities Defect, City may undertake, at Principal Project Company's sole cost and expense and without prior Notice, all work necessary to correct such hazardous condition(s).

**6.11.1.6** Before expiry of the applicable warranty period, Principal Project Company shall execute and deliver to City a written assignment, in form and substance reasonably acceptable to City, of all Principal Project Company's and Contractors' right, title and interest in and to all warranties, and to the extent assignable, claims and causes of action held by Principal Project Company or its Contractors against Third Parties, concerning the SFMTA O&M Facilities.

### **6.11.2 Contractor Warranties and Guaranties**

**6.11.2.1** Principal Project Company shall obtain from all Contractors representations, warranties, guarantees and obligations in accordance with Good Industry Practice for work of similar scope and scale, with respect to design, materials, workmanship, equipment, tools and supplies furnished by all such Contractors and Suppliers, which shall extend not only to Principal Project Company but also to City and any Utility Owner or Authority Having Jurisdiction for whom Work is being performed. The warranties from Key Contractors shall be for such periods as specified in the Technical Requirements or, if not specified, a period of not less than two years from the date of the Certificate of Substantial Completion. All representations, warranties, guarantees and obligations of Key Contractors: (a) shall be written so as to survive all City and any Third Party inspections, tests and approvals; and (b) shall provide that upon expiration or any earlier termination of this Agreement before the expiration of such representations, warranties, guarantees and obligations they shall automatically be for the benefit of and enforceable by City and its successors and assigns, and any Utility Owner or Authority Having Jurisdiction for whom Work is being performed, subject to the rights of the Lenders as provided in any Direct Agreement.

**6.11.2.2** To the extent that any Contractor warranty or guaranty is voided after termination of this Agreement by reason of Principal Project Company's negligence or failure to comply with the requirements of the Contract Documents in incorporating material or equipment into the Project, Principal Project Company shall correct any Defects which would otherwise have been covered by such warranty.

**6.11.2.3** Contractor warranties are in addition to all rights and remedies available under the Contract Documents or applicable Law, and shall not limit Principal Project Company's liability or responsibility imposed by the Contract Documents or applicable Law with respect to the Work, including liability for design Defects, construction Defects, strict liability, breach, negligence, willful misconduct or fraud.

**6.11.2.4** Principal Project Company hereby assigns to City all warranties and guaranties under each Contract, as well as Principal Project Company's rights under the Contracts, effective as of the end of the Term.

### **6.11.3 Warranties for Utility Owners and Authorities Having Jurisdiction**

If required by the Utility Owner or Authority Having Jurisdiction, as applicable, Principal Project Company shall provide, or obtain and ensure performance under as if Principal Project Company provided, warranties and guaranties, for all Work performed for Utility Owners and Authorities Having Jurisdiction, for two years after the date of acceptance of such work by the Utility Owner or Authority Having Jurisdiction, as applicable or such longer term as provided in any agreement with the Utility Owner or Authority Having Jurisdiction, for the benefit (with rights of enforcement) of such Utility Owner or Authority Having Jurisdiction. City shall have, and shall

be identified as a third party beneficiary of the right to enforce, all such warranties and guaranties of such work. Upon acceptance of such work by the Utility Owner or Authority Having Jurisdiction, as applicable, and delivery of an assignment of the relevant warranty and guaranty rights to the Principal Project Company shall be relieved of responsibility for maintenance of such work.

## **6.12 Maintain Good Standing**

**6.12.1** Principal Project Company shall remain qualified to do business in the State and remain in and maintain good standing and shall undertake all actions to do so, including continued timely submission of all required information and payments when due to the California Secretary of State, Franchise Tax Board, Internal Revenue Service, or any other applicable agency or entity. Principal Project Company shall immediately provide Notice to City if it is no longer duly qualified and in good standing.

**6.12.2** Principal Project Company shall ensure that each Key Contractor shall remain duly qualified to do business in the State and in good standing throughout the term of the Key Contract and immediately provide Notice to City if a Key Contractor is no longer duly qualified or in good standing.

---

## ARTICLE 7. DESIGN AND CONSTRUCTION

### 7.1 General Obligations of Principal Project Company Concerning D&C Work

#### 7.1.1 Principal Project Company shall:

- (a) expeditiously and diligently progress performance of the D&C Work to achieve Substantial Completion by the Substantial Completion Deadline;
- (b) carry out or do all things necessary to perform the D&C Work and design and construct the Infrastructure Facility in accordance with the Contract Documents and Good Industry Practice;
- (c) ensure the Infrastructure Facility meets the requirements of the Contract Documents, including that the Infrastructure Facility be constructed in compliance with the San Francisco Green Build Code (Chapter 7 (Green Building Requirements for City Buildings) of the San Francisco Environment Code) and achieve LEED Gold certification;
- (d) provide maintenance and other services as described in the Contract Documents;
- (e) ensure adequate materials, equipment and resources are available to ensure compliance with the requirements of the Contract Documents under normal conditions and reasonably anticipated abnormal conditions;
- (f) ensure all materials and equipment are of good quality and new unless otherwise expressly stated;
- (g) ensure, as of the Substantial Completion Date, the Construction Work shall be free of Defects, errors and omissions, except as may be set out in the Punch List (which shall be fully resolved as of Final Acceptance of the Infrastructure Facility);
- (h) ensure, as of the Substantial Completion Date, the Design Work meets each of the requirements set out in this Agreement;
- (i) ensure the Project Site is kept in a safe, secure, neat and clean condition at all times;
- (j) cooperate with City and Authorities Having Jurisdiction in all matters relating to the D&C Work, including their Oversight of D&C Work;
- (k) remove and replace Nonconforming Work and/or materials, whether discovered or rejected by City or Principal Project Company, or otherwise remedy such Nonconforming Work and/or materials in an acceptable manner and in accordance with the requirements of the Contract Documents; and

- (l) pay all direct and indirect costs for all Utility services required to perform and complete the D&C Work in accordance with the requirements of the Contract Documents.

## **7.2 Performance, Design and Construction Standards**

**7.2.1** Principal Project Company shall construct and equip the Infrastructure Facility in accordance with the Project's Release for Construction Documents, taking into account the Project Site limits and other constraints affecting the Project.

**7.2.2** The Project design and construction shall be subject to certification in accordance with the procedures contained in the approved PPC's Design Quality Plan and PPC's Construction Quality Plan.

**7.2.3** Principal Project Company shall use reasonable efforts to identify and provide Notice to City of any specifications or other provisions in the Technical Requirements that are erroneous, create a potentially Unsafe Condition, or may be inconsistent with Good Industry Practice or applicable Law. Such Notice must include a request for City approval of a Deviation or changes to the provision that Principal Project Company believes are necessary to render it correct, safe and consistent with Good Industry Practice and applicable Law. If Principal Project Company commences or continues any D&C Work affected by the change after the need for the change was known, or should have been known through the exercise of reasonable care, Principal Project Company shall bear any additional costs and time associated with redoing the D&C Work already performed.

**7.2.4** After Commercial Close, City may modify relevant provisions of the Technical Requirements to incorporate any changed, added or replaced Standards and Specifications applicable to the D&C Work by delivering a City Change to Principal Project Company.

## **7.3 Design Implementation**

Principal Project Company, through appropriately qualified professional engineers and architects registered and licensed in the State and identified in Principal Project Company's Project Management Plan, shall furnish designs, plans and specifications in accordance with the Contract Documents. Principal Project Company shall cause the architect(s) of record and/or Engineer(s) of Record for the Project to sign and seal all Final Design Documents.

## **7.4 Schedule, Deadlines, Notices to Proceed and Commencement of Work**

### **7.4.1 Project Schedule**

**7.4.1.1** Subject to occurrence of a Delay Event resulting in an extension of time in accordance with this Agreement, if any, Principal Project Company represents and warrants that, as of the Effective Date, its Project Schedule represents a practical schedule to complete performance of the Work through Final Acceptance and is consistent with applicable deadlines.

**7.4.1.2** Between the Effective Date and the earlier of NTP2 and approval of Principal Project Company's Project Schedule in accordance with Section 7.4.1.3, Principal Project Company shall perform the Work in accordance with the Initial Schedule.

**7.4.1.3** Principal Project Company shall submit to City, for City review and approval, a proposed detailed Project Schedule in accordance with Section 1.2 of Division 1 of the Technical Requirements and Exhibit 11 (Submittal Review Process).

**7.4.1.4** Upon City's approval, the detailed Project Schedule becomes the Project Schedule and Principal Project Company shall perform the remaining Work in accordance with such Project Schedule.

**7.4.1.5** The Parties shall use the Project Schedule for planning and monitoring the progress of the D&C Work. The Project Schedule shall include the deadlines for Substantial Completion and Final Acceptance of the Infrastructure Facility.

**7.4.1.6** Principal Project Company shall not be limited in the sequencing or staging of the D&C Work, except to the extent that the Contract Documents or applicable Law imposes limitations.

**7.4.1.7** Principal Project Company acknowledges and agrees that the Contract Deadlines provide reasonable and adequate time to perform the Work required within the Contract Deadlines, subject only to Principal Project Company's rights to obtain time extensions under Article 14 (Compensation and Other Relief for Delay Events and Relief Events).

## **7.4.2 Float**

**7.4.2.1** All Float contained in the Project Schedule, or as generated during the course of the Work, shall be a project resource and available to both City and Principal Project Company, and shall not be considered as time for exclusive use or benefit of either City or Principal Project Company. Principal Project Company shall cause each Prime Contractor to acknowledge Float to be available to City as well as Principal Project Company as needed to absorb delay caused by Delay Events or other events, achieve interim completion dates and achieve Contract Deadlines.

**7.4.2.2** All Float shall be identified as such in the Project Schedule on each affected schedule path. City shall have the right to examine the identification of (or failure to identify) Float on the Project Schedule in determining whether to approve the Project Schedule. Once identified, Principal Project Company shall monitor, account for and maintain Float in accordance with critical path methodology.

## **7.4.3 Commencement of Non-Construction Work**

Except as provided in Section 7.4.6 (Work Before NTP 1), Principal Project Company shall not commence any Work until City has issued NTP 1 authorizing commencement of non-Construction Work. City shall promptly issue NTP 1 when all of the conditions set forth in Exhibit 15A (Conditions to NTP 1 - Commencement of Non-Construction Work) have been satisfied.

## **7.4.4 Commencement of Construction Work**

Principal Project Company shall not commence any portion of the Construction Work until City has issued NTP 2 authorizing commencement of the applicable portion of Construction Work.

City shall promptly issue NTP 2 when all of the conditions set forth in Exhibit 15B (Conditions to NTP 2 - Commencement of Construction Work) have been satisfied.

**7.4.5** References in the Technical Requirements to Standards and Specifications relating to the D&C Work shall mean the most recent editions in effect as of the Setting Date, unless expressly provided otherwise.

#### **7.4.6 Work Before NTP 1**

**7.4.6.1** Except as provided in Section 7.4.6.2 and as may be provided pursuant to any Early Works Agreement between Principal Project Company and City, Principal Project Company shall not perform any Work prior to NTP 1.

**7.4.6.2** Before NTP 1, Principal Project Company shall perform all Work required to achieve Financial Close, and otherwise undertake all efforts to satisfy the conditions set forth in Exhibit 15A (Conditions to NTP 1 - Commencement of Non-Construction Work). If Financial Close fails to occur, City shall have no obligation to reimburse Principal Project Company for any of its costs incurred relating to this Agreement, other than payments allowed under Section 3.6 (No-Fault Termination).

### **7.5 Acquisition of Real Property**

#### **7.5.1 Additional Acquisitions**

**7.5.1.1** If Principal Project Company identifies any property that is not subject to Section 7.5.1.2 but that Principal Project Company seeks to add to the Project Site to accommodate Principal Project Company's particular design or for Principal Project Company's convenience in performing the Work, then Principal Project Company may submit to City a request for acquisition of additional property interests and related documentation as reasonably requested by City. In such event, Principal Project Company shall prepare and submit to City for review and approval new or revised surveys, legal descriptions, a preliminary title report and a copy of all encumbrances of record, draft site plats, design and other appropriate documentation of basis of acquisition and justification of acquisition. Principal Project Company's request shall include an analysis identifying alternative approaches that could be adopted to avoid the need for the acquisition, including use of retaining walls and other design modifications. Following delivery of a request under this Section 7.5.1.1:

- (a) City will review the request and supporting documentation and will determine whether the proposed acquisition appears to be appropriate for the Project, whether any additional information or documentation is necessary for the acquisition, and the anticipated schedule for the acquisition;
- (b) upon agreement between City and Principal Project Company regarding the acquisition of any additional property, Principal Project Company shall support the acquisition as requested by City; and
- (c) prior to acquisition of any additional property interests under this Section 7.5 (Acquisition of Real Property), Principal Project Company shall provide to City any additional documentation required by City for the acquisition.

**7.5.1.2** If City chooses to acquire property proposed for acquisition by Principal Project Company pursuant to Section 7.5.2.1 (“**Additional Properties**”), City will proceed with the acquisition, subject to this Section 7.5 (Acquisition of Real Property). In all situations, City has no obligation to acquire any Additional Property.

**7.5.1.3** Principal Project Company shall be responsible for the cost to acquire Additional Properties, together with all costs and expenses incurred by City in connection with acquiring Additional Properties. In paying all such costs and expenses, Principal Project Company is not acquiring, and shall not be deemed to be acquiring, any interest in real property for Principal Project Company. Such costs and expenses shall include:

- (a) the cost of acquisition services, relocation services and associated document preparation costs;
- (b) the cost of relocation assistance in accordance with applicable Law;
- (c) the cost of condemnation proceedings, including attorneys’ and expert witness fees, and all fees and expenses for production of exhibits, transcripts, photos and other documents and materials;
- (d) the acquisition price of the Additional Properties and associated appraisals, costs, settlements, offers of judgment, court awards or judgments, including pre-judgment and post-judgment interest, costs, attorney’s fees, claims for loss of business goodwill and any other consideration for the Additional Properties;
- (e) the cost of permanent or temporary acquisition of leases, easements, rights of entry, licenses and other interests in real property, including for drainage, temporary work space, Temporary Areas, and any other convenience of Principal Project Company;
- (f) the cost of permitting; and
- (g) closing costs in accordance with City policies.

**7.5.1.4** City will submit statements to Principal Project Company regarding Recoverable Costs relating to acquisition of Additional Properties, not more often than monthly. Principal Project Company shall reimburse City for Recoverable Costs within 30 days of receipt of an invoice. In addition to any other remedy, City shall have the right to curtail or suspend acquisition activities if Principal Project Company for any reason fails to pay any such invoice in full when due. City will resume acquisition activities promptly after delinquent amounts are paid in full with interest.

**7.5.1.5** Principal Project Company shall bear all risk of delays related to acquisition of Additional Properties and the risk that an Additional Property is not able to be acquired. Each Additional Property shall become part of the Project Site only upon City’s written Notice to Principal Project Company indicating that the Additional Property has been acquired and that City grants Principal Project Company access to the Additional Property.

**7.5.1.6** Principal Project Company shall not be entitled to any compensation or any extension of any Contract Deadline under the Contract Documents or otherwise entitled to make a Claim as a result of (i) site conditions associated with any Additional Properties (including those relating to Hazardous Materials, differing site conditions, or Utilities)

## **7.5.2 Temporary Interests in Property**

**7.5.2.1** Principal Project Company shall be solely responsible for acquisition of any temporary interests in property that Principal Project Company determines is necessary, desirable or advisable to obtain in connection with the Project or the Work. Principal Project Company shall pay directly the cost to acquire, maintain, operate, and/or dispose of all such property interests. If the property is within the limits of any real property scheduled for acquisition by City or is intended to be used for permanent improvements, or if Principal Project Company intends to request City to acquire such real property, Principal Project Company shall coordinate with City and shall not negotiate with the owner(s) of such interests except with express permission of City and in compliance with applicable Law.

**7.5.2.2** City shall have no obligation to acquire temporary interests in property. Principal Project Company shall solely bear the risk of any delays and cost impacts related to acquisition of temporary interests, regardless of whether City agrees to undertake any such acquisition.

**7.5.2.3** Principal Project Company shall promptly provide Notice to City regarding all temporary interests in property that it or any of its Contractors acquires in the vicinity of the Project.

## **7.5.3 Property Acquisitions and Scheduling Work**

**7.5.3.1** Principal Project Company's Project Schedule shall not provide for any Work to be done on any Additional Properties acquired or to be acquired in accordance with Section 7.5.1 (Additional Acquisitions) until after City has granted Principal Project Company access to the Additional Property in writing.

**7.5.3.2** Concurrently with the initial review of the Project Schedule, Principal Project Company and City shall meet to discuss:

- (a) Principal Project Company's access requirements associated with planned activities and the extent to which delay in access to property identified for acquisition under Section 7.5.1 (Additional Acquisitions) is likely to affect a Critical Path;
- (b) what efforts (if any) could reasonably be undertaken by the Parties to accelerate acquisition of any critical real property interests;
- (c) whether schedule delays may be avoided by providing access to property subject to conditions or restrictions;
- (d) whether any changes should be made to the Project Schedule; and

- (e) whether anticipated covenants, conditions and restrictions affecting access will affect Principal Project Company's ability to perform Work as scheduled, and how to mitigate any such problems.

**7.5.3.3** Principal Project Company shall coordinate with City regarding:

- (a) completion of Project design and identification of final site requirements and construction impacts;
- (b) any adjustments to the Project Schedule necessary to reflect City's expected timeline to acquire any property identified for acquisition under Section 7.5.1 (Additional Acquisitions); and
- (c) any design features that may impact properties for which no property acquisition is contemplated, with the goal of avoiding damages to properties not previously identified and addressed.

**7.6 Utilities, Utility Adjustments and Utility Delay**

**7.6.1 Utilities to Serve Facility**

**7.6.1.1** Principal Project Company shall be solely responsible for obtaining and implementing all new Utility services needed for the Infrastructure Facility, and must timely submit the appropriate applications to obtain electricity, water, sewer, cable, etc. This work expressly includes obtaining electricity and power from PG&E for the Project, including all applications and coordination required to obtain such Utility services.

**7.6.1.2** City shall, from time to time as required, enter into contracts with Energy suppliers for the supply of Energy to the Infrastructure Facility and shall be responsible for all payments due pursuant to such supply contracts. For avoidance of doubt, the Infrastructure Facility's electricity, natural gas, water, and other such Utility bills will be sent to City and City will be responsible for paying such utility bills. Principal Project Company will be provided with copies of the invoices.

**7.6.2 Principal Project Company's General Responsibilities**

**7.6.2.1** Principal Project Company shall be responsible for all Utility Adjustments required by the Project.

**7.6.2.2** City agrees to cooperate as reasonably requested by Principal Project Company in advancing Utility Adjustments, including attendance at negotiation sessions and review with Utility Owners. Principal Project Company shall timely keep City informed of the status of any such negotiations.

**7.6.2.3** Principal Project Company shall bear the sole risk, cost and schedule impact of Utility Adjustments other than, subject to Articles 13 (General Provisions Applying to Delay Events and Relief Events) and 14 (Compensation and Other Relief for Delay Events and Relief Events), as a direct result of a City Change or Relief Event.

### **7.6.3 Avoiding Utility Adjustments and Minimizing Costs**

**7.6.3.1** Principal Project Company shall minimize Utility Adjustments in the design and construction of the Infrastructure Facility and costs for which Principal Project Company may be entitled to additional compensation pursuant to the Contract Documents, including by taking into account existing Utilities (and their location) in its design and working around existing Utilities (including existing PG&E poles at or adjacent to the Project Site), including through its construction sequencing, means and methods. If a Utility Adjustment could have been avoided through Principal Project Company undertaking a Reasonable Investigation prior to the Setting Date, Principal Project Company shall bear the full risk and liability associated with such Utility Adjustment, irrespective of any other provisions in this Agreement that might provide compensation, time or other relief in connection with such Utility Adjustment.

**7.6.3.2** Principal Project Company shall reimburse City for any costs City incurs as a result of Principal Project Company's failure to comply with the requirements of this Section 7.6.3 (Avoiding Utility Adjustments and Minimizing Costs).

### **7.6.4 Allocation of Work Responsibility**

**7.6.4.1** The allocation of responsibility for performing Utility Adjustment design, construction, and/or materials procurement for each Utility Adjustment as between Principal Project Company and the Utility Owner shall be determined in accordance with Section 1.13 of Division 1 of the Technical Requirements (including pursuant to the Utility Coordination Work Plan and Utility Project Execution Plan). For purposes of this Section 7.6 (Utilities, Utility Adjustments and Utility Delay) and Section 1.13 of Division 1 of the Technical Requirements, references to responsibility for performing Utility Adjustment design and construction include all tasks customarily associated therewith; provided, however, that Principal Project Company shall be responsible for all coordination with Utility Owners that is necessary in order to accomplish the Utility Adjustments in compliance with the requirements of the Contract Documents.

**7.6.4.2** Principal Project Company is responsible for scheduling all Utility Adjustments so as allow for the issuance of NTP 2 as soon as practicable and to meet all applicable Contract Deadlines, without regard to whether a Utility Adjustment is performed by Principal Project Company or by the affected Utility Owner (or its contractors). Accordingly, under no circumstances shall any reallocation of responsibility for Utility Work between Principal Project Company and a Utility Owner be considered grounds for a time extension hereunder.

**7.6.4.3** No increase or decrease in compensation payable to Principal Project Company shall be made pursuant to this Section 7.6.4 (Allocation of Work Responsibility) on account of any change in the allocation of responsibility for Incidental Utility Work, or any other matter for which the Contract Documents specify how liability, cost or risk is to be allocated between City and Principal Project Company.

### **7.6.5 Utility Adjustment Costs**

**7.6.5.1** Principal Project Company is responsible for all costs of the Utility Work, including costs of acquiring Utility easements and costs with respect to relinquishment or acquisition of Utility Owner property interests, but excluding (a) costs attributable to Utility Betterments, for which the Utility Owner is responsible and which are not paid to Utility Owner by City; and (b)

any other costs for which the Utility Owner is responsible under Law which are not paid to Utility Owner by City. Principal Project Company shall fulfill this responsibility either by performing the Utility Work at its own cost, if permitted by the Utility Owner, or by reimbursing the Utility Owner for the Utility Owner's performance of the Utility Work, in accordance with Section 7.6.5.4. Principal Project Company shall bear the costs due to the Utility Owner and all costs and expenses associated therewith, including the costs of Utility Owner inspections and any overtime charges incurred by the Utility Owner. Principal Project Company is solely responsible for collecting directly from the Utility Owner any amount due to Principal Project Company for Utility Betterment costs or other costs incurred by Principal Project Company for which the Utility Owner is responsible, whether under Law or otherwise.

**7.6.5.2** If for any reason Principal Project Company is unable to collect any amounts due to Principal Project Company from any Utility Owner, then as between City and Principal Project Company, (a) City shall have no liability for such amounts, (b) Principal Project Company shall have no right to collect such amounts from City or to offset such amounts against amounts otherwise owing from Principal Project Company to City, and (c) Principal Project Company shall have no right to stop Work, sue for *mandamus*, demand or plead in any court for City's participation in resolution of any dispute with the Utility Owner, or seek to exercise any other remedies against City on account of the Utility Owner's failure to pay.

**7.6.5.3** Principal Project Company shall maintain a complete set of records for the costs of Utility Work performed (whether incurred by Principal Project Company or by the Utility Owner), in a format reasonably satisfactory to City and in sufficient detail for analysis. For both Utility Owner costs and Principal Project Company costs, the totals for each cost category shall be shown in such manner as to permit comparison with the categories stated on the estimate. Principal Project Company. All records with respect to Utility Work shall comply with the record keeping and audit requirements of the Contract Documents.

**7.6.5.4** To the extent that City is required to initially pay a Utility Owner for any costs related to Utility Owner's performance of Utility Work under this Section 7.6.5 (Utility Adjustment Costs), Principal Project Company, on a monthly basis, shall reimburse City for any costs incurred in connection with such Utility Work. The amounts reimbursed shall be due and payable within 10 days after receipt of City's invoice for such Utility Work. City, in its sole discretion, may also deduct the amount to be reimbursed from any payment due and payable to Principal Project Company should Principal Project Company fail to reimburse City for such Utility Work.

## **7.6.6 Incidental Utility Work**

Notwithstanding any contrary provision of the Contract Documents, Principal Project Company shall be responsible for all Incidental Utility Work without regard to the allocation of Work responsibility otherwise established pursuant to this Section 7.6 (Utilities, Utility Adjustments and Utility Delay). Without limiting the provision of Section 7.6.2.3, Principal Project Company also shall be responsible for furnishing all designs for Incidental Utility Work that Principal Project Company performs, unless such designs are included among that portion of the Utility Work to be performed by the Utility Owner. Principal Project Company shall not be entitled to any adjustment in its compensation or Contract Deadlines on account of costs incurred, cost savings or delays associated with the performance of Incidental Utility Work by Principal Project Company or by any Utility Owner.

## **7.6.7 Bonds and Insurance; Security for Utility Adjustment Costs**

**7.6.7.1** All Utility Work shall automatically be covered by the Payment Bonds and Performance Bonds described in Section 10.2 (Performance Security) and by the insurance described in Section 10.1 (Insurance).

**7.6.7.2** Principal Project Company shall satisfy all requirements of Utility Owners to provide security for reimbursement of Utility Adjustment costs to which the Utility Owner is entitled and that are the responsibility of Principal Project Company hereunder.

## **7.6.8 Utility Investigation by Principal Project Company**

**7.6.8.1** During the PDA Term, Principal Project Company has undertaken an investigation of Utilities affecting the Project Site, including Utilities located on, in, under, around or impacting the Project Site and the Project. Principal Project Company represents and warrants that it has analyzed Reference Documents, diligently commenced coordination concerning Utility Adjustments (including submitting and actively pursuing relocation applications to Utility Owners with respect to impacted Utilities, taking into account the Project Schedule), contacted and made inquiries of Utility Owners, performed substantial surface inspections of the Project Site and undertaken such additional inspections, including substantial subsurface utility investigations, as it deems appropriate and as are required by the Contract Documents and in keeping with Good Industry Practice to verify, fully and accurately identify all Utilities (including contacting and accessing Non-Dig Alert Utilities), addressing all field conditions, and validating the Utility Information. Principal Project Company acknowledges that its rights to any compensation, time or other relief in connection with Utilities, Unidentified Utilities, Utility Adjustments and Utility Delay is conditioned on the accuracy of the foregoing representations and warranties.

**7.6.8.2** Except as otherwise provided in Sections 7.6.9 (Claims for Inaccuracies in Utility Information) and 7.6.13 (Utility Delays), the Parties specifically intend by Section 7.6 (Utilities, Utility Adjustments and Utility Delay) to delegate to Principal Project Company the obligation to perform all responsibilities with respect to identification of all Utilities and to allocate to Principal Project Company all risk of increased costs and time of the Utility Work resulting from inaccuracies in the reputed locations of such facilities (and in any other relevant information with respect to such facilities).

## **7.6.9 Claims for Inaccuracies in Utility Information**

**7.6.9.1** If during performance of Construction Work, Principal Project Company encounters any Non-Dig Alert Utilities located at the Project Site that requires a Utility Adjustment, and such Utility is (i) an Unidentified Utility; (ii) not a Service Line; and (iii) not identified or reflected in whole or in part in the Utility Information, then, subject to the provisions of Articles 13 (General Provisions Applying to Delay Events and Relief Events) and 14 (Compensation and Other Relief for Delay Events and Relief Events), Principal Project Company shall be entitled to a Change Order to compensate Principal Project Company for any material increase in Principal Project Company's actual direct costs of performing the Utility Work that is directly attributable to undertaking the Utility Adjustment of the Non-Dig Alert Utility. The amount of such Change Order shall be determined in accordance with Article 14 (Compensation and Other Relief for Delay Events and Relief Events).

---

**7.6.9.2** Principal Project Company shall not be entitled to any compensation pursuant to this Section 7.6.9 (Claims for Inaccuracies in Utility Information) or otherwise for any of the following:

- (a) Increased costs of the Work attributable to Unidentified Utilities and Non-Dig Alert Utilities, to the extent that the existence of the facility was known to Principal Project Company as of the Setting Date or could have been inferred from a Reasonable Investigation or otherwise from the presence of other facilities, such as buildings, meters, junction boxes, manholes or identifying markers, visible during a surface inspection of the area conducted prior to the Effective Date;
- (b) Increased costs of the Work attributable to Unidentified Utilities and Non-Dig Alert Utilities where Principal Project Company failed to provide timely Notice in accordance with Articles 13 (General Provisions Applying to Delay Events and Relief Events) and 14 (Compensation and Other Relief for Delay Events and Relief Events);
- (c) Increased costs of the Work attributable to Unidentified Utilities and Non-Dig Alert Utilities that can be Protected in Place or removed rather than physically relocated;
- (d) Any additional costs incurred by Utility Owners (that are not reimbursable or payable to the Utility Owner) as a result of the Unidentified Utility;
- (e) Increased costs of the Utility Work attributable to all other Utilities that are not Unidentified Utilities or Non-Dig Alert Utilities; and
- (f) Delay and disruption damages, except as specifically set forth in the Contract Documents.

### **7.6.10 Changes in Design**

**7.6.10.1** For purposes of this Section 7.6.10 (Changes in Design), a Project design change impacting Utility Adjustments is a change that (a) requires a Utility Adjustment that was not listed in the Utility Information; or (b) necessitates acquisition of a Utility Easement not included in the real property rights comprising the Project Site.

**7.6.10.2** Inasmuch as Principal Project Company is both furnishing the design of and constructing the Project, Principal Project Company may have opportunities to reduce the costs of certain portions of the Work, which may increase the costs of certain other portions of the Work or of Utility Work to be performed by Utility Owners. In considering such opportunities, Principal Project Company shall consider the impact of Project design changes on Utility Adjustments with the overall goal of minimizing the necessity for Utility Adjustments to the extent practical, in compliance with Section 7.6.3 (Avoiding Utility Adjustments and Minimizing Costs). Accordingly, except for cost increases or decreases resulting from City Changes in Project design affecting Utility Work, and notwithstanding any other contrary provision of the Contract Documents, the following rules shall apply with respect to Project design changes during the course of the Project which either reduce the nature or extent of or eliminate any Utility Adjustment, or result in unanticipated Utility Adjustments or an increase in the nature, extent, or costs of anticipated Utility Adjustments:

- (a) Principal Project Company shall not be entitled to extension of any Contract Deadline on account of delays resulting from any such design changes (including delays in acquisition of Utility Easements by City or Utility Owners);
- (b) Principal Project Company shall not be entitled to any increase in compensation for any additional costs which Principal Project Company incurs as a result of such design changes (including additional costs of Utility Work, the costs of any additional Work on other aspects of the Project undertaken in order to facilitate the avoidance or minimization of Utility Adjustments, and/or increased costs resulting from any Project Site conditions associated with Utility Easements made necessary by such design changes); and
- (c) If City incurs any additional costs as a result of such design changes (including any increases in amounts owed by City to Utility Owners, e.g., for work which is unusable or which must be redone), then Principal Project Company shall reimburse City for such costs within 10 days after receipt of City's invoice therefor, or in the sole discretion of City, City may deduct the amount of reimbursement due from any payment due and payable to Principal Project Company under the Contract Documents should Principal Project Company fail to reimburse City for such costs.

This Section 7.6.10 (Changes in Design) shall not apply to any changes in design made to accommodate any Change in Law.

#### **7.6.11 Utility Betterments**

Principal Project Company shall be responsible for addressing any requests by Utility Owners that Principal Project Company design and/or construct a Utility Betterment. Notwithstanding any other provision of this Section 7.6 (Utilities, Utility Adjustments and Utility Delay), no Work, Utility Adjustments or other Utility-related items initially included in the Work shall be considered a Utility Betterment. Any Utility Betterment performed as part of a Utility Adjustment, whether by Principal Project Company or by the Utility Owner, shall be subject to the same standards and requirements as if it were a necessary Utility Adjustment. Under no circumstances shall Principal Project Company proceed with any Utility Betterment that is incompatible with the Project or is not in compliance with applicable Law, the Regulatory Approvals or the Contract Documents, including the Contract Deadlines. Under no circumstances will Principal Project Company be entitled to any additional compensation or time extension under the Contract Documents as the result of any Utility Betterment, whether performed by Principal Project Company or by the Utility Owner. Principal Project Company shall provide City with such information, analyses, and certificates as City may request in order to determine compliance with this Section 7.6.11 (Utility Betterments).

#### **7.6.12 Failure of Utility Owners to Cooperate**

**7.6.12.1** Principal Project Company shall make diligent efforts to obtain the cooperation of each Utility Owner as necessary for the Project. Principal Project Company is responsible for verifying the progress of each Utility Owner's work. Principal Project Company shall provide Notice to City within five days after the occurrence of any of the following: (a) Principal Project Company reasonably believes for any reason that any Utility Owner would not undertake or

permit Utility Work in a manner consistent with the timely completion of the Project or in accordance with Law, the Regulatory Approvals or the Contract Documents, (b) Principal Project Company becomes aware that any Utility Owner is not cooperating in a timely manner to provide agreed-upon work or approvals in accordance with the Contract Documents, or (c) any other dispute arises between Principal Project Company and a Utility Owner with respect to the Project, despite Principal Project Company's diligent efforts to obtain such Utility Owner's cooperation or otherwise resolve such dispute. Such Notice may include a request that City assist in resolving the dispute or in otherwise obtaining the Utility Owner's timely cooperation. Principal Project Company shall provide City with such information as City reasonably requests regarding the Utility Owner's failure to cooperate and the effect of any resulting delay on the Project Schedule. After delivering Notice to City, Principal Project Company shall continue to use diligent efforts to pursue the Utility Owner's cooperation.

**7.6.12.2** If Principal Project Company requests assistance of City pursuant to Section 7.6.12.1, the following provisions apply:

- (a) Principal Project Company shall provide evidence satisfactory to City, in its good faith determination, that (i) the subject Utility Work is necessary, (ii) the time for completion of the Utility Adjustment in the Project Schedule (including any Major Utility Adjustment Deadline) was, in its inception, a reasonable amount of time for completion of such work, (iii) Principal Project Company has made, and continues to make, diligent efforts to obtain the Utility Owner's cooperation and commenced coordination at the earliest time, including during the PDA Term (including submitting and actively pursuing Utility Adjustment applications to Utility Owners with respect to impacted Utilities, taking into account the Project Schedule), (iv) the representation and warranty set forth in Section 7.6.8.1 was true and accurate as of the Effective Date; and (v) the Utility Owner is not cooperating (clauses (a)(i) through (v) above are referred to herein as the "Conditions to Assistance").
- (b) Following receipt by City of satisfactory evidence, City shall take such reasonable steps as City may reasonably determine to obtain the cooperation of the Utility Owner or resolve the dispute; provided, however, City shall have no obligation to prosecute eminent domain or other legal proceedings, or to exercise any other legal remedy available to it under Law or existing contract, unless City elects to do so in its sole discretion. City may, at its sole discretion, participate in the resolution of any dispute between Principal Project Company and a Utility Owner, whether or not requested to do so by Principal Project Company.
- (c) Without limiting City's obligations under clause (b) above, if City holds contractual rights that might be used to enforce the Utility Owner's obligation to cooperate, City shall have the right not to exercise those rights. The decision not to exercise those rights shall be in the sole discretion of City.

**7.6.12.3** Any assistance provided by City shall not relieve Principal Project Company of its sole and primary responsibility for the satisfactory compliance with its obligations under the Contract Documents and its obligations with respect to timely completion of all necessary Utility Adjustments.

---

### 7.6.13 Utility Delays

7.6.13.1 Except as set forth in clause (b), below, the term “Utility Delay” shall mean:

- (a) Any unreasonable and unjustified delay by a Utility Owner in connection with a Utility Adjustment relating to an Unidentified Utility beyond the date set forth in the approved Project Schedule (including any update to the Project Schedule submitted and approved following identification of the Unidentified Utility) following receipt by City of proper Notice pursuant to Section 7.6.12.1, provided that all of the “Conditions to Assistance” described in Section 7.6.12.2 have been satisfied.
- (b) Any Major Utility Adjustment Delay following receipt by City of proper Notice pursuant to Section 7.6.12.1, provided that all of the “Conditions to Assistance” described in Section 7.6.12.2 have been satisfied.
- (c) Notwithstanding the foregoing, the term "Utility Delay" does not include and is not intended to address (i) City Changes relating to Utilities, the impact of which will be addressed in the Change Order, (ii) any Utility Adjustments other than (x) Major Utility Adjustments beyond the Major Utility Adjustment Deadline or (y) as a direct result of a City Change, Unidentified Utility or Unavoidable Delay Event (excluding Utility Delay); (iii) additional work associated with a Project design change as described in Section 7.6.10 (Changes in Design); (iv) any event described in this Section 7.6.13.1 which results from or arises out of the actions or omissions of any PPC-Related Entity or any PPC Fault; or (v) any delay or impact relating to or arising out of the failure by any PPC-Related Entity to undertake the coordination activities with Utilities contemplated by the Predevelopment Agreement or based on the results of a Reasonable Investigation (even if such delay otherwise would have been considered Utility Delay but for such failure). Principal Project Company shall not rely upon any proposed schedules, durations or deadlines, if any, included in the Reference Documents with respect to Utility Adjustments, and Principal Project Company may not base any Claims for a time extension or additional compensation upon such proposed schedules, durations, and deadlines. ***[As noted in the definitions of Major Utility Adjustment/Major Utility Adjustment Deadline/Major Utility Adjustment Delay, City will consider deletion of (v) if and when PNC has engaged with utilities and developed a list of Major Utility Adjustments and durations which City has approved]***

7.6.13.2 Subject to the limitations and restrictions in this Section 7.6.13 (Utility Delays) and Articles 13 (General Provisions Applying to Delay Events and Relief Events) and 14 (Compensation and Other Relief for Delay Events and Relief Events), any Contract Deadline(s) affected by a Utility Delay shall be extended in accordance with, and subject to, Section 14.1.3. Furthermore, if two Utility Delays occur that are concurrent with each other but are not concurrent with any other delay, then the period of concurrent delay shall be considered a Utility Delay but shall only be counted once for purposes of any time extension.

7.6.13.3 Principal Project Company shall not be entitled to extension of any Contract Deadline or other relief for a Utility Delay pursuant to Section 7.6.13.2 or otherwise unless all of the following conditions are satisfied (in addition to satisfaction of any conditions specified in Section 7.16.13.1):

- 
- (a) The Utility Adjustment is solely associated with an Unidentified Utility or a Major Utility Adjustment Delay;
  - (b) Principal Project Company has timely satisfied the “Conditions to Assistance” requirements described in Section 7.6.12.2;
  - (c) If applicable, Principal Project Company has provided a reasonable Utility Adjustment plan to the Utility Owner that has been approved by City;
  - (d) Principal Project Company has provided evidence satisfactory to City that (i) Principal Project Company took advantage of Float available early in the Project Schedule for coordination activities with respect to the Utility(ies) to which such Utility Delay relates, (ii) Principal Project Company has fulfilled its obligation to coordinate with the Utility Owner to prevent or reduce such delays, and (iii) Principal Project Company has otherwise made diligent efforts to obtain timely performance by the Utility Owner but has been unable to obtain such timely performance;
  - (e) There exist no circumstances which have delayed or are delaying the affected Utility Adjustment(s), other than those that fit within the definition of a Utility Delay; and
  - (f) The delay is otherwise allowable under Articles 13 (General Provisions Applying to Delay Events and Relief Events) and 14 (Compensation and Other Relief for Delay Events and Relief Events).

**7.6.13.4** Principal Project Company shall not be entitled to any Extra Work Costs, Delay Costs or for any other increased costs or Claims attributable to delays described in this Section 7.6.13 (Utility Delays).

#### **7.6.14 Utility-Related Claims; Additional Restrictions on Change Orders Relating to Utility Adjustments**

In addition to all of the other requirements and limitations contained in this Section 7.6 (Utilities, Utility Adjustments and Utility Delay), and Articles 13 (General Provisions Applying to Delay Events and Relief Events) and 14 (Compensation and Other Relief for Delay Events and Relief Events), Principal Project Company’s entitlement to any relief relating to Utility Adjustments shall be subject to the restrictions and limitations set forth in this Section 7.6.14 (Utility-Related Claims; Additional Restrictions on Change Orders Relating to Utility Adjustments).

**7.6.14.1** Principal Project Company shall provide documentation satisfactory to City showing that the required analysis was performed and an appropriate determination made regarding the need for the Utility Adjustment, and shall also bear the burden of proving that the amount of any additional costs and/or time incurred by Principal Project Company are both necessary and reasonable.

**7.6.14.2** To the extent compensation is permitted under this Section 7.6 (Utilities, Utility Adjustments and Utility Delay), any relief increasing compensation to Principal Project Company pursuant to this Section 7.6 (Utilities, Utility Adjustments and Utility Delay) shall include only the incremental costs arising from the circumstances giving rise to such relief, i.e., the amount

payable shall take into account the costs that would have been incurred absent such circumstances and a credit shall be allowed for any avoided costs.

**7.6.14.3** Principal Project Company shall not be entitled to any increase in compensation for any costs of coordinating with Utility Owners.

### **7.6.15 FTA Requirements**

The Project is funded in part with funds made available by the Federal Transit Administration. In carrying out the Utility Adjustments, Principal project Company shall comply with all Laws as necessary for Utility Adjustments to be eligible for reimbursement from such funding.

## **7.7 Hazardous Materials Management; Risk Allocation**

### **7.7.1 Hazardous Materials Management**

**7.7.1.1** Except as otherwise provided in this Section 7.7.1 (Hazardous Materials Management), Principal Project Company shall, as part of the Work, perform, or cause to be performed, all Hazardous Materials Management required in connection with the Project in accordance with applicable Law, Regulatory Approvals, the approved Environmental Protection Program, and all applicable provisions of the Contract Documents.

**7.7.1.2** Principal Project Company shall have the following duties to identify, avoid, minimize and mitigate adverse monetary and non-monetary impacts to the Project and to City relating to Hazardous Materials:

- (a) Principal Project Company shall adopt design and construction techniques for the Project, using Good Industry Practice, that avoid, to the extent reasonably practicable, the need for Hazardous Materials Management;
- (b) when performing Hazardous Materials Management, Principal Project Company shall use Good Industry Practice, including design modifications and construction techniques, to minimize costs (including long-term costs) of Hazardous Materials Management; and
- (c) Principal Project Company shall use appropriately trained personnel to conduct Hazardous Materials Management activities.

**7.7.1.3** Principal Project Company shall promptly provide Notice to City of any Hazardous Materials encountered in connection with the Project, the Project Site or the Work that require (a) reporting or Notice to any Governmental Entity and/or (b) taking any response action (e.g., evaluating and addressing the circumstances and location of the Hazardous Materials) under applicable Law, Regulatory Approvals, the approved Environmental Protection Program and the Contract Documents, as applicable. A Notice provided under this Section 7.7.1.3 shall advise City of any obligation to provide Notice to Governmental Entities under applicable Law. Principal Project Company shall make all such reports, or deliver all such Notices, to any Governmental Entity with respect to Hazardous Materials encountered in connection with the Project, the Project Site or the Work, providing concurrent Notice and copies of such reports and Notices to City.

---

#### 7.7.1.4 Procedures and Compensation for Hazardous Materials Management

- (a) Principal Project Company shall manage, treat, handle, store, remediate, remove, transport (where applicable), document and dispose of all Hazardous Materials and perform all other aspects of Hazardous Materials Management as appropriate, in accordance with applicable Law, Regulatory Approvals, the approved plans required to be provided under Section 01 35 44 of Division 10 of the Technical Requirements, and this Agreement.
- (b) Principal Project Company is prohibited from starting Hazardous Material removal Work without a City-approved Hazardous Materials Submittal as described in Section 02 80 13 of Division 10 of the Technical Requirements. Principal Project Company shall not conduct any sampling or analysis of suspected building materials without prior permission from the City. The time utilized and costs incurred by Principal Project Company to undertake and obtain City approval of such Hazardous Materials Submittals shall not be eligible for relief, time extension or compensation under this Agreement.
- (c) Except where Principal Project Company is required to take immediate action under the Contract Documents or applicable Law, Principal Project Company shall afford City the opportunity to inspect sites containing Hazardous Materials and to consult with Principal Project Company about the recommended approach before any Hazardous Materials Management or other action is taken which would inhibit City's ability to ascertain the nature and extent of the contamination.
- (d) Where management, treatment, handling, storage, remediation, transport, documentation or disposing of Hazardous Materials constitutes a Hazardous Materials Event, Section 14.1.5 (Additional Limits Relating to Hazardous Materials Event During D&C Period) and Section 14.2.5 (Additional Limits Relating to Hazardous Materials Event During IFM Period) shall apply regarding Principal Project Company's rights to potential compensation and extension of any Contract Deadline.

**7.7.1.5** If Principal Project Company fails to undertake the Hazardous Materials Management required under this Section 7.7.1 (Hazardous Materials Management) within a reasonable time after discovery of Hazardous Materials, taking into consideration the nature and extent of the contamination and action required and the potential impact upon Principal Project Company's schedule for use of and operations on the Project Site, City may provide Notice to Principal Project Company that City will undertake the Hazardous Materials Management. If Principal Project Company fails to remedy the failure within 3 Business Days following provision of a Notice under this Section 7.7.1.5:

- (a) City may itself undertake Hazardous Materials Management actions or procure a contractor to perform such work, in which case City will do so in accordance with all applicable Environmental Laws;
- (b) Principal Project Company shall reimburse City on a current basis, within 10 days of request, for Recoverable Costs from fines, penalties or other

assessments against City or the Project by Governmental Entities due to Principal Project Company's delay or failure to undertake the Hazardous Materials Management), so long as City has performed in accordance with Section 7.7.1.5(a); and

- (c) City shall have no liability or responsibility to Principal Project Company arising out of, relating to or resulting from City's Hazardous Materials Management actions and such actions shall not constitute a Relief Event or other basis for a Claim.

**7.7.1.6** In the event of an emergency constituting an immediate hazard to health or safety of Building Occupants or City property due to Principal Project Company's failure to undertake the Hazardous Materials Management required under this Section 7.7.1 (Hazardous Materials Management), City may undertake, at Principal Project Company's sole cost and expense and without prior Notice, all work necessary to correct such hazardous condition(s).

## **7.7.2 Additional Hazardous Materials Obligations of Principal Project Company**

**7.7.2.1** Principal Project Company shall avoid exacerbating Hazardous Materials (including Pre-Existing Hazardous Materials as well as new Releases) in, on, under or migrating from the Project Site. For purposes of determining liability, as between City and Principal Project Company, under Sections 7.7.1.4(a) and 7.7.1.4(c), Principal Project Company shall only be liable for exacerbation of Hazardous Materials arising out of or relating to PPC Fault.

**7.7.2.2** Principal Project Company shall take all reasonable efforts to ensure that no act or omission of any PPC-Related Entity will result in an unlawful Release of Hazardous Materials to or into wastewater, storm or sanitary sewer systems, surface water, air, soils or groundwater in, on, under or migrating from the Project Site.

## **7.7.3 Hazardous Materials Generator Responsibilities**

**7.7.3.1** As between Principal Project Company and City, City shall be considered the generator and assume generator responsibility for Hazardous Materials, other than any PPC Release, and City shall not assert that Principal Project Company has legal responsibility for such Hazardous Materials (other than a PPC Release) as a generator. City has approval rights of Principal Project Company's selection of the destination facility to which Hazardous Materials, other than any PPC Release, will be transported.

**7.7.3.2** With regard to Hazardous Materials other than any PPC Release, City shall comply with the applicable standards for generators including those found at 40 CFR Part 262, including the responsibility to sign manifests and other waste tracking records for the transport of Hazardous Materials.

**7.7.3.3** Sections 7.7.3.1 and 7.7.3.2 shall not preclude or limit any rights, remedies or defenses that City or Principal Project Company may have against any Governmental Entity or other third parties, including prior owners, lessees, and licensees nor shall Sections 7.7.3.1 and 7.7.3.2 be interpreted as an admission of City's liability as to any Governmental Entity or other third parties, or otherwise preclude City from asserting to any Governmental Entity or other third parties that another entity, other than Principal Project Company or City, is the generator of any

Hazardous Materials. Notwithstanding the foregoing, Principal Project Company (and not City) shall be considered the generator with respect to any PPC Release.

## **7.8 Substantial Completion**

**7.8.1.1** The City and Principal Project Company mutually agree that time is of the essence with respect to the dates and times specified in this Agreement.

**7.8.1.2** Principal Project Company shall achieve Substantial Completion on or before the Substantial Completion Deadline. Failure to achieve Substantial Completion by the Long Stop Date is a PPC Default under Section 16.1.1(c).

**7.8.1.3** The conditions to Substantial Completion are set forth in Exhibit 15C (Conditions to Substantial Completion).

**7.8.1.4** Approximately six calendar months before the date on which Principal Project Company expects to achieve Substantial Completion, Principal Project Company shall provide to City its anticipated schedule to achieve Substantial Completion. Principal Project Company shall promptly advise City if at any time Principal Project Company determines that its anticipated schedule to achieve Substantial Completion will change. Principal Project Company shall provide an updated schedule to City 21 days before the date Principal Project Company expects to achieve Substantial Completion. Principal Project Company's schedule shall include, at a minimum, dates when Principal Project Company will submit all remaining documentation and evidence required by Exhibit 15C (Conditions to Substantial Completion) and the Technical Requirements with respect to Substantial Completion.

**7.8.1.5** When Principal Project Company determines that it has satisfied all conditions to Substantial Completion, it shall deliver to City a request for Certificate of Substantial Completion, in a form reasonably acceptable to City, stating the date that Principal Project Company determined it satisfied all conditions in Exhibit 15C (Conditions to Substantial Completion). Together with the request for Certificate of Substantial Completion, Principal Project Company shall submit a Punch List of items to be completed as a condition precedent to achievement Final Acceptance, obtain approval from Utility Owners and Authorities Having Jurisdiction of any Punch List items affecting Utilities and elements subject to the jurisdiction of an Authority Having Jurisdiction and obtain City's acceptance of the Punch List. The Punch List shall not include any items that adversely affect the safety, use or operability of the Project.

**7.8.1.6** During the 14-day period following the receipt of such request for Certificate of Substantial Completion:

- (a) Principal Project Company and City shall meet and confer to facilitate City's determination of whether Principal Project Company has met the conditions for Substantial Completion; and
- (b) City will conduct an inspection of the Project, review the applicable Final Design Documents, Construction Documents and other Submittals and conduct such other investigations as may be necessary to evaluate whether Substantial Completion has been achieved.

**7.8.1.7** As soon as reasonably practicable and, in any event, no later than 21 days after receipt of Principal Project Company's Notice under Section 7.8.1.5, City's Authorized Representative shall inspect, in conjunction with Principal Project Company, the D&C Work and City's Authorized Representative shall either:

- (a) if City's Authorized Representative agrees that Substantial Completion has been achieved, issue the Certificate of Substantial Completion to Principal Project Company within 10 days after the inspection:
  - (i) certifying that Substantial Completion has taken place;
  - (ii) stating the Substantial Completion Date;
  - (iii) listing any Punch List items which, in its opinion, remains to be performed; and
  - (iv) setting out reasonable details of the work remaining to be performed to achieve Final Acceptance; or
- (b) if Substantial Completion has, in City's opinion, not been achieved, issue a Notice to Principal Project Company within 10 days after the inspection:
  - (i) listing the work which, in its opinion, remains to be performed to achieve Substantial Completion; or
  - (ii) stating in its opinion, that Substantial Completion is so far from being achieved that it is not practicable to provide a list of the type referred to in Section 7.8.1.7(b)(i).

**7.8.1.8** Principal Project Company shall give Notice to City's Authorized Representative when Principal Project Company considers that the work listed in a Notice issued by City's Authorized Representative under Section 7.8.1.7(b)(i) has been completed.

**7.8.1.9** Sections 7.8.1.4 through 7.8.1.8 will apply in respect of any new Principal Project Company Notice under Section 7.8.1.8 in the same way as if it were the original Notice given under Section 7.8.1.4.

**7.8.1.10** City's Authorized Representative's opinion as to whether Substantial Completion has been achieved will not be restricted by any Notice, list or opinion which City previously provided to Principal Project Company under Section 7.8.1.7(b)(i).

**7.8.1.11** In the event that the Principal Project Company and City disagree as to whether or not Substantial Completion has been achieved, the Substantial Completion Date, the list of work remaining to be performed or the list of or estimated cost to perform Punch List items, City and Principal Project Company will meet to resolve such dispute, failing which such dispute shall be resolved in accordance with **Error! Reference source not found.** (Contract Dispute Procedures).

**7.8.1.12** Notwithstanding any other provision of this Agreement, City is under no obligation to certify Substantial Completion or commence the payment of Availability Payments prior to the

original Substantial Completion Deadline, regardless of whether Substantial Completion has been achieved prior to the original Substantial Completion Deadline.

## **7.9 Final Acceptance**

**7.9.1.1** Promptly after achieving Substantial Completion, Principal Project Company shall perform all remaining D&C Work, including expeditiously and diligently correcting all of the Punch List items specified pursuant to Section 7.8.1.7(a)(iii), to achieve Final Acceptance by the Final Acceptance Deadline.

**7.9.1.2** The conditions to Final Acceptance are set forth in Exhibit 15D (Conditions to Final Acceptance).

**7.9.1.3** When Principal Project Company determines that it has satisfied all conditions to Final Acceptance, it shall provide a certification to City, in a form reasonably acceptable to City, stating the date that Principal Project Company determined that it satisfied all the conditions in Exhibit 15D (Conditions to Final Acceptance).

**7.9.1.4** Within 21 days after receipt of Principal Project Company's Notice under Section 7.9.1.3, City's Authorized Representative shall inspect, in conjunction with Principal Project Company, the D&C Work and shall either:

- (a) if City's Authorized Representative agrees that Final Acceptance has been achieved, issue a Certificate of Final Acceptance to Principal Project Company within 15 days after the inspection certifying that Final Acceptance has taken place and the Final Acceptance Date; or
- (b) if in City's Authorized Representative's opinion, Final Acceptance has not been achieved, issue a Notice to Principal Project Company within 15 days after the inspection listing the work it believes remains to be performed to achieve Final Acceptance.

**7.9.1.5** Without limiting Principal Project Company's other obligations under this Agreement, immediately upon receipt of a Notice under Section 7.9.1.4(b), Principal Project Company shall expeditiously and diligently progress performance of the work specified in the Notice.

**7.9.1.6** Principal Project Company shall give Notice to City's Authorized Representative when Principal Project Company considers that the work listed in City's Authorized Representative's Notice under Section 7.9.1.4(b) has been completed.

**7.9.1.7** Sections 7.9.1.4 through 7.9.1.6 will apply in respect of any new Principal Project Company Notice under Section 7.9.1.6 in the same way as if it were the original Notice under Section 7.9.1.4

**7.9.1.8** City's Authorized Representative's opinion as to whether Final Acceptance has been achieved will not be restricted by any:

- (a) Certificate of Substantial Completion, Notice, list or opinion already provided under this Agreement; or

(b) warranty provided by any PPC-Related Entity.

**7.9.1.9** In the event that City and Principal Project Company disagree as to whether or not Final Acceptance has been achieved or the Final Acceptance Date, City and Principal Project Company will meet to resolve such dispute, failing which such dispute shall be resolved in accordance with **Error! Reference source not found.** (Contract Dispute Procedures).

## **7.10 Responsibility for Loss or Damage**

**7.10.1** The D&C Work includes having full charge and care of the Project Site and the D&C Work (including bearing risk of loss and damage to the D&C Work and Project Site) through Substantial Completion (or in the case of any Punch List Items, Final Acceptance), except to the extent that City or Third Parties have accepted elements of the D&C Work and expressly assumed responsibility for maintenance of such elements.

**7.10.2** Principal Project Company shall take every reasonable precaution against Loss or damage to any part of the Project from any cause, whether arising from the performance or nonperformance of the D&C Work.

**7.10.3** For so long as Principal Project Company bears the risk of loss and damage to D&C Work under Section 7.10.1, Principal Project Company shall repair, restore and replace Losses or damages to such D&C Work occasioned by any cause, subject to potential relief in accordance with, and subject to, clause (r) of the definition of "Compensable Delay Event". Principal Project Company shall ensure that such work is performed in accordance with the Contract Documents and applicable Law.

**7.10.4** Principal Project Company shall repair, restore and replace any Losses or damages to City property other than the D&C Work caused by any PPC-Related Entity.

## **7.11 Nonconforming Work**

### **7.11.1 Obligation to Replace Nonconforming Work**

Principal Project Company shall perform all Work in conformity with the Contract Documents. If Principal Project Company has not performed the Work in conformity with the Contract Documents, then, in addition to any other remedies available to City, City may direct Principal Project Company to, and Principal Project Company shall, remove and replace or otherwise remedy the Nonconforming Work. Principal Project Company shall not be entitled to make a Claim in connection with such D&C Work except as it relates to a dispute regarding whether Principal Project Company had performed the D&C Work in conformity with the Contract Documents.

### **7.11.2 Remedial Plan for Nonconforming Work**

**7.11.2.1** Promptly after Nonconforming Work is identified but no later than 10 Business Days after the earlier of (i) Notice from City to Principal Project Company; and (ii) Principal Project Company first obtains Actual Knowledge of such Nonconforming Work, Principal Project Company shall submit a remedial plan to City, for review and approval, describing the error or Defect giving rise to the Nonconforming Work and describing Principal Project Company's planned remedial action. Such proposal shall address Infrastructure Facility integrity,

aesthetics, operational impact on City including MOT, impact on the public, Building Occupants and any applicable Governmental Entities, maintainability, the effect on the Project Schedule and other relevant issues.

**7.11.2.2** If City determines that a proposed plan of correction may infringe upon Infrastructure Facility integrity, operations or maintainability, then City may elect to perform a technical assessment of Principal Project Company's proposal. City shall provide Notice to Principal Project Company promptly upon determining that an assessment is required, and shall take reasonable efforts to expedite the assessment. Should City elect to perform any such technical assessment, (a) if so requested by City, Principal Project Company shall not proceed with the remedial plan until City has conducted its technical assessment and provided prior approval of the remedial plan and (b) Principal Project Company shall not be entitled to make any Claim in connection with the technical assessment or reasonable delay in the remedial plan pending City's approval.

### **7.11.3 City's Remedies**

**7.11.3.1** City shall have the right and authority to cause Nonconforming Work to be removed, replaced or otherwise remedied and to withhold or deduct the costs from any monies due or that become due to Principal Project Company under the Contract Documents upon (a) any failure of Principal Project Company to provide a proposed remedial plan as described in Section 7.11.2.1 and obtain City's approval thereof, or (b) any failure of Principal Project Company to comply with City's direction under this Agreement relating to any safety issue, including Safety Compliance Orders.

**7.11.3.2** In addition to the right to cause the removal, replacement or remedy of the Nonconforming Work, at the request of Principal Project Company or upon its failure to remove, replace or otherwise remedy the Nonconforming Work within the timelines set forth in this Agreement, City may, in its sole discretion, accept such Nonconforming Work and receive reimbursement in an amount equal to the greater of: (a) the amount deemed appropriate by City (acting in good faith) to provide compensation for future impacts, maintenance and/or other costs relating to the Nonconforming Work, or (b) 100% of Principal Project Company's cost savings associated with its failure to perform the Work in accordance with the requirements of the Contract Documents.

## **7.12 Design and Construction of Joint Development Alternatives**

Nothing contained in this Agreement shall obligate City to design and construct any Joint Development Alternative or utilize Principal Project Company or any PPC-Related Entity in connection with the design and construction of any Joint Development Alternative.

### **7.13 FF&E During D&C Period**

#### **7.13.1 Selection and Procurement of PPC-Furnished FF&E**

**7.13.1.1** Principal Project Company shall:

- (a) update the Equipment List from time to time as appropriate to:
  - (i) reflect decisions made during the design development process;

- (ii) ensure that like PPC-Furnished FF&E are grouped together;
  - (iii) address any comments provided by the City's Authorized Representative with respect to PPC-Furnished FF&E in accordance with Exhibit 11 (Submittals Review Process); and
  - (iv) ensure that Principal Project Company provides PPC-Furnished FF&E as necessary to satisfy the requirements of this Agreement;
- (b) defer final selection of those items of PPC-Furnished FF&E which have high technical obsolescence risk to a time as close as reasonably possible to Substantial Completion, to better ensure that Principal Project Company will provide the most technically up to date items of such PPC-Furnished FF&E as of Substantial Completion; and
- (c) procure and provide the PPC-Furnished FF&E, as it may be amended in accordance with this Section 7.13.1 (Selection and Procurement of PPC-Furnished FF&E) or as a result of a Change Order.

**7.13.1.2** Unless necessary to meet its obligations under Section 7.13.1(a)(iv) or to carry out a Change Order, Principal Project Company shall not decrease the quantity or provide PPC-Furnished FF&E of a lesser quality (which may be determined based on attributes such as specification, brand, and place of manufacture) than an item identified in the Equipment List as of the Effective Date.

### **7.13.2 Selection of City-Furnished Equipment and Existing FF&E**

**7.13.2.1** City will select City-Furnished Equipment and identify Existing FF&E to be included in the Infrastructure Facility and update the Equipment List when reasonably required by Principal Project Company prior to Substantial Completion.

**7.13.2.2** Principal Project Company shall defer as long as reasonably possible the time for City to select the City-Furnished Equipment and identify the Existing FF&E.

**7.13.2.3** City will procure the City-Furnished Equipment identified in the Equipment List, as it may be amended as a result of a Change Order.

### **7.13.3 Installation of PPC-Furnished FF&E**

Principal Project Company shall install or locate (as applicable depending on whether the FF&E is loose or fixed) all items of PPC-Furnished FF&E within the Project Site in accordance with the Release for Construction Documents and so that the Infrastructure Facility meets the requirements of the Principal Project Documents. If the Release for Construction Documents do not identify locations for the placement of loose items of PPC-Furnished FF&E, Principal Project Company shall locate such items in accordance with direction from City's Authorized Representative.

#### **7.13.4 Installation of City-Furnished IT/Comms FF&E**

**7.13.4.1** Principal Project Company must provide City or its authorized representative continued and uninterrupted access to the IT/Comms Site for no less than 14 consecutive days prior to the commencement of commissioning and testing of the Infrastructure Facility (“**City Access Period**”) for the City to install the City-Furnished IT/Comms FF&E. The access provided shall be sufficient for City to complete such installation and transition and shall comply with the conditions in Section 1.11.7 of Division 1 of the Technical Requirements.

**7.13.4.2** Provided City complies with Project Site safety standards, Principal Project Company shall have no entitlement to make any claim against City for any delay to the Work caused by any access to or work undertaken by City under Section 7.13.5.1. Principal Project Company shall be entitled to relief in accordance with, and subject to, clause (n) of the definition of “Compensable Delay Event” in connection with City’s access or work undertaken by City under Section 7.13.5.1.

**7.13.4.3** Subject to Section 7.13.4.4, City shall install City-IT/Comms FF&E to the IT/Comms Site during the City Access Period.

**7.13.4.4** City will release Principal Project Company from all claims and liability in connection with the transfer of and installation of the City-IT/Comms FF&, except to the extent that Principal Project Company or a PPC-Related Entity (i) damages such FF&E or (ii) fails to comply with its obligations under this Agreement concerning such FF&E.

#### **7.13.5 Commissioning of FF&E for Substantial Completion**

**7.13.5.1** Following installation of the PPC-Furnished FF&E and the City-Furnished IT/Comms FF&E, Principal Project Company shall commission and undertake all tests of the Infrastructure Facility, in accordance with the requirements of this Agreement and Division 6 of the Technical Requirements to achieve the requirements of Substantial Completion.

**7.13.5.2** City will release Principal Project Company from all claims and liability in connection with the City-Furnished IT/Comms FF&E, to the extent that Principal Project Company is unable to successfully commission or undertake tests of such FF&E in accordance with the requirements of this Agreement and Division 06 of the Technical Requirements, except to the extent that the failure of such FF&E is caused by an act or omission of Principal Project Company or a PPC-Related Entity.

#### **7.14 Move-In**

##### **7.14.1 General**

As provided in Section B.25 (Move-In Services) of the IFM Specifications, Principal Project Company shall plan, coordinate, manage and execute the physical Move-In of the Infrastructure Facility, including Existing FF&E and City Furnished Equipment (excluding City-Furnished IT/Comms FF&E), following Substantial Completion in accordance with the Move-In Plan and in coordination with the Move-In Subcommittee (“**Move-In**”).

**7.13.4.4** City will release Principal Project Company from all claims and liability in connection with the transfer of and installation of the City Furnished Equipment and Existing

FF&E, except to the extent that Principal Project Company or a PPC-Related Entity (i) damages such FF&E or (ii) fails to comply with its obligations under this Agreement concerning such FF&E.

#### **7.14.2 Move-In Subcommittee**

**7.14.2.1** The move-in subcommittee (the “Move-In Subcommittee”) shall consist of three representatives of each Party. Members of the Move-In Subcommittee may invite, on prior notice to all members, such other advisors and consultants as they require from time to time to attend meetings and provide briefings to the Move-In Subcommittee.

**7.14.2.2** The Move-In Subcommittee shall assist the Parties by promoting cooperative and effective communication with respect to matters related to the Move-In, including issues related to the move-in into the Infrastructure Facility, the City Access Periods and the transfer and installation of all Existing FF&E.

**7.14.2.3** The primary role of the Move-In Subcommittee shall be to oversee and coordinate the Move-In in a timely and efficient manner and in accordance with the Project Schedule.

**7.14.2.4** The Move-In Subcommittee shall be responsible for receiving and reviewing all matters related to the Move-In.

**7.14.2.5** The members of the Move-In Subcommittee may adopt such procedures and practices for the conduct of the activities of the Move-In Subcommittee as they consider appropriate from time to time.

**7.14.2.6** Unless otherwise agreed, the Move-In Subcommittee shall operate only until the Final Acceptance Date.

#### **7.14.3 Move-In Resource**

**7.14.3.1** Principal Project Company shall, at least 24 months prior to Substantial Completion, prepare and submit to City a list of prospective candidates, including from existing resources, (each a “Move-In Resource Candidate”) for appointment as Move-In Resource, each of which must have experience planning and executing staff and logistical transitions in projects of similar size, scope and complexity in the United States.

**7.14.3.2** Subject to Section 24.17(c), Principal Project Company shall conduct a competitive bid process for the selection of the Move-In Resource from among the Move-In Resource Candidates, which bid process shall be completed by no later than 18 months prior to the Scheduled Substantial Completion Date. Principal Project Company shall consult with City in the design and implementation of such competitive bid process, including the development of the evaluation criteria, and shall accommodate any reasonable request of City with respect thereto. City may participate in the evaluation and selection of the successful Move-In Resource Candidate for appointment as Move-In Resource. City may, but is not required to, retain the Move-In Resource at City’s cost to plan, coordinate, manage and execute the transition from the Existing Facilities to the Infrastructure Facility.

---

## ARTICLE 8. INFRASTRUCTURE FACILITY MAINTENANCE

### 8.1 General

#### 8.1.1 General Obligations

**8.1.1.1** Principal Project Company is responsible for performance of IFM Services in accordance with requirements specified in the Contract Documents, including the IFM Management Plan approved by City during the PDA Term.

**8.1.1.2** Principal Project Company shall ensure that:

- (a) all IFM Services is performed in accordance with all applicable Laws, Regulatory Approvals and Good Industry Practice, as it may evolve over time;
- (b) the Infrastructure Facility remains safe, fit for use for the intended functions, meets the requirements of the Contract Documents, remains free of Defects and meets the minimum performance standards for operations as specified in the Contract Documents, including the Technical Requirements, throughout the IFM Period;
- (c) (i) all materials and equipment furnished during the IFM Period are of good quality and new and (ii) all Infrastructure Facility components and related consumables obtained as part of the IFM Services and supplied during the IFM Period are of good quality and new and fit for their intended purpose in accordance with the Contract Documents; and
- (d) all IFM Services is performed in accordance with the IFM Plan and City-approved plans required in the IFM Specifications.

**8.1.1.3** Principal Project Company shall monitor compliance of the IFM Services with the requirements of Contract Documents and provide Notice to City if any noncompliance occurs.

**8.1.1.4** Principal Project Company shall cooperate with City (and Authorities Having Jurisdiction as applicable) in all matters relating to the IFM Services and required availability of the Infrastructure Facility, including any Oversight with respect to operation and maintenance of the Project.

**8.1.1.5** Principal Project Company shall obtain, maintain, repair and replace elements of the Infrastructure Facility, except SFMTA O&M Facilities, as appropriate throughout the duration of the IFM Period, including maintenance, repair and replacement of consumable and life-expired items and rehabilitation of the Infrastructure Facility, except SFMTA O&M Facilities.

**8.1.1.6** Principal Project Company shall, in keeping with Good Industry Practice, implement or incorporate Technology Enhancements for the Infrastructure Facility throughout the duration of the IFM Period, at no cost to City, to the extent such enhancements are (a) scheduled in the IFM Management Plan, or (b) needed to correct Defects in the Work. To the extent that the City directs the Principal Project Company to implement or incorporate Technology Enhancements in circumstances other than those set forth above, such direction shall be considered a City Change.

**8.1.1.7** City shall pay all direct and indirect costs for all Utility services relating to the operation and maintenance, throughout the Term, of the Infrastructure Facility in accordance with the Contract Documents.

## **8.1.2 Changes in Standards and Specifications**

**8.1.2.1** The Parties anticipate that, from time to time, the Standards and Specifications will be changed, added or replaced, which may be implemented through revisions to existing standards and specifications or through new standards and specifications.

**8.1.2.2** Any Renewal Work required to be performed by Principal Project Company shall be performed in compliance with the then current Standards and Specifications. City may, through a City Change, require Principal Project Company to comply with updated Standards and Specifications prior to the date set forth in Principal Project Company's Renewal Work Schedule for Renewal Work affected by the updated Standards and Specifications.

## **8.1.3 Hazardous Materials Management**

Principal Project Company shall comply with Section 7.7 (Hazardous Materials Management; Risk Allocation) throughout the IFM Period.

## **8.1.4 Utility Accommodation**

**8.1.4.1** Principal Project Company acknowledges that from time to time during the course of the IFM Period, Utility Owners will apply for additional utility permits to install new Utilities that may affect the Project Site, or to modify, repair, upgrade, relocate or expand existing Utilities within the Project Site.

**8.1.4.2** Throughout the IFM Period, Principal Project Company shall monitor Utilities and Utility Owners within the Project Site for compliance with applicable Utility permits, easements, and applicable Law, and shall use diligent efforts to obtain the cooperation of each Utility Owner having Utilities within the Project Site. Principal Project Company shall promptly provide Notice to City if (a) Principal Project Company believes that any Utility Owner is not complying with the terms of a Utility permit, easement, or applicable Law affecting a Utility within the Project Site, or (b) any other dispute arises between Principal Project Company and a Utility Owner with respect to a Utility within the Project Site, despite Principal Project Company having exercised its diligent efforts to obtain the Utility Owner's cooperation. If Principal Project Company, despite diligent efforts, is unable to resolve any dispute with a Utility Owner, Principal Project Company may request City to provide reasonable assistance. Following delivery of such a request the Parties shall consult regarding measures to be undertaken.

## **8.2 Principal Project Company Inspection, Testing and Reporting**

**8.2.1** Principal Project Company shall carry out inspections and tests in accordance with the Technical Requirements and IFM Management Plan. Principal Project Company shall use the results of such inspections and tests to develop and update the IFM Management Plan, to maintain asset condition and service levels, and to develop programs of maintenance and Renewal Work to minimize the effect of IFM Services on City employees, residents, and other members of the public.

**8.2.2** Principal Project Company shall submit all reports relating to the IFM Services, including the IFM annual reports, in the form, with the content and within the time required under the Contract Documents.

**8.2.3** The inspections and reports described above are in addition to maintenance of the Failure Event and Noncompliance Event database and related reports under Section 15.3.1 (Noncompliance Database).

### **8.3 Responsibility for Loss or Damage**

**8.3.1** The IFM Services includes having full charge and care of the Infrastructure Facility, except for the SFTMA O&M Facilities, from the date of Substantial Completion of the Infrastructure Facility through the end of the IFM Period.

**8.3.2** Principal Project Company shall take reasonable precautions against Loss or damage to the Infrastructure Facility and other improvements and assets within the Project Site due to any cause.

**8.3.3** Principal Project Company shall repair, restore and replace all Losses or damages to the Infrastructure Facility, excluding the SFMTA O&M Facilities. Principal Project Company shall ensure that such work is performed in accordance with the Contract Documents and applicable Law.

**8.3.4** If any repair, restoration or replacement of the Infrastructure Facility building envelope or exterior grounds is required due to Vandalism, Principal Project Company shall be responsible for the first \$150,000 of costs incurred in the aggregate per calendar year (the “**Annual Vandalism Deductible**”) to perform such repair, restoration or replacement. The Annual Vandalism Deductible shall be index-linked and increased by the Escalation Factor calculated in accordance with Section 2 of Exhibit 4B (Availability Payment Mechanism).

**8.3.5** For each calendar year of the Term, City will compensate Principal Project Company through a Change Order for costs incurred by Principal Project Company in performing repairs, restoration or replacements due to Vandalism that exceed the Annual Vandalism Deductible, if there are any such costs. If any repair, restoration or replacement of the Infrastructure Facility building interior, excluding any SFMTA O&M Facilities, is required due to Vandalism, such repair, restoration or replacement will be treated as a City Change.

**8.3.6** Principal Project Company shall repair, restore and replace any Losses or damages to City property other than the Infrastructure Facility caused by any PPC-Related Entity.

### **8.4 Renewal Work; IFM Management Plan**

#### **8.4.1 Performance of Renewal Work**

**8.4.1.1** Principal Project Company shall diligently perform Renewal Work as and when necessary to comply with the Contract Documents, including the Handback Requirements. Principal Project Company shall use the IFM Management Plan developed in accordance with the Technical Requirements as the principal guide for scheduling and performing Renewal Work; except that Principal Project Company may perform Renewal Work not identified in IFM Management Plan as necessary to maintain compliance with the Contract Documents, subject

to scheduling the performance of such Renewal Work at times agreed to by City, in its reasonable discretion.

**8.4.1.2** If, at any time, Principal Project Company has failed to perform the Renewal Work in accordance with the then current IFM Management Plan and applicable requirements of the Contract Documents (including the Technical Requirements, including Section E of the IFM Specifications), and performance of such Renewal Work is required to ensure continued performance of the Project in accordance with the Contract Documents, City may give written Notice thereof to Principal Project Company. If Principal Project Company has failed to complete the Renewal Work within 30 days after City delivers such Notice, then City shall have the right to perform and complete such Renewal Work at the expense and for the account of Principal Project Company, and to deduct from payments otherwise payable to Principal Project Company by City under this Agreement to pay the costs of such action. The foregoing remedy is in addition to any other remedies available to City under the Contract Documents on account of such failure, including the assessment of Noncompliance Points, and City's right to intervene immediately and without Notice to address Safety Compliance.

## **8.4.2 IFM Management Plan**

As a condition to Substantial Completion pursuant to Exhibit 15C (Conditions to Substantial Completion), Principal Project Company shall prepare and submit to City for review and approval an IFM Management Plan updated in accordance with the IFM Specifications. Coordination of Operations and Maintenance Responsibilities

At Principal Project Company's request from time to time, City will, at no cost to City, reasonably assist Principal Project Company in seeking the cooperation and coordination of any Authority Having Jurisdiction with respect to Principal Project Company's IFM Services. The objectives of such assistance will be to minimize disruptions to transit operations, City employees, residents, and traffic and ensure that all IFM activities are carried out in accordance with then-current maintenance standards and then-current traffic management standards, practices and procedures of such Authorities Having Jurisdiction.

## **8.5 Handback**

### **8.5.1 Handback Condition**

**8.5.1.1** Principal Project Company shall diligently perform and complete all Renewal Work required to be performed and completed before the Termination Date, based on the required adjustments and changes to the IFM Management Plan resulting from the inspections and analysis under this Section 8.5.

**8.5.1.2** Upon the Termination Date, Principal Project Company shall surrender the Project, including any Upgrades, to City, in the condition and meeting all of the requirements of the Handback Requirements.

**8.5.1.3** In the event of early termination of this Agreement, Principal Project Company shall only be required to comply with the requirements of this Section 8.5 (Handback) to the extent that any Renewal Work was scheduled to have been performed before the Early Termination Date.

---

## **8.5.2 Independent Engineer**

**8.5.2.1** The Parties must select an Independent Engineer to:

- (a) perform joint technical reviews and handback inspections in accordance with Section 8.5.4;
- (b) make a determination regarding the estimated Handback Work costs in accordance with Section 8.5.4.2(h); and
- (c) verify in accordance with Section 8.5.5 (Handback Assessment) whether the Handback Requirements have been met.

**8.5.2.2** Prior to each Review Date, Principal Project Company must, in consultation with City, establish the schedule and process for the selection of an Independent Engineer for purposes of the Independent Engineer roles contemplated in Section 8.5.2.1. Principal Project Company must develop the solicitation package and draft contract terms, subject to approval by City, and Principal Project Company must set the solicitation schedule with the goal of selecting the Independent Engineer 6 months prior to each Review Date.

**8.5.2.3** The solicitations required under Section 8.6.2 (Independent Engineer) must include issuance of a request for competitive proposals from a list of firms approved by City, review of proposals by the Parties, a joint determination regarding which firm is the best qualified to provide Independent Engineer services, and negotiation of a fair and reasonable price for performance of such services. If negotiations fail with the highest ranked firm, the Parties may elect to terminate negotiations and proceed with the next highest ranked firm. This process must be followed until a firm is selected to serve as the Independent Engineer. If the Parties fail to reach agreement regarding selection of the Independent Engineer, or regarding acceptable terms of the agreement with the Independent Engineer, the Claim must be subject to resolution under Article 18 (Contract Dispute Procedures).

**8.5.2.4** The Independent Engineer will be appointed jointly by the Parties and will act independently from and not as an agent of either Party. Any advisor of City, a PPC-Related Entity, or a Lender is deemed to have an organizational conflict of interest and not eligible to respond to the solicitation.

**8.5.2.5** Each Party is responsible for its own costs related to the Independent Engineer solicitation processes. The Parties will be equally responsible for all amounts payable under the terms of the agreement with the Independent Engineer.

## **8.5.3 Handback Reserve Amount**

**8.5.3.1** Within 30 days of the commencement of the 26<sup>th</sup> Contract Year, and annually thereafter to the end of the IFM Period, Principal Project Company shall calculate the Handback Reserve Amount and prepare and deliver to City a report that:

- (a) specifies Principal Project Company's estimate of the Handback Reserve Amount based on the inspections and the updated Handback Renewal Work Plan provided for under Section 8.5.4.2(h)~~8.5.4.2(h)~~; and

- (b) details how Principal Project Company's estimated Handback Reserve Amount was calculated.

**8.5.3.2** Within 15 Business Days of receipt of each report described in Section 8.5.3.1, City will review the report and provide a Notice to Principal Project Company setting forth its determination of the Handback Reserve Amount, including supporting materials.

**8.5.3.3** Following delivery of each update and report, the Parties shall meet to discuss whether any changes should be made to the scope or schedule for performance of the Handback Renewal Work or to the Handback Reserve Amount.

#### **8.5.4 Joint Technical Review and Handback Inspections and Report**

**8.5.4.1** The Parties and the Independent Engineer shall schedule and conduct joint technical inspections of the Infrastructure Facility:

- (a) within 90 days following the Substantial Completion Date;
- (b) each 5 year anniversary after the Substantial Completion Date; and
- (c) the 25th anniversary of the Effective Date of this Agreement ("**Handback Inspection**"),

each of the above constitutes a "**Review Date**".

**8.5.4.2** Within 30 days following each Review Date, the Independent Engineer must produce and deliver to City a report (the "**Condition Report**") for review and approval in accordance with Exhibit 11 (Submittal Review Process). The Condition Report shall:

- (a) identify the condition of the Infrastructure Facility and the Project Site and each element for which Principal Project Company is responsible under the Agreement;
- (b) compare the condition of each element with the current Infrastructure Facility standard requirements in the IFM Specifications;
- (c) compare the actual Renewal Work replacement with the approved Handback Renewal Work Plan;
- (d) identify and documents deficiencies in the current condition or Renewal Work replacement activities and makes recommendations on actions required to bring the condition and Renewal Work replacement activities to the current required standard;
- (e) provides the FCI index as of the time of the Joint Technical Review;
- (f) determines and verifies the condition of all elements and their Residual Lives;
- (g) adjusts, to the extent necessary based on inspection and analysis, element Useful Lives, ages, Residual Lives; and

- (h) in the case of the Handback Inspection, (a) determines the Handback Renewal Work required to be performed and completed before the Termination Date, based on the Handback Requirements for Residual Life at the conclusion of the Term, the foregoing adjustments and the foregoing changes to the IFM Management Plan; and (b) includes an estimate and details of the costs to perform the Handback Work and the Renewal Work (“**Handback Reserve Amount**”).

**8.5.4.3** Principal Project Company must update the IFM Management Plan following each inspection of the Infrastructure Facility in accordance with Section 8.5.4.2 and deliver the updated plan to City for City’s review and approval in accordance with Exhibit 11 (Submittal Review Process). Such update shall include a plan to rectify identified deficiencies, schedule of activities and any process or administrative changes and maintenance and Renewal Work activities. All planned activities related to updated IFM Management Plan must be completed within a maximum of 12 months from receipt of the applicable Condition Report.

**8.5.4.4** The Parties shall undertake a subsequent inspection of the remediation work completed by Principal Project Company in connection with the updated IFM Management Plan and, if required, issue a revised Condition Report.

## **8.5.5 Handback Assessment**

**8.5.5.1** In the case of the Handback Inspection, when Principal Project Company determines that it has satisfied the Handback Requirements, it shall provide a certification to City and Independent Engineer, in a form reasonably acceptable to City, stating the date that Principal Project Company determined that it satisfied the Handback Requirements.

**8.5.5.2** During the 30-day period following receipt of such certification:

- (a) Principal Project Company, Independent Engineer, and City shall meet and confer to facilitate City’s determination of whether Principal Project Company has met the Handback Requirements;
- (b) Independent Engineer will conduct a final inspection of the Project, review the Handback Renewal Work Plan and any other relevant Submittals and conduct such other investigations as may be necessary to evaluate whether the Handback Requirements have been met; and
- (c) Independent Engineer shall (i) deliver a report of findings and determination to Principal Project Company and City stating in Independent Engineer’s opinion whether Principal Project Company has met the Handback Requirements; or (ii) provide Notice to Principal Project Company stating the reasons why the Handback Requirements have not been met.

**8.5.5.3** Within 10 days after City’s receipt of a report given by Independent Engineer under Section 8.6.5.2(c) stating that the Handback Requirements have been met, City will either:

- (a) provide Notice to Principal Project Company that it concurs with the Independent Engineer’s determination that the Handback Requirements have been met; or

- 
- (b) provide Notice to Principal Project Company regarding the reasons why City believes the Handback Requirements have not been met.

**8.5.5.4** If Independent Engineer provides Notice under Section 8.5.5.2(c)(ii), then Principal Project Company shall take appropriate steps to satisfy the remaining conditions and provide a certification under Section 8.5.5 once the conditions have been satisfied and otherwise repeat the process described in this Section 8.5.5 until City provides Principal Project Company the notice described in Section 8.5.5.3(a).

**8.5.5.5** The findings of the Independent Engineer shall be inadmissible and given no weight during the Article 18 (Contract Dispute Procedures) process.

## **8.5.6 City Right to Self-Perform and Recover Costs**

If City determines that the Project does not comply with any Handback Requirement, or Handback Renewal Work is not timely or properly performed, City may provide Principal Project Company Notice of such failure(s). Principal Project Company shall have 15 days from the date the City delivers this Notice to rectify such failure(s) to City's satisfaction; provided, however, that if (i) the nature of such rectification is such that the rectification cannot with diligence be completed within such 15 day period; (ii) such failure does not relate to a matter of public or facility safety or an Emergency; and (iii) Principal Project Company has commenced and is diligently pursuing meaningful steps to rectify immediately after receiving the Notice of such failure(s), Principal Project Company shall have such additional period of time, up to a maximum period of 60 days from the date City delivers the Notice, as is reasonably necessary to diligently effect such rectification. If Principal Project Company fails to rectify such failure(s) within this period, then, in addition to City's rights under the Contract Documents, City may bring the Project into compliance with such Handback Requirement(s) and Principal Project Company shall be liable for City's Recoverable Costs incurred in performing that Work. In recovering such amounts, City may (a) reduce any Availability Payment then due and owing from City to Principal Project Company, (b) invoice Principal Project Company for such amount, as a lump sum payment, (c) set off such amount against any other amount then due and owing from City to Principal Project Company, (d) draw against funds withheld under this Section 8.5 (Handback) or against the letter of credit described in Section 8.6.5 (Handback Requirements Letters of Credit), (e) require funds in the reserve account described in Section 8.5.7 (Handback Requirements Reserve Account) to be used to pay for required Renewal Work, or (f) any combination of clauses (a) through (e).

## **8.5.7 Spare Parts**

Principal Project Company must comply with the requirements with respect to Spare Parts as set out in Section F.1.2(2) of the IFM Specifications.

## **8.6 Handback Requirements Reserve Account**

### **8.6.1 Establishment**

**8.6.1.1** Within 30 days of the commencement of the 26<sup>th</sup> Contract Year, Principal Project Company shall establish a reserve account (the "**Handback Requirements Reserve Account**") exclusively available for the uses set forth in Section 8.6.3 (Use of Handback Requirements Reserve Account). Principal Project Company shall provide to City the details regarding the

account, including the name, address and contact information for the depository institution and the account number, and shall provide Notice to City regarding any change made from time to time to any such details and the effective date of such change immediately upon or prior to such change taking effect. City shall have a first priority perfected security interest in the Handback Requirements Reserve Account, and the right to receive monthly account statements directly from the depository institution. Principal Project Company shall deliver such Notices to the depository institution and execute such documents as may be required to establish and perfect City's interest in the Handback Requirements Reserve Account under the Uniform Commercial Code as adopted in the State.

**8.6.1.2** In lieu of Principal Project Company establishing the Handback Requirements Reserve Account, Principal Project Company may deliver to City one or more Handback Requirements Letters of Credit on the terms and conditions set forth in Section 8.6.5 (Handback Requirements Letters of Credit) and Section 10.4 (Letters of Credit).

## **8.6.2 Funding**

**8.6.2.1** Within 30 days after the date of City's first Notice delivered to Principal Project Company pursuant to Section 8.5.3.2, Principal Project Company shall deposit to the Handback Requirements Reserve Account an amount equal to the Handback Reserve Amount specified in such Notice. If, at any time after the initial deposit of funds into the Handback Requirements Reserve Account, City determines, in its good faith discretion, that the balance of funds held in the Handback Requirements Reserve Account may be insufficient to pay for the Handback Renewal Work (as amended) yet to be performed or paid for, then City may give Notice to Principal Project Company setting forth the insufficient amount and requiring Principal Project Company to replenish the Handback Requirements Reserve Account with additional funds necessary to make up the insufficiency. Principal Project Company shall deposit such additional funds into the Handback Requirements Reserve Account not later than ten Business Days after such Notice from City. If after recalculation of the Handback Reserve Amount following any of the annual inspections provided for in Section 8.5.4 (Joint Technical Review and Report), the amount on deposit in the Handback Requirements Reserve Account exceeds the percentage of the Handback Reserve Amount required to be on deposit in the Handback Requirements Reserve Account in accordance with Section 8.6.2.1 on such calculation date, Principal Project Company shall be entitled to draw any surplus amount and no further deposits shall be made until the next inspection and determination of the Handback Reserve Amount.

**8.6.2.2** If Principal Project Company disputes, in good faith, any Handback Reserve Amount specified by City in City's Notices delivered to Principal Project Company pursuant to Section 8.5.3.2, Principal Project Company shall fund the full portion (including the disputed amount) of the Handback Reserve Amount pending resolution of the Contract Dispute in accordance with **Error! Reference source not found.** (Contract Dispute Procedures).

**8.6.2.3** Funds held in the Handback Requirements Reserve Account may be invested and reinvested only in securities, obligations, bonds, funds, instruments or other investments listed under California Government Code section 16430 ("**Eligible Investments**"). Eligible Investments in the Handback Requirements Reserve Account must mature during the Term, and the principal of such Eligible Investments must be available for withdrawal at any time during the Term without penalty. Any interest earned on funds held in the Handback Requirements Reserve Account shall be earned on behalf of the Principal Project Company.

**8.6.2.4** If Principal Project Company fails to make the deposits required pursuant to this Section 8.6.2 (Funding), when due, City shall be entitled to deduct the amount required to be deposited from the Quarterly Availability Payments due to Principal Project Company and shall deposit such amount to the Handback Requirements Reserve Account on behalf of Principal Project Company.

**8.6.2.5** If the amount on deposit in the Handback Requirements Reserve Account at any time exceeds the current calculation of the Handback Reserve Amount, Principal Project Company may withdraw any surplus amount in excess of the current calculation.

### **8.6.3 Use of Handback Requirements Reserve Account**

**8.6.3.1** Principal Project Company shall be entitled to draw funds from the Handback Requirements Reserve Account in such amounts and at such times as needed only to pay for the Handback Renewal Work as required by the Handback Renewal Work Plan. Amounts in the Handback Requirements Reserve Account can only be used for the purposes described in this Section 8.6.3.1 and are not available as security for repayment of Project Debt or making Distributions, except as permitted by Section 8.7.4.1. The use of amounts in the Handback Requirements Reserve Account by Principal Project Company for any purpose other than as permitted in this Section 8.6.3.1 shall be a PPC Default.

**8.6.3.2** Before drawing funds from the Handback Requirements Reserve Account, Principal Project Company shall give written Notice to City of the amount to be drawn and the purpose for which funds will be used. City shall have 10 Business Days from the date of the receipt of such Notice to disapprove the draw from the Handback Requirements Reserve Account. City may disapprove the draw only if the requested amount and/or purposes for which the funds will be used do not comply with the Handback Renewal Work Plan. If City fails to disapprove the draw within the 10 Business Day period following receipt of Notice, Principal Project Company shall be entitled to draw funds in the manner described in the Notice to City.

### **8.6.4 Disbursement of Handback Requirements Reserve Account on Completion of Handback Renewal Work or Earlier Termination**

**8.6.4.1** Following completion of the Handback Renewal Work and after the expiration of the Term, any remaining Handback Requirements Reserve Balance shall be drawn and retained by Principal Project Company.

**8.6.4.2** If this Agreement is terminated for any reason before the completion of the Handback Renewal Work, any remaining Handback Requirements Reserve Balance shall be drawn and retained by City. ***[PNC TO PROVIDE SUGGESTED SPECIFIC DRAFTING TO ADDRESS ISSUE REGARDING THAT IT IS NOT IN A WORSE POSITION IF IT USES LOC VS. CASH]***

### **8.6.5 Handback Requirements Letters of Credit**

**8.6.5.1** In lieu of establishing the Handback Requirements Reserve Account, Principal Project Company may deliver to City one or more letters of credit (each, a "**Handback Requirements Letter of Credit**"), on the terms and conditions set forth in this Section 8.6.5 (Handback Requirements Letter of Credit) and Section 10.4 (Letters of Credit). The Handback Requirements Letter of Credit shall name City as the sole beneficiary and shall not provide for any other dual or multiple beneficiaries. Principal Project Company shall execute, and shall

cause the financial institution issuing the Handback Requirements Letter of Credit to execute, such documents as may be required to establish and perfect City's interest in the Handback Requirements Letter of Credit under the Uniform Commercial Code as adopted in the State, which interest shall be a first priority security interest as provided in Section 8.6.1.1. If the Handback Requirements Reserve Account has been previously established, Principal Project Company at any time thereafter may substitute one or more Handback Requirements Letters of Credit for all or any portion of the amounts required to be on deposit in the Handback Requirements Reserve Account, on the terms and conditions set forth in this Section 8.6.5 (Handback Requirements Letters of Credit).

**8.6.5.2** Upon receipt of the required substitute Handback Requirements Letter of Credit, City shall authorize the release to Principal Project Company of amounts in the Handback Requirements Reserve Account equal to the face amount of the substitute Handback Requirements Letter of Credit. If the face amount of all Handback Requirements Letters of Credit is less than the total amount required to be funded to the Handback Requirements Reserve Account before expiration of the Handback Requirements Letter of Credit, Principal Project Company shall be obligated to pay, when due, the shortfall into the Handback Requirements Reserve Account. Alternatively, Principal Project Company may deliver a Handback Requirements Letter of Credit with a face amount equal to at least the total amount required to be funded to the Handback Requirements Reserve Account during the period up to the expiration of the Handback Requirements Letter of Credit, or may deliver additional Handback Requirements Letters of Credit or cause the existing Handback Requirements Letter of Credit to be amended to cover the shortfall before deposits of the shortfall to the Handback Requirements Reserve Account are due.

**8.6.5.3** City shall have the right to draw on the Handback Requirements Letter of Credit, without prior Notice to Principal Project Company, for the reasons set forth in Sections 10.4.1.3(a), (b) and (c) and Section 8.6.4.2.

**8.6.5.4** Except when drawing upon the Handback Requirements Letter of Credit in accordance with Section 8.6.4.2, City shall deposit the proceeds from drawing on the Handback Requirements Letter of Credit into the Handback Requirements Reserve Account.

## **8.6.6 Coordination with JDA Project Companies and Joint Development Alternatives**

Principal Project Company acknowledges and agrees that one or more Joint Development Alternatives may be constructed prior to or following Substantial Completion. Principal Project Company shall not interfere with the work of or cause any delay to any JDA Project Company that may be carrying out work within the Project Site or in the land adjoining or near the Project Site, including with respect to the Joint Development Alternatives, and will allow them reasonable access to the Project Site, provided that Principal Project Company shall not be in breach of this Section 8.7.6 (Coordination with JDA Project Companies and Joint Development Alternatives) for any temporary interruption to the work of any JDA Project Company that (a) has been agreed to in advance in accordance with procedures agreed to by Principal Project Company, such contractor for the Joint Development Alternative and any relevant Third Party; or (b) is reasonably necessary in accordance with Law and Good Industry Practice to respond to emergencies creating an immediate and serious threat to public health, safety, security or the Environment.

## **8.7 IFM Operations Committee**

**8.7.1** As provided in Section B.9.1.2 (IFM Operations Committee) of the IFM Specifications, the IFM Operations Committee shall be responsible for receiving and reviewing matters related to operational interface and communications for IFM Services, including Maintenance Services and Renewal Work, and SFMTA O&M Services; and

**8.7.2** Any unanimous decision of the IFM Operations Committee shall be final and binding on the Parties. If the IFM Operations Committee is unable to reach a unanimous decision, either Party may refer the matter for resolution in accordance with Article 18 (Contract Dispute Procedures). The findings of the IFM Operations Committee shall be inadmissible and given no weight during the Article 18 (Contract Dispute Procedures) process.

## **8.8 FF&E During IFM Period**

### **8.8.1 Title and Responsibility for Risk**

**8.8.1.1** Subject to Section 2.4.3 (Passage of Title), City will own all FF&E during the IFM Period.

### **8.8.2 Maintenance and Replacement of FF&E During IFM Period**

**8.8.2.1** Until the end of the IFM Period, Principal Project Company shall maintain, replace and repair all PPC-Maintained FF&E.

**8.8.2.2** Where Principal Project Company is required to replace PPC-Maintained FF&E, the replacement FF&E must:

- (a) meet standards relative to the current market commensurate with standards relative to the market for the FF&E being replaced as of the original purchase date;
- (b) be consistent with Good Industry Practices for quality, durability, materials and technology;
- (c) have a design life equal to or greater than the terms of the PPC-Maintained FF&E being replaced; and
- (d) not increase costs payable by City (as compared with PPC-Maintained FF&E where alternative FF&E is readily available on comparable terms and would not have such an effect).

**8.8.2.3** Subject to Section 8.9.2.4 and Section 6.11, City will, during the Term:

- (a) replace and repair Existing FF&E and maintain, replace and repair City-Furnished Equipment and Office/Admin and Training Spaces FF&E if an item:
  - (i) is exhibiting continuous faults; or

- (ii) is leading to faults which are causing continual disruptions to IFM Services as a result of being worn or tired
- (b) notify Principal Project Company of Existing FF&E, or City-Furnished Equipment (as applicable) being replaced; and
- (c) in connection with replacements and repairs under Section 8.9.2.3(a), ensure that the replacement Existing FF&E, Office/Admin and Training Spaces FF&E or City-Furnished Equipment (as applicable) do not increase the cost to Principal Project Company or any PPC-Related Entity of performing the IFM Services.

**8.8.2.4** The replacement and repair of the Existing FF&E, Office/Admin and Training Spaces FF&E or City-Furnished Equipment in accordance with Section 8.9.2.3 will be at City's cost unless the need to replace the Existing FF&E or City-Furnished Equipment is due to any PPC Fault or the failure of Principal Project Company or any PPC-Related Entity to comply with Principal Project Company's obligations under this Agreement with respect to that Existing FF&E or City-Furnished Equipment, including Section 6.11. In such case, the replacement costs will be an obligation due and payable by Principal Project Company to City.

**8.8.2.5** Principal Project Company shall:

- (a) provide all equipment for IFM Services;
- (b) ensure all items of FF&E and equipment for IFM Services are securely stored to prevent unauthorized access and to ensure that the health and safety of the public or City are not adversely affected;
- (c) ensure all items of FF&E are accounted for and present on the completion of each activity or use;
- (d) ensure all fuel to be used in the performance of the IFM Services is dispensed and accounted for via the use of a log book;
- (e) ensure machinery and dispensing mechanisms have lockable fuel caps; and
- (f) advise City promptly and no later than three days after Principal Project Company becomes aware of any item of FF&E or equipment for IFM Services which has not been accounted for, and cooperate with City in conducting all necessary procedures to establish and take steps to ensure that items will be accounted for properly in the future;
- (g) develop a tools management and safety policy and submit said policy for review in accordance with Exhibit 11 (Submittals Review Process); and
- (h) maintain records of FF&E and FM Services Equipment audits and make such records available to City on request.

## **8.9 Energy Management**

### **8.9.1 Independent Energy Auditor**

**8.9.1.1** After the second anniversary, but no later than the third anniversary, of the Final Acceptance Date, the Parties shall appoint an Independent Energy Auditor to:

- (a) provide an initial report inclusive of operating assumptions, current Weather Data and energy model simulation files regarding the IFM Facility's energy performance for the purposes of establishing the Annual Energy Target in accordance with Section 3 (Calculation of Annual Energy Target) of Exhibit 12 (Energy Management); and
- (b) provide an updated report, as a result of agreed operating changes to the Infrastructure Facility, to determine the adjusted Annual Energy Target in accordance with Section 3 (Calculation of Annual Energy Target) of Exhibit 12 (Energy Management)

**8.9.1.2** Principal Project Company shall, in consultation with, and subject to the approval of, City, establish the schedule and process for the selection of an Independent Energy Auditor for purposes of the Independent Energy Auditor roles contemplated in Section 3 (Calculation of Annual Energy Target) of Exhibit 12 (Energy Management). Principal Project Company shall develop the solicitation package and draft contract terms, subject to approval by City, and Principal Project Company shall set the solicitation schedule with the goal of selecting the Independent Energy Auditor at least one month prior to the second anniversary of the Final Acceptance Date, and as agreed between the Parties in accordance with Section 3.2.2 of Exhibit 12 (Energy Management).

**8.9.1.3** The solicitations required under this Section 8.9.1 (Independent Energy Auditor) shall include issuance of a request for competitive proposals from a list of firms approved by City, review of proposals by the Parties, a joint determination regarding which firm is the best qualified to provide Independent Energy Auditor services, and negotiation of a fair and reasonable price for performance of such services. If negotiations fail with the highest ranked firm, the Parties may elect to terminate negotiations and proceed with the next highest ranked firm. This process shall be followed until a firm is selected to serve as the Independent Energy Auditor. If the Parties fail to reach agreement regarding selection of the Independent Energy Auditor, or regarding acceptable terms of the agreement with the Independent Energy Auditor, the Claim shall be subject to resolution under Article 18 (Contract Dispute Procedures).

**8.9.1.4** The Independent Energy Auditor will be appointed jointly by the Parties and will act independently from and not as an agent of either Party. Any member or advisor of City, a PPC-Related Entity, or a Lender is deemed to have an organizational conflict of interest and not eligible to respond to the solicitation.

**8.9.1.5** Each Party is responsible for its own costs related to the Independent Energy Auditor solicitation processes. The Parties will be equally responsible for all amounts payable under the terms of the agreement with the Independent Energy Auditor.

## **8.9.2 External Energy Auditor**

**8.9.2.1** On an as needed basis during the IFM Period, the City, in its sole discretion, may select an External Energy Auditor to:

- (a) undertake an energy audit of the Bus Yard inclusive of both SFMTA O&M Services and IFM Services; and
- (b) provide operational recommendations related to energy savings and maintenance considerations for Bus Yard inclusive of both SFMTA O&M Services and IFM Services

**8.9.2.2** If the City asks PPC to undertake the solicitation of the External Energy Auditor:

- (a) Principal Project Company shall, in agreement with City, establish the schedule and process for the selection of an External Energy Auditor. Principal Project Company shall develop the solicitation package and draft contract terms, subject to approval by City, and Principal Project Company shall set the solicitation schedule with the goal of selecting the External Energy Auditor, and as agreed between the Parties in accordance with Section 3.2.2 of Exhibit 12 (Energy Management).
- (b) The solicitations required under this Section 8.9.2.2 (External Energy Auditor) shall include issuance of a request for competitive proposals from a list of firms approved by City, review of proposals by the Parties, a joint determination regarding which firm is the best qualified to provide External Energy Auditor services, and negotiation of a fair and reasonable price for performance of such services. If negotiations fail with the highest ranked firm, the Parties may elect to terminate negotiations and proceed with the next highest ranked firm. This process shall be followed until a firm is selected to serve as the External Energy Auditor. If the Parties fail to reach agreement regarding selection of the Independent Energy Auditor, or regarding acceptable terms of the agreement with the Independent Energy Auditor, the Claim shall be subject to resolution under Article 18 (Contract Dispute Procedures).

**8.9.2.3** If the City undertakes the solicitation of the External Energy Auditor by itself, the City will determine its procurement process in its sole discretion.

**8.9.2.4** The External Energy Auditor will be appointed by the City and will act independently from and not as an agent of City. Any advisor or member of City, a PPC-Related Entity, or a Lender is deemed to have an organizational conflict of interest and not eligible to respond to the solicitation.

**8.9.2.5** City will be responsible for all costs related to the External Energy Auditor solicitation processes and all amounts under the terms of the agreement with the External Energy Auditor.

**8.9.2.6** Principal Project Company shall, promptly and reasonably, provide any information necessary for the External Energy Auditor to reasonably undertake its obligations in providing the services in accordance with Section 8.9.2.1

**8.9.2.7** Principal Project Company shall comply with the operational recommendations of the External Energy Auditor at its own cost in accordance with Section 6 (External Energy Auditor) of Exhibit 12 (Energy Management).

**8.9.3 Failure to meet LEED Requirements**

**8.9.3.1** In the event that LEED BD+C Gold Rating, including the mandatory 12x EAc2 Optimize Energy Performance credits, is not obtained within 12 months after the Substantial Completion Date, other than as a sole and direct result of any affirmative act or omission of City or unless unreasonably withheld by USGBC or an equivalent body, Principal Project Company shall pay to City liquidated damages in the amount of \$100,000. In the event that LEED BD+C Gold Rating, including the mandatory 12x EAc2 Optimize Energy Performance credits, is not obtained within 24 months after the Final Acceptance Date, other than as a sole and direct result of any affirmative act or omission of City or unless unreasonably withheld by USGBC or an equivalent body, such event shall be a PPC Default pursuant to Section 16.

**8.9.3.2** Principal Project Company shall submit all necessary documentation to achieve LEED BD+C Gold within 6 months after the Substantial Completion Date.

**8.9.3.3** The Parties agree that such liquidated damages are not a penalty but represent a genuine and reasonable pre-estimate of the damages that the City will suffer as a result of the happening of the specified event and would be difficult or impossible to quantify upon the happening of the specified event. Such payment shall constitute full and final settlement of all damages that may be claimed by the City as a result of a failure by Project Company to achieve LEED BD+C Gold Rating and the minimum credit requirements and, for greater certainty, a failure by Project Co to achieve LEED BD+C Gold Rating shall not result in a PPC Default Event provided that such liquidated damages are promptly paid. The Parties agree that such liquidated damages shall be payable whether or not City incurs or mitigates its damages, and that City shall not have any obligation to mitigate any such damages.

## ARTICLE 9. CONTRACTING AND LABOR PRACTICES

### 9.1 Disclosure of Contracts and Contractors

**9.1.1** The provisions of this Section 9.1 (Disclosure of Contracts and Contractors) apply with respect to (a) Prime Contracts and lower tier Contracts entered into by Prime Contractors, excluding personal services contracts and contracts with Suppliers other than Key Contractors, and (b) Contracts with Affiliates, regardless of the nature or tier of the Contract.

**9.1.2** With each Monthly Report required during the D&C Period and each Infrastructure Facility monthly report required during the IFM Period, Principal Project Company shall provide City with a list of all Contracts, including, for each Contract, (a) the name of the Contractor (indicating the Contractor is an Affiliate, if applicable), (b) a summary of the scope of work, and (c) the dollar value. If the Contract includes Construction Work or Renewal Work, include assurance that the prevailing wage for labor, as specified in the Contract Documents, is paid for all labor performed under such Contract.

**9.1.3** Principal Project Company shall allow City full access to all Contracts and records regarding Contracts and shall deliver to City, (a) within 10 days after execution, copies of all Key Contracts, guarantees thereof and amendments and supplements to Key Contracts and guarantees thereof, and (b) within 10 days after receipt of a request from City, copies of all other Contracts (including amendments and supplements) as may be requested.

### 9.2 Responsibility for Work, Contractors and Employees

**9.2.1** Principal Project Company may enter into one or more Contracts with Contractors to perform portions of the Work.

**9.2.2** The retention of Contractors by Principal Project Company does not relieve Principal Project Company of its responsibilities under this Agreement or for the quality of the Work or materials or services provided by it.

**9.2.3** Each Contract shall include (a) terms sufficient to ensure both the acknowledgement of and compliance by the Contractor with the applicable requirements of the Contract Documents and to ensure that City has the ability to exercise its rights specified in the Contract Documents, (b) those terms that are specifically required by the Contract Documents to be included in such Contract, and (c) all applicable Laws.

**9.2.4** Principal Project Company shall require each Contractor to familiarize itself with the requirements of any and all applicable Laws and the conditions of any required Regulatory Approvals.

**9.2.5** Nothing in this Agreement will create any contractual relationship between City and any Contractor. No Contract entered into by or under Principal Project Company shall impose any obligation or liability upon any Indemnitee to any Contractor or any of its employees. Principal Project Company shall include, or cause to be included, a provision in all Contracts acknowledging the same.

**9.2.6** Principal Project Company shall supervise and be fully responsible for any PPC Fault while performing Work under this Agreement or while on the Project Site, as though Principal Project Company directly employed all such individuals.

**9.2.7** If City has reasonable cause to disapprove of an employee of any PPC-Related Entity, Principal Project Company shall remove such employee within 10 Business Days after receipt of written Notice from City of such disapproval.

### **9.3 Key Contracts; Contractor Qualifications**

#### **9.3.1 Key Contract Approvals, Amendments and Termination; Use of and Change in Key Contractors**

**9.3.1.1** Principal Project Company shall provide City, for City's review and comment, draft copies of (a) any Key Contracts not executed before the Effective Date and (b) proposed material amendments to Key Contracts (regardless of whether the Key Contract to be amended was executed before the Effective Date). Such drafts shall be provided at least 30 days before execution of a Key Contract or an amendment to a Key Contract, as applicable. Any proposed amendment to required terms described in Section 9.3.2 (Key Contract Provisions) shall be considered a material amendment.

**9.3.1.2** Except as otherwise approved by City, Principal Project Company shall retain, employ and utilize the firms and organizations identified in the Implementation Proposal to fill the roles designated therein.

**9.3.1.3** Principal Project Company shall not terminate or permit termination of any Key Contract or permit any substitution, replacement or assignment of any Key Contractor, except with City's prior approval; provided, however, that City's prior approval is not required in the event of (a) any termination of this Agreement where City elects not to assume Principal Project Company's future obligations under such Key Contract, (b) any suspension, debarment, disqualification or removal (distinguished from ineligibility due to lack of financial qualifications) of the Key Contractor, or (c) any agreement for voluntary exclusion of the Key Contractor, from bidding, proposing or contracting with any federal, State or local department or agency. City agrees to act reasonably with respect to approval of a replacement in the case of material uncured default by the Key Contractor under the Key Contract.

#### **9.3.2 Key Contract Provisions**

**9.3.2.1** Each Key Contract shall comply with the requirements set forth in Exhibit 14 (Key Contract Provisions).

### **9.4 Prompt Payment to Contractors**

Principal Project Company shall comply, and shall cause each Contractor to comply, with the provisions of Business and Professions Code section 7108.5, California Civil Code sections 8122-8138, and any other applicable Law relating to prompt payment of contractors and/or subcontractors and waivers and releases by them of stop payment notices and payment bond rights.

---

## 9.5 Key Personnel

Principal Project Company shall:

- (a) retain, employ and utilize the individuals specifically listed in the Implementation Proposal, and retain, employ and utilize individuals qualified for the positions described in Section 1.1.4 of Division 1 of the Technical Requirements to fill Key Personnel positions for the relevant period identified in the Technical Requirements; Principal Project Company acknowledges that if City reasonably determines that an individual is not qualified for a Key Personnel position, Principal Project Company shall at City's request replace that individual with one that meets the required qualifications;
- (b) not change or substitute any such individuals except due to retirement, death, disability, incapacity, or voluntary or involuntary termination of employment, or as otherwise approved by City under Section 9.5(c);
- (c) promptly provide Notice to City of any proposed replacement for any Key Personnel position. City shall have the right to review the qualifications and character of each individual to be appointed to a Key Personnel position and shall act reasonably in approving or disapproving use of such individual in such position before the commencement of any Work by such individual;
- (d) cause each Key Person to dedicate the full amount of time necessary for the proper prosecution and performance of the Work, as more specifically described in Section 1.1.4 of Division 1 of the Technical Requirements;
- (e) commit each Key Person to the Project in accordance with Section 1.1.4 of Division 1 of the Technical Requirements;
- (f) provide City with office and cell phone numbers and email addresses for each Key Person. City may contact Key Personnel 24 hours per day, seven days per week;
- (g) ensure that the Project Manager identified in the Implementation Proposal or otherwise approved by City (i) will have full responsibility for the prosecution of the D&C Work, (ii) will act as agent and be a single point of contact in all matters relating to the D&C Work on behalf of Principal Project Company at least until Final Acceptance, (iii) will be present (or ensure that his or her approved designee is present) at the construction site at all times that Construction Work is performed, and (iv) will be available to respond promptly to City; and
- (h) ensure that the Quality Program Manager identified in the Implementation Proposal or otherwise approved by City (i) will have full responsibility for quality assurance and quality control with respect to D&C Work until Final Acceptance, (ii) is present (or his or her approved designee is present) at the construction site at all times that Construction Work is performed, and (iii) will be available to respond promptly to City.

---

### 9.5.1 Key Personnel Deductions

**9.5.1.1** If an individual filling a Key Personnel role is not available for, or actively involved in, the performance of the Work per their position requirement as required in Section 1.1.4 of Division 1 of the Technical Requirements, as determined by City in its good faith discretion, then:

- (a) Principal Project Company acknowledges and agrees that City and the Project will suffer significant and substantial damages and that it is impracticable and extremely difficult to ascertain and determine the actual damages which would accrue to City in such event;
- (b) Subject to Section 9.5.2 (Limitations on Deductions for Unavailability of Key Personnel), Principal Project Company shall pay City a Key Personnel deduction as follows, for each position held by such individual, as deemed compensation to City for such damages:

Category	KEY PERSONNEL DEDUCTION
Project Manager	\$150,000
Deputy Project Manager	\$75,000
Design Manager	\$75,000
Construction Manager	\$75,000
IFM Manager	\$75,000
Quality Program Manager	\$75,000
Project Safety Representative	\$75,000
Construction Superintendent	\$75,000
Third Party and Utility Coordinator Manager	\$75,000

and

- (c) Principal Project Company agrees to pay a further Key Personnel deduction for all Key Personnel in the amount of 50% of the applicable amounts listed under Section 9.5.1.1(b) for each 6 calendar month period where any Key Personnel position is vacant or not being fulfilled in accordance with this Agreement as determined by City.

**9.5.1.2** Principal Project Company agrees that the Key Personnel deductions payable in accordance with Section 9.5.1.1 are liquidated damages, not a penalty and are reasonable under the circumstances existing as of the Effective Date. The Parties have agreed to liquidated damages under this Section 9.5.1 (Key Personnel Deductions) in order to fix and limit Principal Project Company's costs and to avoid later Contract Disputes over what amounts of damages are properly chargeable to Principal Project Company.

**9.5.1.3** City may deduct amounts owing from Principal Project Company to City under Section 9.5.1.2 from amounts owing from City to Principal Project Company under this

Agreement (including the Milestone Payment), or to collect such liquidated damages from the Performance Bond.

## **9.5.2 Limitations on Deductions for Unavailability of Key Personnel**

**9.5.2.1** Principal Project Company is not liable for liquidated damages under Section 9.5.1.1 if:

- (a) Principal Project Company removes or replaces such personnel at the direction of City; or
- (b) An individual filling a Key Personnel position is unavailable because of the application of applicable Law, or due to death, disability, family leave, retirement, injury or no longer being employed by the applicable PPC-Related Entity (provided that moving to an affiliated company or a Subcontractor is not considered grounds for avoiding liquidated damages),

provided Principal Project Company promptly proposes to City a replacement for such personnel for review and approval within 30 days of unavailability, in the case of Sections 9.5.2.1(a) or 9.5.2.1(b).

**9.5.2.2** Principal Project Company may replace the Principal Project Company's Project Manager not more frequently than every three years during the IFM Period without incurring liquidated damages under Section 9.5.1 (Key Personnel Deductions), but only if Principal Project Company replaces the outgoing Principal Project Company's Project Manager with a City-approved replacement before the outgoing individual vacates the position.

**9.5.2.3** Upon approval of any Key Personnel replacement, the new individual shall be considered a Key Personnel for all purposes under this Agreement, including this Section 9.5.2 (Limitations on Deductions for Unavailability of Key Personnel).

## **9.5.3 Skilled Personnel; Removal at City Direction**

All individuals performing the Work shall have the skill and experience and any licenses or certifications required to perform the Work assigned to them. If City determines, in its good faith discretion, that any individual employed by Principal Project Company or by any Subcontractor is not performing the Work in a proper, safe and skillful manner, then at the written request of City, Principal Project Company or such Subcontractor shall promptly remove such individual and such individual shall not be re-employed on the Project without the prior written approval of City, in its good faith discretion. If Principal Project Company or the Subcontractor fails to remove such individual or individuals or fails to furnish skilled and experienced personnel for the proper performance of the Work, then City may, in its good faith discretion, suspend the affected portion of the Work for cause by delivery of Notice of such suspension to Principal Project Company. Such suspension shall in no way relieve Principal Project Company of any obligation contained in the Contract Documents or entitle Principal Project Company to a time extension, compensation or other Change Order. Once compliance is achieved, as determined by City, City will deliver Notice to Principal Project Company and Principal Project Company shall be entitled to and shall promptly resume the Work. If City's determination is later found to not have

been exercised in good faith, such suspension shall be considered a suspension for convenience.

## **9.6 DBE Participation**

### ***[NOTE TO PNC: DBE PROVISIONS/PROGRAM UNDER DEVELOPMENT]***

**9.6.1** Principal Project Company shall either achieve or demonstrate it has exercised good faith efforts to achieve the following Disadvantaged Business Enterprise (“DBE”) participation goals:

- (a) % of Principal Project Company’s costs for the Design Work;
- (b) % of Principal Project Company’s costs for the Construction Work;

**9.6.2** Achievement of the DBE participation goal for each type of Work identified in Sections 9.6.2(a) and (b) will be measured as a percentage of Principal Project Company’s costs for each such type of Work, where the total amount paid to DBE firms for each such type of Work will be measured against Principal Project Company’s costs for each such type of Work, without reduction for Deductions or other offsets.

**9.6.3** Principal Project Company shall comply with the terms and conditions set forth in Exhibit [ ] (DBE Compliance Manual) and in the approved DBE Utilization Plan.

**9.6.4** If Principal Project Company fails to achieve any DBE participation goal, then Principal Project Company must demonstrate that it met all good faith efforts requirements for achieving the goal in accordance with 49 C.F.R. Appendix A to Part 26 - Guidance Concerning Good Faith Efforts and the DBE Compliance Manual. The efforts employed must at a minimum include those that one could reasonably expect a contractor to take if the contractor were actively and aggressively trying to obtain DBE participation sufficient to meet the DBE goals (See 49 C.F.R. Part 26, Appendix A).

**9.6.5** To obtain an accurate record of Principal Project Company’s performance towards meeting its DBE participation commitments and DBE goals, Principal Project Company shall utilize City’s reporting system to report DBE and non-DBE payments and all other reporting activities throughout the performance of Work. Principal Project Company shall maintain an accurate listing of all DBE and non-DBE firms in City’s reporting system. Principal Project Company shall ensure that all relevant Contractors, Suppliers and/or brokers (at all tiers) participate in trainings in the use and operation of City’s reporting system and comply with the verification of payments and other related reporting requirements through the reporting system. City may require additional reports to ensure adequate reporting of DBE participation for the Project.

**9.6.6** Principal Project Company shall complete all DBE and non-DBE reporting requirements on City’s reporting system in accordance with the DBE Compliance Manual. If City provides a notice to Principal Project Company indicating that Principal Project Company has not achieved a DBE participation goal, Principal Project Company shall, within ten days of such notice, submit for City’s consideration Principal Project Company’s Good Faith Efforts documentation for the applicable time period.

---

**9.6.7** Failure by Principal Project Company to carry out the DBE requirements set forth in this Section 9.6 (DBE Participation) is a material breach of this Agreement, which may result in:

- (a) the termination of this Agreement;
- (b) Noncompliance Points and Deductions as set forth in Exhibit 4 (Payment Mechanism); and/or
- (c) other administrative remedies, including monetary liability, as set forth in Sections 801 and 802 of Exhibit [ ] (DBE Compliance Manual) or in this Agreement.

**9.6.8** Principal Project Company acknowledges the importance of Principal Project Company and Contractors timely tracking and entering DBE compliance data into City's reporting system. City's comments, approvals, acceptances, NTPs, payments, including the Milestone Payment, Availability Payments, periodic payments, progress payments, and other actions shall not waive or limit any remedies City has under the Contract Documents should City determine that Principal Project Company has failed to carry out the DBE requirements pursuant to this Section 9.6 (DBE Participation).

**9.6.9 DBE Utilization Plan**

**9.6.9.1** Within [ ] days after issuance of NTP 1, Principal Project Company shall submit to City for approval in its sole discretion, a DBE Utilization Plan that describes Principal Project Company's robust plan outreach, marketing, recruitment, and other good faith efforts for achieving the DBE participation goals set forth in this Section 9.6 (DBE Participation). The DBE Utilization Plan shall, at a minimum, include the following components:

- (a) provisions for submission of DBE forms and affidavits through City's DBE reporting system;
- (b) expanded descriptions of the types of proactive DBE and small business bid-specific marketing, recruitment, outreach and community engagement efforts that Principal Project Company will implement while preparing for and undertaking the D&C Work in order to include DBEs and on the Project, including:
  - (i) processes for timely communications and outreach methods that Principal Project Company will use;
  - (ii) processes to keep track of potential DBEs, small businesses and other Contractors on the Work;
  - (iii) proposed innovative methods for (A) involving new and emerging DBEs, and (B) identifying firms that might potentially be certified as DBEs, and for assisting them to become DBE-certified and involved in the Project; and
  - (iv) a discussion of how these efforts will flow through tiers of Subcontractors on the Project;

- (c) description of efforts Principal Project Company has made and will make to recruit and utilize DBE firms such as graphic design and printing, marketing, outreach, training, employment services, catering companies, maintenance companies, janitorial services, security companies and other trades to help meet the DBE business goals;
- (d) description of proposed DBE and small business capacity-building efforts to be implemented throughout the Work, including methods to assist DBEs with record-keeping and compliance, bonding, financing, access to supplies and other capabilities;
- (e) description of the estimated DBE participation level for Design Work for each month of the Design Work and cumulatively, including a table or diagram of an estimated schedule that illustrates projected work sequencing of DBE utilization for the Design Work;
- (f) description of the estimated DBE participation level for Construction Work for each month of the Construction Work and cumulatively, including a table or diagram of an estimated schedule that illustrates projected work sequencing of DBE utilization for the Construction Work;
- (g) description of processes and procedures that Principal Project Company will use to monitor, track, document and report recruitment, progress and utilization of DBEs, and to maintain and adjust the DBE participation schedule to help ensure achievement of the DBE goals, including time intervals at which Principal Project Company will employ these processes and procedures;
- (h) description of specific measures that Principal Project Company will undertake throughout the duration of the D&C Work to achieve and manage the DBE goals, including training workshops, technical and financial assistance, support services, mentor/protégé relationships, recruiting and encouraging potential DBEs to obtain certification, etc. Include a proposed schedule of events/activities;
- (i) description of how Principal Project Company will manage DBEs on the Project, including processes for project management, technical performance reviews, feedback and dispute resolution to resolve issues that may arise;
- (j) description of other procedures and processes for meeting DBE requirements, such as documenting and submitting affidavits for additional DBEs committed to the Project to meet or exceed the DBE goals, prompt pay requirements and substitution/replacement of DBEs; and
- (k) description of any other innovative or additional good faith efforts activities already undertaken or ones Principal Project Company plans to undertake that are not listed above or listed in 49 C.F.R. Part 26.

**9.6.10** Principal Project Company shall engage the DBE Contractors identified in the table set forth in Exhibit [ ] (List of Approved DBE Subcontractors and Suppliers) as part of Principal

Project Company's efforts to meet Principal Project Company's DBE participation commitments and DBE goals during the Term, subject to the DBE Contractor substitution procedures set forth in Exhibit [ ] (DBE Compliance Manual).

**9.6.11** Not later than [150] days following NTP 1, in accordance with the requirements set forth in Exhibit [ ] (DBE Compliance Manual), Principal Project Company shall provide to City for approval a list of all the DBE and small business firms that Principal Project Company proposes to engage to meet Principal Project Company's DBE participation commitments for the Construction Work.

**9.6.12** Unless City's prior written consent is provided for termination or substitution of a DBE Contractor, Principal Project Company shall not be entitled to any payment for work or materials identified for a DBE Contractor unless it is performed or supplied by such DBE Contractor.

**9.6.13 DBE Compliance Contractor**

Principal Project Company shall retain or cause to be retained a Contractor to provide DBE liaison and compliance services that:

- (a) is not corporately affiliated with Principal Project Company or a Key Contractor; and
- (b) has primary responsibility on behalf of Principal Project Company to coordinate Principal Project Company's DBE compliance efforts and interface with City regarding DBE and SBE matters.

**9.6.14 DBE Compliance Assessment**

**9.6.14.1** Annually until Substantial Completion, following the anniversary of the Effective Date each year, City will assess Principal Project Company's utilization during the preceding 12-month period of DBE firms in performance of Design Work and Construction Work. If after the end of any such 12-month period Principal Project Company is behind in meeting a DBE participation goal under Section 9.6.1(a) or (b), City may require Principal Project Company to update its plan and efforts to achieve the goal, at no additional cost to City.

**9.7 Contracts with Affiliates**

**9.7.1** Affiliates may perform Work only if:

- (a) Principal Project Company or a Contractor executes a written Contract with the Affiliate which:
  - (i) complies with all applicable provisions of the Contract Documents, including this Article 9 (Contracting and Labor Practices), is consistent with Good Industry Practice, and is in form and substance substantially similar to Contracts then being used by Principal Project Company or Affiliates for similar Work or services with unaffiliated contractors;
  - (ii) sets forth the scope of Work and all the pricing, terms respecting the scope of Work;

- (iii) contains pricing, scheduling and other terms no less favorable to Principal Project Company than those that Principal Project Company could reasonably obtain in an arms'-length, competitive transaction with an unaffiliated Contractor. Principal Project Company shall bear the burden of proving that the same are no less favorable to Principal Project Company; and
- (b) The Work to be performed by the Affiliate is not Work that any Contract Document, the Project Management Plan indicates is to be performed by an independent or unaffiliated party.

**9.7.2** Before Principal Project Company or a Contractor enters into a written Contract (including supplements and amendments) with an Affiliate, Principal Project Company shall submit a true and complete copy of the proposed Contract to City for comment. City shall have 20 days after receipt to deliver its comments to Principal Project Company. If the Contract with the Affiliate is a Key Contract, it shall be subject to City's approval as provided in Section 9.3.1 (Key Contract Approvals, Amendments and Termination; Use of and Change in Key Contractors).

**9.7.3** Principal Project Company shall make no payments to Affiliates for work or services in advance of provision of such work or services, except for reasonable mobilization payments or other payments consistent with arm's length, competitive transactions of similar scope. Advance payments in violation of this provision shall be excluded from the calculation of Termination Compensation.

## **9.8 Labor Standards**

**9.8.1** In performing the Work, Principal Project Company shall comply, and require all Contractors to comply, with all applicable federal and State labor, occupational safety and health Laws and orders, including payment of Prevailing Rate of Wages.

**9.8.2** By the 15<sup>th</sup> day of each calendar month during the Term, Principal Project Company shall submit to City certified payroll records for all employees of Principal Project Company and Contractors at all tiers for the preceding calendar month.

**9.8.3** In the event a prevailing wage law violation is discovered, City may withhold from payments owing (including the Milestone Payment and any Availability Payments) Principal Project Company's underpaid back wages plus penalties as required under Section 6.22(e)(8) (Non-Compliance with Wage Provisions – Penalties) of the San Francisco Administrative Code until the violation is resolved.

**9.8.4** All individuals performing the Work shall be qualified, experienced, competent and skilled in the performance of the portion of the Work assigned and related obligations of Principal Project Company in accordance with the Contract Documents and any applicable minimum levels in the Technical Requirements.

**9.8.5** If any individual employed by Principal Project Company or any Contractor lacks required qualifications, skill, competence, experience, licensing, certification, registration, permit, approval, bond or insurance or is not performing the Work in a proper, safe and skillful

manner, then Principal Project Company shall, or shall cause such Contractor to, remove such individual, and such individual shall not be re-employed on the Work.

**9.8.6** If, after Notice and reasonable opportunity to cure, Principal Project Company fails to take action as required by Section 9.8.5, or if Principal Project Company fails to ensure that qualified, skilled, experienced, competent, licensed, certified, registered, permitted and approved personnel are furnished for the proper performance of the Work, then City may suspend the affected portion of the Work by delivering to Principal Project Company Notice of such suspension. Such suspension shall in no way relieve Principal Project Company of any obligation contained in the Contract Documents.

## **9.9 Local Hiring Requirements for Construction Work and Renewal Work**

Principal Project Company shall comply with local hiring requirements for Construction Work and Renewal Work, as mandated by the San Francisco Local Hiring Policy for Construction set forth in Chapter 82 of the Administrative Code and related implementing regulations.

### **9.10 First Source Hiring Program**

Principal Project Company shall comply with all applicable provisions of the First Source Hiring Program as set forth in Chapter 83 of the San Francisco Administrative Code, including all enforcement and penalty provisions.

### **9.11 SFMTA Employment Training Program**

**9.11.1** As part of the SFMTA Employment Training Program, Principal Project Company shall cause at least 4 professional services trainees to be hired during the period of the D&C Work for professional services performed for the Infrastructure Facility. If a person hired through the First Source Hiring Program also meets the trainee requirements described below, that person may be counted toward these trainee hiring requirements. Trainees may be obtained through the City's One Stop Employment Center, which works with various employment and job training agencies/organizations or other employment referral source.

**9.11.2** Principal Project Company shall ensure that:

- (a) Each trainee is hired by either the Principal Project Company or a Contractor providing professional services for the Infrastructure Facility.
- (b) No trainee is counted towards meeting more than one contract requirement. For example, if City and Principal Project Company enter into this Agreement and another contract, any trainee hired for services under this Agreement would not count toward the trainee hiring requirement for the other contract.
- (c) Each trainee meets enrollment qualifications established under the City's First Source Hiring Program as follows:
  - (i) "Qualified" with reference to an economically disadvantaged individual shall mean an individual who meets the minimum bona fide occupational qualifications provided by the prospective employer to the

San Francisco Workforce Development System in the job availability notices required by the First Source Hiring Program.

- (ii) “Economically disadvantaged individual” shall mean an individual who is either (i) eligible for services under the Workforce Investment Act of 1988 (29 U.S.C. 2801 et seq.), as determined by the San Francisco Private Industry Council; or (ii) designated “economically disadvantaged” by the FS First Source Hiring Program HP administration, which means an individual who is at risk of relying upon, or returning to, public assistance.
- (iii) “On-the-job training” means the hiring party hire the trainee on a full-time basis for at least 12 months or on a part-time basis for 24 months (using the full-time or part-time definition of the employer hiring that trainee), with prior approval offering him/her on-the-job training that allows the trainee to progress on a career path.
- (d) Before a trainee is hired by a Contractor or by Principal Project Company, Principal Project Company submits for City’s approval a description and summary of training proposed for that trainee, along with the rate of pay for the position.
- (e) A trainee’s commitment does not require that he/she is used only on this Project; the trainee may also be used on other Principal Project Company or Contractor projects that may be appropriate for the trainee’s skill development.

Principal Project Company acknowledges its obligation to hire or cause to be hired trainees pursuant to the Trainee Plan and shall comply with the Trainee Plan during the Term.

#### **9.12 Deductions and Noncompliance Points Relating to Local Hire and SFMTA Training Program Requirements Development**

If Principal Project Company fails to meet certain requirements set forth in this [Article 9](#) (Contracting and Labor Practices), City may, without limiting City’s other rights and remedies under this Agreement, assess Deductions and Noncompliance Points as provided in [Exhibit 4](#) (Payment Mechanism).

#### **9.13 Ethical Standards**

**9.13.1** Principal Project Company or its representatives shall not make, nor cause to be made, any cash payments, commissions, employment, gifts, entertainment, free travel, loans, free work, substantially discounted work, or any other considerations to (a) City representatives, employees, or their relatives, or (b) representatives of subcontractors, or material suppliers or any other individuals, organizations, or businesses receiving funds in connection with this Project.

**9.13.2** Principal Project Company employees (or their relatives), agents, or subcontractors shall not receive any cash payments, commissions, employment, gifts, entertainment, free travel, loans, free work, or substantially discounted work or any other considerations from any other contractors or from any City employee, agent, representative.

**9.13.3** Principal Project Company agrees to provide Notice to a designated City representative within 48 hours of any instance where Principal Project Company becomes aware of a failure to comply with the provisions of this Section 9.13 (Ethical Standards).

**ARTICLE 10. INSURANCE; PAYMENT AND  
PERFORMANCE SECURITY; INDEMNITY**

**10.1 Insurance**

**10.1.1 Insurance Policies and Coverage**

Principal Project Company shall procure and maintain, or cause to be procured or maintained, the Insurance Policies identified in this Section 10.1 (Insurance) and in Exhibit 7 (Insurance Requirements) strictly in accordance with the minimum coverage requirements and terms of coverage as set forth in Exhibit 7 (Insurance Requirements) and in this Section 10.1 (Insurance). Principal Project Company shall timely pay, or cause to be paid, the premiums for all Insurance Policies and insurance coverages required by this Agreement. There shall be no recourse against City or any of the other City Additional Insureds for payment of premiums or other amounts with respect to the Insurance Policies, except to the extent (a) included within the Availability Payments or (b) an increase in premiums is a compensable Extra Work Cost as part of a Compensable Delay Event or Compensable Relief Event.

**10.1.2 General Insurance Requirements**

**10.1.2.1 Insurers**

All insurance required hereunder shall be procured from insurers that at the time coverage commences are authorized to do business in the State and have a rating of not less than A-:VIII according to A.M. Best's Financial Strength Rating and Financial Size Category, except as otherwise provided in Exhibit 7 (Insurance Requirements) or approved in writing by City in its reasonable discretion.

**10.1.2.2 Deductibles; Self-Insured Retentions; Claims Exceeding Policy Limits**

Except to the extent expressly provided otherwise in the Contract Documents, Principal Project Company shall be responsible for paying all insurance deductibles and self-insured retentions, and City shall have no liability for deductibles, self-insured retentions or claim amounts exceeding the required policy limits. If City is the sole cause of an insured Loss (including Losses caused by the SFMTA's operations) City shall pay the applicable insurance deductibles and self-insured retentions, notwithstanding any subrogation waivers. In the event that any required insurance coverage involves a self-insured retention: (a) the entity responsible for the self-insured retention shall have an authorized representative issue a letter to City, at the same time the Insurance Policy is to be procured, stating that it shall protect and defend City to the same extent as if an insurer provided coverage for City; and (b) Principal Project Company shall ensure that the relevant Insurance Policy expressly permits (but does not obligate) City, or a designee of City, to pay the self-insured retention to satisfy any policy condition requiring payment of the self-insured retention for coverage to apply. If the entity responsible for the self-insured retention does not pay the self-insured retention amount when due, then City may, but is not obligated to, pay the self-insured retention amount on behalf of such entity, and Principal Project Company shall indemnify City for such amount and any other Losses incurred by City in connection with the entity's failure to pay the self-insured retention amount when due.

### 10.1.2.3 Primary Coverage

Without any limitation, each policy shall provide that the coverage afforded under the policy is primary and noncontributory with respect to any other insurance available to all named and City Additional Insureds.

### 10.1.2.4 Verification of Coverage

- (a) When Principal Project Company is required by the Contract Documents to initially obtain or cause to be obtained an Insurance Policy, Principal Project Company shall deliver to City a certificate of insurance before policy inception followed by a binder of insurance in a form reasonably acceptable to City no later than 30 days following policy inception. Principal Project Company shall make submit all certificates of insurance including relevant endorsements attached to the certificates of insurance prior to each policy effective date and binders of insurance as soon as they are issued by the insurers but not later than 30 days following policy inception. Each required binder must state the identity of all insurers, list all named and additional insureds, state the type of coverage and limits including any applicable sublimits, list all deductibles and self-insured retentions, provide the policy effective and expiration date, and list all applicable endorsements once available.
- (b) In addition, as soon as they become available, Principal Project Company shall deliver to City (i) a true and complete copy of each such Insurance Policy or modification, or renewal or replacement Insurance Policy obtained by Principal Project Company or a Prime Contractor and all endorsements thereto and (ii) satisfactory evidence of payment of the premium therefor.
- (c) If Principal Project Company has not provided City with the certificates of insurance, including applicable endorsements, prior to policy inception and evidence of premium payment within 30 days after each payment is due, City may, upon written Notice to Principal Project Company, in addition to any other available remedy, without obligation and without further inquiry as to whether such insurance is actually in force, elect to obtain such an Insurance Policy; and Principal Project Company shall reimburse City for any Recoverable Costs thereof upon demand. In addition, City shall have the right, without obligation or liability, to suspend all or any portion of Work, during any time that such proofs of coverage, in compliance with this Section 10.1 (Insurance), have not been provided.

### 10.1.2.5 Waivers of Subrogation

City and Principal Project Company waive all rights against each other, against each of their respective agents, employees and Project consultants, and against Contractors and their respective members, directors, officers, employees, subcontractors and agents for any claims to the extent covered and paid by insurance obtained pursuant to this Section 10.1 (Insurance), with the exception of professional liability insurance and except such rights as they may have to the proceeds of such insurance. Principal Project Company shall require all Contractors to provide similar waivers in writing, each in favor of all other parties specified above. Each policy

for which Principal Project Company or any Contractor is required to provide coverage for the City Additional Insureds shall include a waiver of any right of subrogation against the City Additional Insureds.

#### **10.1.2.6 No Recourse**

Except as may be inclusive within the MaxAP or as expressly provided otherwise in this Agreement, there shall be no recourse against City for payment of premiums or other amounts with respect to the insurance Principal Project Company is required to provide hereunder.

#### **10.1.2.7 Support of Indemnifications**

The insurance coverage Principal Project Company is required to provide hereunder shall support but is not intended to limit Principal Project Company's indemnification obligations under the Contract Documents.

#### **10.1.2.8 Additional Terms and Conditions**

- (a) Each Insurance Policy shall state or be endorsed to state that coverage cannot be canceled except after 30 days' prior Notice (or ten days in the case of cancellation for non-payment of premium) has been given to City. No policy language or endorsement shall include any limitation of liability of the insurer for failure to provide such Notice.
- (b) No Insurance Policy shall provide coverage on a "claims made" basis, with the exception of any professional liability Insurance Policies, unless specifically approved in writing by City.

#### **10.1.2.9 Requirements Not Limiting**

The Parties acknowledge and agree that:

- (a) requirements for specific coverage features or limits contained in this Section 10.1 (Insurance) and in Exhibit 7 (Insurance Requirements) are not intended as a limitation on coverage, limits or other requirements, or a waiver of any coverage normally provided by any Insurance Policy;
- (b) specific reference to a given coverage feature is not intended to be all inclusive, or to the exclusion of other coverage, or a waiver of any type; and
- (c) all insurance coverage and limits provided by Principal Project Company, or by third parties pursuant to obligations of Principal Project Company under this Agreement, and, in each case, available or applicable to this Agreement are intended to apply to the full extent of the Insurance Policies, and nothing contained in this Agreement limits, or shall be deemed to limit, the application of such insurance coverage.

Except as otherwise specifically set forth in the Contract Documents, Principal Project Company may meet its insurance obligations in any manner Principal Project Company deems reasonably

appropriate, so long as, in each case, and with respect to the coverages prescribed for each Insurance Policy, Principal Project Company meets all the requirements therefor.

#### **10.1.2.10 Deemed Self-Insurance by Principal Project Company**

If, in any instance, Principal Project Company (i) has not performed its obligations respecting insurance coverage set forth in this Agreement or (ii) is unable to enforce and collect any such insurance for failure (x) to assert claims in accordance with the terms of the Insurance Policies or (y) to prosecute claims diligently, then, for purposes of determining Principal Project Company's liability and the limits thereon or determining reductions in compensation due from City to Principal Project Company on account of available insurance, Principal Project Company shall be treated as if it has elected to self-insure up to the full amount of insurance coverage which would have been available had Principal Project Company performed such obligations and not committed such failure.

#### **10.1.2.11 Umbrella and Excess Policies**

Principal Project Company shall have the right to satisfy the requisite insurance coverage amounts for liability insurance through a combination of primary policies and umbrella or excess policies. Umbrella and excess policies shall comply with all insurance requirements for the applicable type of coverage ("follow form").

#### **10.1.2.12 Inadequacy of Required Coverage**

City makes no representation that the scope of coverage and limits of liability specified for any Insurance Policy to be carried pursuant to this Agreement or approved variances therefrom are adequate to protect Principal Project Company against its undertakings under this Agreement to City, or its liabilities to any third party. It is the responsibility of Principal Project Company and each Subcontractor to determine if any changes or additional coverages are required to adequately protect their interests. No such limits of liability or approved variances therefrom shall preclude City from taking any actions as are available to it under this Agreement, or otherwise under applicable Law.

#### **10.1.2.13 No Relief from Liabilities and Obligations**

Neither compliance nor failure to comply with the insurance provisions of this Agreement will relieve Principal Project Company or City of their respective liabilities and obligations under this Agreement.

#### **10.1.2.14 Adjustments in Coverage Amounts**

- (a) At least once every two years during the Term (commencing initially on the Substantial Completion Date), City and Principal Project Company shall review and may, upon mutual agreement, adjust, as appropriate, the per occurrence and aggregate limits for the Insurance Policies that have stated dollar amounts set forth in Exhibit 7 (Insurance Requirements).
- (b) In determining adjustments, Principal Project Company and City shall take into account (i) claims and loss experience for the Project, (ii) the physical condition of the Project, (iii) the Safety Compliance and Noncompliance Points

record for the Project, (iv) best practices in the insurance industry and (v) the terms of the Financing Documents.

- (c) If a City Change to increase required limits of Insurance Policies results in a net increase in applicable insurance premiums, Principal Project Company shall be entitled to the actual amount of such net increase (without profit or mark-up), provided that to the extent such adjustments are made to reflect Principal Project Company's performance on the Project (including for reasons described in Section 10.1.2.14(b)(i), (ii), or (iii)), Principal Project Company shall not be entitled to any compensation.

### 10.1.3 Insurance Premium Benchmarking

During the IFM Period, City will allocate the risk or benefit of increases and decreases in insurance premiums through an insurance benchmarking process as set forth in this Section 10.1.3 (Insurance Premium Benchmarking). In no event shall City participate in any insurance premium risk associated with additional or extended coverages beyond those required under Exhibit 7 (Insurance Requirements), or changes in premiums that are not the result of market-wide factors. The benchmarking process will occur as follows:

- (a) For the purposes of the benchmarking process, the “**Starting Insurance Benchmarking Premiums**” shall equal the following:

Coverage	Agreement Reference	Amount
Worker’s Compensation and Employer’s Liability	<u>Exhibit 7, Section 2.1</u>	<i>[\$•] [Note: To be included based on Implementation Phase Proposal]</i>
Commercial General Liability	<u>Exhibit 7, Section 2.2</u>	<i>[\$•] [Note: To be included based on Implementation Phase Proposal]</i>
Commercial Automobile Liability	<u>Exhibit 7, Section 2.3</u>	<i>[\$•] [Note: To be included based on Implementation Phase Proposal]</i>
Pollution Legal Liability	<u>Exhibit 7, Section 2.4</u>	<i>[\$•] [Note: To be included based on Implementation Phase Proposal]</i>
Property Insurance	<u>Exhibit 7, Section 2.5</u>	<i>[\$•] [Note: To be included based on Implementation Phase Proposal]</i>

- (b) 60 days after the commencement date for the initial policies for the Required Minimum Insurance Policies and every two years thereafter during the IFM Period (each, a “**Benchmarking Date**”), Principal Project Company shall submit a report (“**Insurance Review Report**”) to City that includes the following elements:
- (i) Firm current quotes from three established and recognized insurance providers for the Required Minimum Insurance Policies; provided, however, that if three quotes are not available, Principal Project Company may, prior to the due date of Insurance Review Report, request a modification of this requirement, which shall be considered by City, in its good faith discretion. The quotes shall represent the current and fair market cost of providing the Required Minimum Insurance Policies.
  - (ii) With the exception of the first Benchmarking Date, copies of the premium invoices for the actual insurance policies obtained by Principal Project Company for the IFM Services for the prior two years (“**Actual Insurance Policies**”).
  - (iii) With the exception of the first Benchmarking Date, a comprehensive written explanation of any effect that a PPC-Related Entity’s loss experience has had on the premiums for the Required Minimum Insurance Policies and the Actual Insurance Policies. The explanation shall include: (A) an assessment by Principal Project Company’s independent insurance broker addressing industry trends in premiums for the Required Minimum Insurance Policies and analysis (if applicable) of any Project-specific reasons for the increase in premiums; and (B) detailed analysis of any claims (paid or reserved) since the last report period, with claim date(s), description of incident(s), claims amount(s), and the level of deductibles provided.
- (c) City may independently assess the accuracy of the information in the Insurance Review Report and retains the right to perform its own independent insurance review, which may include retaining advisors, obtaining independent quotes for the Required Minimum Insurance Policies or performing its own assessment as to the impact of claims history on renewal costs.
- (d) The Starting Insurance Benchmarking Premiums shall be used in the benchmarking process for the remainder of the Term in accordance with the following procedures:
- (i) 60 days after each Benchmarking Date, Principal Project Company shall provide the Insurance Review Report, with the information specified in Section 10.1.3(b). City shall determine the change in premium costs on a coverage-by-coverage basis for the Required Minimum Insurance Policies calculated based on the information obtained from the initial Insurance Review Report or, if City deems

appropriate in its reasonable discretion, from information obtained pursuant to Section 10.1.3(c).

- (ii) City will use the Starting Insurance Benchmarking Premiums to measure changes in premium costs at each Benchmarking Date for each of the Required Minimum Insurance Policies. The Starting Insurance Benchmarking Premiums shall be adjusted based on the percentage change in CPI (“**Escalated Benchmark Insurance Premiums**”) from the Effective Date. Broker’s/agent’s fees and/or commissions will not be considered as part of the benchmarking exercise described in this Section 10.1.3 (Insurance Premium Benchmarking), shall be identified and excluded from premiums, and are the exclusive responsibility of Principal Project Company.
- (iii) The subsequent Insurance Review Reports shall be used to establish the renewal premiums for the Required Minimum Insurance Policies for purposes of the benchmarking process described in this Section 10.1.3 (Insurance Premium Benchmarking). In no event shall premium increases that are caused by Project-specific losses, changes in deductibles or matters within the control of Principal Project Company or any PPC-Related Entity be subject to the benchmarking exercise or risk sharing described in this Section 10.1.3 (Insurance Premium Benchmarking). Principal Project Company may voluntarily choose to procure an insurance package which exceeds the Required Minimum Insurance Policies (with, for example, higher deductibles or coverage amounts, less exclusions, etc.), in which case Principal Project Company and City recognize that: (A) the actual variations in Principal Project Company’s insurance premiums may not necessarily reflect the variations in the minimum insurance requirements and (B) City will disregard the actual insurance package and will rely upon the analysis from the Insurance Review Report and its own independent analysis of the effect on the minimum insurance requirements. However, any insurance beyond the Required Minimum Insurance Policies shall not be subject to the insurance benchmarking process and the MaxAP adjustment described in Section 10.1.3(e).
- (iv) If City elects to retain its own insurance advisor to analyze the extent of eligible premium increases, Principal Project Company shall cooperate in good faith with any reasonable requests for additional information from City’s insurance advisor. No later than 30 days after Principal Project Company’s submission of the Insurance Review Report, City shall make its determination of the eligible premium increases subject to the risk-allocation described in Section 10.1.3(e).
- (e) As of a Benchmarking Date:
  - (i) if the aggregate annual insurance premiums for the Actual Insurance Policies, after adjustment for any changes in coverage and deductibles and as such premiums may be adjusted pursuant to

Section 10.1.3(d)(iii) (the “**Actual Insurance Premiums**”) exceed 120% of the aggregate Escalated Benchmark Insurance Premiums, then City shall, within 30 days of the Benchmarking Date and on each 12 calendar month anniversary thereof until the next benchmarking period, make a lump sum payment to Principal Project Company in an amount equal to 85% of the Actual Insurance Premiums that are in excess of 120% of the aggregate Escalated Benchmark Insurance Premiums; and

- (ii) if the Actual Insurance Premiums are less than 80% of the aggregate Escalated Benchmark Insurance Premiums, then City shall, during each 12 calendar month period commencing on the Benchmarking Date until the next benchmarking period, reduce the payments owed to Principal Project Company in an amount equal to 85% of the amount by which Actual Insurance Premiums are lower than 80% of the aggregate Escalated Benchmark Insurance Premiums.
- (f) Any payments or reductions in payments to Principal Project Company pursuant to Section 10.1.3(e)(i) and (ii) shall be subject to a pro-rata adjustment for any period of less than 12 calendar months.
- (g) Principal Project Company shall maintain copies of the Actual Insurance Policies and the Insurance Review Reports and make these documents available upon City’s request for the Term plus 10 years.

#### **10.1.4 Insurance Unavailability**

##### **10.1.4.1** If an Insurance Unavailability risk occurs, then:

- (a) Principal Project Company shall notify City within 10 days of becoming aware that the risk has become an Insurance Unavailability; and
- (b) City will meet with Principal Project Company within 10 days after receipt of Principal Project Company’s Notice to discuss the risk, including whether the risk is in fact Insurance Unavailability.

**10.1.4.2** If Principal Project Company demonstrates to City’s reasonable satisfaction that it has used diligent efforts in the global insurance and reinsurance markets to procure the required Insurance Policy coverages for the Insurance Unavailability, and if, despite such diligent efforts and, through no fault of Principal Project Company or any other PPC-Related Entity, any Insurance Unavailability exists or occurs, the Parties shall meet further to discuss how the risk should be managed.

**10.1.4.3** If the Parties cannot agree on how to manage the Insurance Unavailability, then City, in its sole discretion, shall elect one of the following, and City’s election shall be final and not subject to **Error! Reference source not found.** (Contract Dispute Procedures):

- (a) compensate Principal Project Company for the costs of any Claim or liability incurred in connection with the Insurance Unavailability, up to an amount equal to the Insurance Proceeds that would have been payable had the

relevant Insurance Policy continued to be available on the previous terms of that Insurance Policy and deduct from the Availability Payment or Milestone Payments owing to Principal Project Company 100% of the greater of (i) the amount of insurance premiums Principal Project Company would have been obligated to pay under this Agreement (up to the Commercially Reasonable Insurance Rates) and (ii) the premiums assumed in the Financial Model;

- (b) if the Insurance Policies are available from insurers meeting the requirements in Section 10.1.2.1 (Insurers), but not at Commercially Reasonable Insurance Rates, provide Notice to Principal Project Company to obtain the Insurance Policy and that City will be responsible for 100% of the premiums that exceed the Commercially Reasonable Insurance Rates;
- (c) provide Notice to Principal Project Company approving one or more variances from Exhibit 7 (Insurance Requirements) such that the risk ceases to be Insurance Unavailability, in which case City will be entitled to a reduction in the Availability Payments equal to 100% of the insurance premiums that Principal Project Company avoids as a result of the variance from Exhibit 7 (Insurance Requirements). In determining Principal Project Company's avoided insurance premiums, the Parties shall compare the actual premiums up to the greater of (i) the amount of insurance premiums Principal Project Company would have been obligated to pay for the relevant Insurance Policy had it been available under normal market conditions without variance from Exhibit 7 (Insurance Requirements) or (ii) the premiums for the relevant Insurance Policy assumed in the Financial Model; or
- (d) terminate this Agreement by Notice to Principal Project Company, as further set out in Section 17.2.6 (Termination for Insurance Unavailability).

### **10.1.5 Review of Insurance Unavailability Risks**

**10.1.5.1** Whenever Principal Project Company has received information from its insurance adviser or other credible insurance industry source that Insurance Unavailability will likely exist during the next insurance renewal period, and annually during any period that Insurance Unavailability exists, Principal Project Company shall deliver Notice thereof to City and submit a report to City that includes the following elements:

- (a) evidence of Principal Project Company's efforts to obtain from at least three insurers meeting the requirements in Section 10.1.2.1 (Insurers) the relevant Insurance Policy required to be maintained during the Term and an explanation of the reasons such efforts were unavailing;
- (b) a comprehensive assessment by Principal Project Company's independent insurance broker identifying the Insurance Unavailability risk, the reasons for unobtainability of insurance, and trends in insurance market conditions respecting the Insurance Unavailability risk;
- (c) a comprehensive written explanation and analysis of:

- (i) any claims and loss experience (paid or reserved) with respect to any PPC-Related Entity or Affiliate, whether in connection with the Project or Work or in connection with any unrelated work or activity of a PPC-Related Entity or Affiliate, since the last review period, with claim date(s), description of incident(s), claims amount(s), and the level of deductibles or self-insured retentions provided; and
- (ii) the effect thereof on obtainability or unobtainability of the relevant Insurance Policies and coverage.

**10.1.5.2** City retains the right to independently assess the accuracy of the information on insurance markets, Insurance Unavailability and impacts of claims and loss experience, and retains the right to perform its own independent insurance review, which may include retaining advisors and seeking independent quotes for the Insurance Policies, all of which shall be undertaken and performed by City and any of its retained experts in good faith and a commercially reasonable manner.

**10.1.5.3** If City's review conducted in accordance with Section 10.1.5.2 determines that the relevant Insurance Unavailability is insurable at Commercially Reasonable Insurance Rates, then Principal Project Company will promptly procure the insurance in connection with that risk in accordance with Exhibit 7 (Insurance Requirements).

**10.1.5.4** Principal Project Company shall use commercially reasonable efforts to ensure that the process set forth in this Section 10.1.5 (Review of Insurance Unavailability Risks) concludes sufficiently in advance of expiration of such Insurance Policies to ensure continuation of insurance coverage under renewed or replacement Insurance Policies. City will cooperate with Principal Project Company in its discharge of this obligation.

#### **10.1.5.5 Defense Costs**

Unless otherwise agreed to in writing by City, defense costs shall not erode the limits of coverage of any of the Insurance Policies, except that defense costs may be included within the limits of coverage of professional liability, contractor's pollution liability and pollution legal liability policies.

#### **10.1.5.6 Contesting Denial of Coverage**

If any Insurer under an Insurance Policy described in Sections 10.1.1 (Insurance Policies and Coverage) and 10.1.3 (Insurance Premium Benchmarking) denies coverage with respect to any claims reported to such Insurer, Principal Project Company and City shall cooperate in good faith to establish whether and to what extent to contest, and how to fund the cost of contesting, the denial of coverage; provided that if the reported claim is a matter covered by an indemnity in favor of City or the denial is the result of Principal Project Company's failure to comply with an insurance requirement, then Principal Project Company shall bear all costs of contesting the denial of coverage.

#### **10.1.6 Lender Insurance Requirements**

If, under the terms of any Financing Agreement or Security Document, Principal Project Company is obligated to, and does, carry insurance coverage with higher limits, lower

deductibles or self-insured retentions, or broader coverage than required under this Agreement, Principal Project Company's provision of such insurance shall satisfy the applicable requirements of this Agreement provided such policy meets all the other applicable requirements of this Section 10.1 (Insurance) and Exhibit 7 (Insurance Requirements). If Principal Project Company carries insurance coverage in addition to that required under this Agreement, then, except for any directors and officers liability insurance carried by Principal Project Company, Principal Project Company shall include the City Additional Insureds as additional insureds thereunder and shall provide to City the proofs of coverage and certificates, binders and copies of the policy as described in Section 10.1.2.4 (Verification of Coverage). If, however, Principal Project Company demonstrates to City that inclusion of such City Additional Insureds as additional insureds will increase the premium, City shall elect either to pay the increase in premium or forego additional insured status.

### **10.1.7 Prosecution of Claims**

**10.1.7.1** Unless otherwise directed by City in writing with respect to City's insurance claims, Principal Project Company shall be responsible for reporting and processing all potential claims by City or Principal Project Company against the Insurance Policies required to be provided by Principal Project Company under the Contract Documents. City will make reasonable efforts to report to Principal Project Company incidents that City's Authorized Representative has Actual Knowledge of and that may give rise to an insurance claim against the Insurance Policies required to be provided by Principal Project Company under the Contract Documents. City will report such incidents to Principal Project Company within a reasonable period of time after City's Authorized Representative actually becomes aware of such incidents. Principal Project Company agrees to report timely to the insurer(s) under such policies any and all matters which may give rise to an insurance claim by Principal Project Company or City and to promptly and diligently pursue such insurance claims in accordance with the claims procedures specified in such policies, whether for defense or indemnity or both. Principal Project Company shall enforce all legal rights against the insurer under the applicable Insurance Policies and applicable Laws in order to collect thereon, including pursuing necessary litigation and enforcement of judgments, provided that Principal Project Company shall be deemed to have satisfied this obligation if a judgment is not collectible through the exercise of lawful and diligent means.

**10.1.7.2** Principal Project Company shall immediately provide Notice to City, and thereafter keep City fully informed, of any incident, potential claim, claim or other matter of which Principal Project Company becomes aware that involves or could conceivably involve either City or City Additional Insureds as a defendant. City agrees to promptly provide Notice to Principal Project Company of City's incidents, potential claims, and matters which may give rise to a City insurance claim, to tender to the insurer City's defense of the claim (if applicable) under such Insurance Policies, and to cooperate with Principal Project Company as necessary for Principal Project Company to fulfill its duties hereunder.

**10.1.7.3** If, in any instance, Principal Project Company (i) has not performed its obligations respecting insurance coverage set forth in this Agreement, or (ii) is unable to enforce and collect any such insurance for failure (x) to assert claims in accordance with the terms of the Insurance Policies or (y) to prosecute claims diligently, then for purposes of determining Principal Project Company's liability and the limits thereon or determining reductions in compensation due from City to Principal Project Company on account of available insurance, Principal Project Company

shall be treated as if it has elected to self-insure up to the full amount of insurance coverage which would have been available had Principal Project Company performed such obligations. Nothing in this Section 10.1.7 (Prosecution of Claims) or elsewhere in this Section 10.1 (Insurance) shall be construed to treat Principal Project Company as electing to self-insure where Principal Project Company is unable to collect due to the bankruptcy or insolvency of any insurer which at the time the Insurance Policy is written meets the rating qualifications set forth in this Section 10.1 (Insurance).

**10.1.7.4** In the event that an Insurer providing any of the Insurance Policies required by this Agreement becomes the subject of bankruptcy proceedings, becomes insolvent, or is the subject of an order or directive limiting its business activities given by any Governmental Entity, including the State Department of Insurance, Principal Project Company shall exercise best efforts to promptly and at its own cost and expense secure alternative coverage in compliance with the insurance requirements contained in this Section 10.1 (Insurance) so as to avoid any lapse in insurance coverage.

**10.1.7.5** If, in any instance, Principal Project Company has not promptly performed its obligation to report to applicable insurers and process any potential insurance claim tendered by City, then City may report the claim directly to the insurer and thereafter seek coverage under the relevant policy.

#### **10.1.8 Application of Insurance Proceeds**

All insurance proceeds received for physical property damage to the Project under any Insurance Policies required under Exhibit 7 (Insurance Requirements) shall be first applied to repair, reconstruct, rehabilitate, restore, renew, reinstate and replace each part or parts of the Project with respect to which such proceeds were received.

### **10.2 Performance Security**

#### **10.2.1 Equity Letter of Credit**

Principal Project Company represents to City that if there is unfunded equity outstanding as of Financial Close, the Financing Documents will require each Equity Member to provide an Equity Letter of Credit to Principal Project Company or the Collateral Agent, the aggregate amount of which shall be at least equal to the unfunded equity outstanding as of Financial Close that is committed to the Project during the D&C Period.

#### **10.2.2 D&C Performance Security**

**10.2.2.1** On or before the Financial Close Date, Principal Project Company shall deliver the D&C Performance Security to City. The D&C Performance Security shall be comprised of the following (“**D&C Performance Security**”):

- (a) the D&C Performance Bond; and
- (b) the D&C Payment Bond.

**10.2.2.2** The D&C Performance Bond shall remain in full force and effect until:

- (a) The Final Acceptance Date;
- (b) There exists no PPC Default with respect to the D&C Work; and
- (c) No event has occurred that, with the giving of Notice or passage of time, or both, would constitute a PPC Default with respect to the D&C Work.

**10.2.2.3** The D&C Payment Bond shall remain in full force and effect until:

- (a) Receipt of evidence satisfactory to City that all Persons eligible to file a Claim under applicable Law against the D&C Payment Bond have been fully paid;
- (b) Receipt of unconditional releases of Claims and stop Notices from all Subcontractors who have filed preliminary Notices of Claims against the D&C Payment Bond; and
- (c) Expiration of the statutory period for Contractors to file a Claim against the D&C Payment Bond, if no claims have been filed.

### **10.3 General Requirements for D&C Performance Security**

**10.3.1.1** Each D&C Performance Security shall be issued by an Eligible Surety or panel of Eligible Sureties.

**10.3.1.2** The D&C Performance Security will be subject to the rights of Lenders under the Direct Agreement.

**10.3.1.3** If the D&C Contract Amount is increased in connection with a Change Order, City may, in its sole discretion, require a corresponding and proportionate increase in the amount of each D&C Performance Security, or alternative security, as applicable.

**10.3.1.4** Principal Project Company agrees that it may not seek an injunction to restrain City from calling upon any D&C Performance Security.

**10.3.1.5** Unless otherwise specified in this Agreement, a draw on the D&C Performance Security or exercise of any rights under such D&C Performance Security will not be conditioned on prior resort to any other security of, or provided for the benefit of, Principal Project Company.

**10.3.1.6** Principal Project Company will pay all Recoverable Costs imposed in connection with City's exercise of its remedies against any D&C Performance Security or replacements thereof.

**10.3.1.7** Principal Project Company may:

- (a) procure the D&C Performance Security, so that they are security, as applicable, for (i) Principal Project Company's performance obligations under the Contract Documents respecting the D&C Work and (ii) Principal Project Company's payment obligations to the designated Persons supplying labor or materials respecting the D&C Work; or

- (b) subject to this Section 10.3 (General Requirements for D&C Performance Security), deliver D&C Performance Security from the Key Contractors for performance of any portion of the Work, so that each security is security for, as applicable, (i) performance of the Key Contractor's obligations under its Contract for D&C Work or (ii) payment to the designated Persons supplying labor or materials respecting the D&C Work.

**10.3.1.8** If Principal Project Company makes the election under Section 10.3.1.7(b), then:

- (a) the language of the bond forms in Exhibit 6B (Form of D&C Payment Bond), Exhibit 6C (Form of D&C Performance Bond), Exhibit 6D (Form of Multiple Obligee Rider for D&C Payment Bond) and Exhibit 6E (Form of Multiple Obligee Rider for D&C Performance Bond) shall be adjusted to reflect this election, but only as necessary to (i) identify the Key Contract for D&C Work as the bonded contract, and (ii) identify the Key Contractor as the principal; and
- (b) if there are two or more parties providing the D&C Performance Security, then the aggregate sum of the D&C Performance Security shall equal the required bond amounts under this Agreement and the size of each bond shall be in proportion to the scope and cost of the Work to be provided under each bonded Key Contract. Subject to the terms of this Agreement, City may proceed against any or both of such bonds in the order that City, in its sole discretion, determines.

## **10.4 Letters of Credit**

### **10.4.1 General Provisions**

Wherever in the Contract Documents Principal Project Company has the option or obligation to deliver to City a letter of credit, in addition to any specific requirements relating to a particular letter of credit, the following provisions shall apply.

**10.4.1.1** Except to the extent expressly provided otherwise in the Contract Documents, the letter of credit shall:

- (a) be a direct pay, irrevocable standby letter of credit;
- (b) be issued by a financial institution that is not an Affiliate, has a credit rating for long-term, unsecured debt of at least "A-" (or its equivalent) from one of the Rating Agencies, and has an office in Los Angeles, California, San Francisco, California, Chicago, Illinois, or New York, New York (or within reasonable proximity to these metropolitan areas) at which the letter of credit can be presented for payment. If the issuer's long-term, unsecured debt rating is downgraded such that the issuer no longer meets the ratings standard set forth above, Principal Project Company shall provide a replacement letter of credit issued by a financial institution meeting such standard within 30 days after the downgrade;

- (c) be payable on demand, conditioned only on written presentment from a beneficiary thereof to the issuer of a sight draft drawn on the letter of credit and a certificate stating that the beneficiary has the right to draw under the letter of credit in the amount of the sight draft, up to the amount due to such beneficiary, without requirement to present the original letter of credit;
- (d) be in place for the entire period of time for which the letter of credit is providing security;
- (e) allow for multiple draws;
- (f) name City as sole beneficiary; and
- (g) be consistent with the requirements of this Section 10.4 (Letters of Credit).

**10.4.1.2** Except to the extent expressly provided otherwise in the Contract Documents, if Principal Project Company has failed to pay or perform when due the duty, obligation or liability under the Contract Documents for which the letter of credit is held, City has the right, subject to any rights of Lenders under the Direct Agreement, to draw on the letter of credit as and when provided in Section 16.2.7 (Performance Bond). If City makes such a draw on the letter of credit, City shall use and apply the proceeds as provided in this Agreement for such letter of credit.

**10.4.1.3** Except to the extent expressly provided otherwise in the Contract Documents and the Direct Agreement, City has the right to draw on the letter of credit, without prior Notice to Principal Project Company, if (a) Principal Project Company has failed to pay or perform when due the duty, obligation, or liability under this Agreement for which the letter of credit is held, (b) for any reason Principal Project Company fails to deliver to City a new or replacement letter of credit, on the same terms, at least 30 days before the expiry of the letter of credit, unless the applicable terms of the Contract Documents expressly provide that no further letter of credit is required with respect to such duty, obligation or liability, or (c) the financial institution issuing the letter of credit fails to meet the requirements in Section 10.4.1.1(b) and Principal Project Company fails to provide a substitute letter of credit issued by a qualified financial institution within 30 days after the downgrade. If City makes such a draw on the letter of credit, City shall be entitled to draw on the full face amount of the letter of credit and shall retain such amount as cash security to secure the obligations under the letter of credit, without payment of interest to Principal Project Company.

**10.4.1.4** Except to the extent expressly provided otherwise in the Contract Documents and the Direct Agreement, a draw on letters of credit shall not be conditioned on prior resort to Principal Project Company or any other security of Principal Project Company. For all draws conditioned on prior Notice from City to Principal Project Company, no such Notice shall be required if it would preclude draw before the expiration date of the letter of credit. City will use and apply draws on letters of credit (or cash security held from draws on letters of credit) toward satisfying the relevant obligation of Principal Project Company (or, if applicable, any other Person for which the letter of credit is performance security). Subject to City's rights under Sections 10.4.1.2 and 10.4.1.3, if City receives proceeds of a draw in excess of the relevant obligation, City will promptly refund the excess to Principal Project Company (or such other Person) after all relevant obligations are satisfied in full.

**10.4.1.5** Except to the extent expressly provided otherwise in the Contract Documents, Principal Project Company's sole remedy in connection with the improper presentment or payment of sight drafts drawn under letters of credit shall be to obtain from City a refund of the proceeds which are misapplied, reimbursement of the reasonable costs Principal Project Company incurs as a result of such misapplication; provided that at the time of such refund Principal Project Company increases the amount of the letter of credit to the amount (if any) then required under applicable provisions of this Agreement. Principal Project Company acknowledges that the presentment of sight drafts drawn upon a letter of credit could not under any circumstances cause Principal Project Company injury that could not be remedied by an award of money damages, and that the recovery of money damages would be an adequate remedy. Accordingly, Principal Project Company covenants (a) not to request or instruct the issuer of any letter of credit to refrain from paying any sight draft drawn under the letter of credit and (b) not to commence or pursue any legal proceeding seeking, and Principal Project Company irrevocably waives and relinquishes any right, to enjoin, restrain, prevent, stop or delay any draw on any letter of credit.

**10.4.1.6** Principal Project Company shall obtain and furnish all letters of credit and replacements thereof at its sole cost and expense, and shall pay all charges imposed in connection with City's presentment of sight drafts and drawing against letters of credit or replacements thereof.

**10.4.1.7** If City makes a permitted assignment of its rights and interests under this Agreement, then Principal Project Company shall cooperate so that concurrently with the effectiveness of such assignment, either replacement letters of credit for, or appropriate amendments to, the outstanding letters of credit shall be delivered to the assignee naming the assignee as beneficiary, at no cost to Principal Project Company.

**10.4.1.8** City acknowledges that if the letter of credit is performance security for a Person other than Principal Project Company (e.g., a Key Contractor), City's draw may only be based on the underlying obligations of such Person.

## **10.5 Guarantees**

**10.5.1** If Principal Project Company, any Key Contractor, any Affiliate or any Lender receives from any Person a guaranty of payment or performance of any obligation(s) of a Key Contractor, then either Principal Project Company shall cause such Person to expressly include City as a guaranteed party under such guaranty, with the same protections and rights of Notice, enforcement and collection as are available to any other guaranteed party, and deliver to City a duplicate original of such guaranty, which guaranty shall provide that the rights and protections of City shall not be reduced, waived, released or adversely affected by the acts or omissions of any other guaranteed party, other than through the rendering of payment and performance to another guaranteed party; and upon receipt of written Notice from City of the occurrence of the circumstances described in Section 10.5.2, such other documents reasonably satisfactory to City permitting City, subject to the rights of the Collateral Agent under any Direct Agreement, to become the transferee beneficiary under such guaranty and to enforce it, including enforcing the guaranty in favor of City or the Project, or both, which transfer documents shall include a certified copy of the guaranty and an executed transfer and assignment of the beneficiary rights from Principal Project Company or Collateral Agent, as applicable, to City; and the guaranty

shall expressly authorize such transfer without condition and permit draw without presentation of the original guaranty.

**10.5.2** City's rights as a transfer beneficiary are exercisable if, subject to Section 10.5.3 and the Direct Agreement, City determines that (a) a Key Contractor has breached or failed to perform any obligations under its Contract and any Notice thereof required under such Contract has been provided and the applicable cure period has expired without full and complete cure, (b) such breach has caused a PPC Default and the applicable cure period has expired without full and complete cure and (c) Principal Project Company or the Collateral Agent has failed to call upon or otherwise enforce such guaranty for the purpose of causing the performance of such obligations by or on behalf of the Contractor within 10 days after City delivers Notice of such breach or expected breach to Principal Project Company and the Collateral Agent and the Cure Period (as defined in the Direct Agreement) has expired.

**10.5.3** So long as Principal Project Company or a Lender is diligently pursuing remedies under a guaranty, City agrees to forbear from (a) exercising remedies under any such guaranty that names City as a direct beneficiary, and (b) exercising its right to become a beneficiary under Section 10.5.1; provided, however, that if the PPC Default giving rise to exercise remedies under any such guaranty remains uncured at the end of the applicable cure period in Section 16.1.2 (Default Notice and Cure Periods), City's obligation to forbear from exercising remedies as a guaranteed party shall cease. The foregoing shall not obviate any agreement by City to forbear from exercising its rights and remedies contained in a Direct Agreement.

## **10.6 Indemnities**

### **10.6.1 General Indemnity**

**10.6.1.1** Subject to Section 10.6.3 (Limitations on Indemnification Obligations), Principal Project Company shall defend, indemnify, protect and hold harmless the Indemnitees from and against any and all claims, causes of action, suits, investigations, legal or administrative proceedings, demands and Losses arising out of or in connection with:

- (a) any alleged or actual PPC Fault, if asserted or incurred by or awarded to any Third Party or any PPC-Related Entity;
- (b) Losses to the Infrastructure Facility, and any interference, disruption, or delay to the Project, caused by or related to the work of any JDA-Related Entity; provided, however, that the indemnity set forth in this clause (b) shall not apply to the D&C Work performed by the D&C Contractor to the extent that the City commences construction of a Joint Development Alternative prior to the earlier of (i) Substantial Completion; or (ii) the Substantial Completion Deadline, unless, in either case, the prime contractor undertaking such construction is the D&C Contractor or an affiliate thereof (in which case, the indemnity shall apply);
- (c) damage to public or private property owned by Third Parties (or any PPC-Related Entity), and for injuries to any person or entity, arising out of performance of the Project or Work by any PPC-Related Entity;

- (d) any alleged intellectual property infringement or other allegedly improper appropriation or use of intellectual property by any PPC-Related Entity in performance of the Project or the Work, or in connection with the Infrastructure Facility;
- (e) any and all claims by any governmental or taxing authority claiming taxes based on gross receipts, purchases or sales, or the use of any property or income of any PPC-Related Entity with respect to any payment for the Project or Work made to or earned by any PPC-Related Entity;
- (f) the failure or alleged failure by any PPC-Related Entity to pay sums due for the Work or services of Contractors, laborers, or suppliers;
- (g) any actual or threatened PPC Release;
- (h) the claim or assertion by any Other Contractor or a Utility that any PPC-Related Entity (i) failed to cooperate reasonably with such party, so as to cause interference, disruption, delay or loss; or (ii) interfered with or hindered the progress or completion of work being performed by such Other Contractor or Utility, so as to cause interference, disruption, delay or loss, to the extent such claim arises out of any PPC Fault;
- (i) any PPC-Related Entity's breach of or failure to perform an obligation that City owes to a Third Party, including any Governmental Entity and any Utility, under applicable Law or under any agreement between City and a Third Party, where City has delegated performance of the obligation to Principal Project Company under this Agreement or the acts or omissions of any PPC-Related Entity which render City unable to perform or abide by an obligation that City owes to a Third Party, including any Governmental Entity and any Utility, under any agreement between City and a Third Party, where, in each case, the agreement was expressly disclosed or known to Principal Project Company;
- (j) inverse condemnation, trespass, nuisance or similar taking of or harm to real property by reason of (i) the failure of any PPC-Related Entity to comply with Good Industry Practice, requirements of this Agreement, the Project Management Plan or Regulatory Approvals respecting control and mitigation of construction activities and construction impacts, (ii) the intentional misconduct or negligence of any PPC-Related Entity in connection with the performance of the Project or the Work, or (iii) the actual physical entry onto or encroachment upon another's property by any PPC-Related Entity in connection with the performance of the Project or the Work;
- (k) errors or other Defects in the supply, construction (including installation), operation or maintenance of the Project (except, subject to Section 6.11.1, with respect to operation and maintenance, of the SFMTA O&M Facilities after Substantial Completion or of Utility Adjustments included in the Project or the Work;

- (l) Design Work that fails, in whole or in part, to meet the requirements of this Contract; and
- (m) Any Principal Project Company failure to implement environmental mitigation measures to control environmental impacts, as required by the Governmental Approvals, the CEQA MMRP and the NEPA document.

**10.6.1.2** Principal Project Company's responsibilities pursuant to this Section 10.6.1 (General Indemnity) include both the obligation to (a) defend the Indemnitees from and against any and all claims, causes of action, suits, investigations, legal or administrative proceedings, demands and Losses, and (b) indemnify the Indemnitees when liability is sustained pursuant to the Contract Dispute Procedures or through judicial proceedings or is mutually agreed upon by the Parties.

**10.6.1.3** Principal Project Company's indemnification shall include reasonable fees of attorneys, consultants, and experts and related costs and City's costs of investigating any claims against City. In addition to Principal Project Company's obligation to indemnify City, Principal Project Company specifically acknowledges and agrees that it has an immediate and independent obligation to defend City from any claim which actually or potentially falls within this indemnification provision, even if the allegations are or may be groundless, false or fraudulent, which obligation arises at the time such claim is tendered to Principal Project Company by City and continues at all times thereafter.

**10.6.1.4** Principal Project Company's responsibilities pursuant to this Section 10.6.1 (General Indemnity) are in addition to any right that City may have under the terms of this Agreement to assess Noncompliance Points and/or Deductions with respect to the same event or circumstance giving rise to a Third Party claim, cause of action, suit, legal or administrative proceeding.

**10.6.1.5** Principal Project Company's defense, indemnity, and hold harmless obligations shall extend to City's consultants (e.g., design professionals and construction managers) providing services covering any portion of the Project under a separate written agreement with City and designated in the Contract Documents as persons or entities to be listed on Principal Project Company's insurance policies as "Additional Insureds." Principal Project Company's defense, indemnity, and hold harmless obligations shall not extend to the liability of a City consultant (including architects and engineers) designated as an Indemnitee or its agents, employees, or subconsultants arising out of, connected with or resulting from such Indemnitee's own active negligence, willful misconduct, bad faith, fraud, errors or omissions or from such Indemnitee's preparation or approval of maps, plans, opinions, reports, surveys, change orders, designs or specifications, or such Indemnitee's issuance of or failure to issue directions or instructions provided that such issuance or failure to issue is the primary cause of the damage or injury.

## **10.6.2 Design Defects**

**10.6.2.1** Principal Project Company agrees that, because the Reference Documents are subject to review and modification by Principal Project Company, (a) it is appropriate for Principal Project Company to assume liability for errors, omissions, inconsistencies and other Defects in the completed Project even though they may be related to errors, omissions, inconsistencies and other Defects in the Reference Documents, and (b) such documents shall

not be deemed “design furnished” by City or any of the other Indemnitees, as the term “design furnished” is used in Civil Code section 2782. Principal Project Company hereby waives the benefit (if any) of Civil Code section 2782 and agrees that this Section 10.6.2 (Design Defects) constitutes an agreement governed by Civil Code section 2782.5.

**10.6.2.2** Subject to Section 10.6.3 (Limitations on Indemnification Obligations), Principal Project Company shall indemnify, defend and hold harmless the Indemnitees from and against any and all claims and Losses arising out of, relating to or resulting from errors, omissions, inconsistencies or other defects in the Design Documents, regardless of whether such errors, omissions, inconsistencies or other defects were also included in the Reference Documents.

### **10.6.3 Limitations on Indemnification Obligations**

**10.6.3.1** Subject to Section 23.8 (Limitation on Third Party Beneficiaries) and the releases and disclaimers herein, including all the provisions set forth in Section 5.1.3 (Limitations on Principal Project Company’s Right to Rely), Principal Project Company’s indemnity obligations shall not extend to any claims, suits, actions or Losses to the extent directly caused by:

- (a) the active negligence, gross negligence, reckless or willful misconduct, bad faith or fraud of an Indemnitee;
- (b) a City-Caused Delay Event or a City-Caused Relief Event; or
- (c) City’s breach of any of its obligations under the Contract Documents.

**10.6.3.2** With respect to Work performed by a design professional as defined in California Civil Code section 2782.8, such indemnities shall apply only to the extent permitted by section 2782.8 as of the Effective Date.

#### **10.6.3.3 Claims by Employees**

In claims by an employee of a PPC-Related Entity, the indemnification obligation under this Section 10.6 (Indemnities) shall not be limited by any limitation on the amount or type of damages, compensation or benefits payable by or for a PPC-Related Entity under workmen’s compensation, disability benefit or other employee benefits laws; provided that this provision shall not be construed as a waiver in favor of any employee by Principal Project Company or any Contractor of any limitation of liability afforded by such laws.

#### **10.6.3.4 Indemnity as Alternative Cause of Action**

The requirement to provide an indemnity as specified in this Section 10.6 (Indemnities) is not intended to provide City with an alternative cause of action against Principal Project Company for damages for breach of contract incurred directly by Indemnitees in connection with the event giving rise to the indemnification obligation.

### **10.6.4 Principal Project Company’s Defense**

In Principal Project Company’s defense of Indemnitees under this Section 10.6 (Indemnities), negotiation, compromise, and settlement of any action, City shall, without prejudice to the rights of any Indemnitees to be indemnified by Principal Project Company, retain reasonable

discretion in and control of the litigation, negotiation, compromise, settlement, and appeals therefrom.

## **10.7 Indemnities by Contractors**

Principal Project Company shall ensure that each Contract includes indemnity provisions appropriate to the scope of the Work to be performed by the Contractor, naming the Indemnitees as indemnitees.

## **10.8 Notice of Claims by Third Parties**

**10.8.1** If the City receives Notice of a claim, cause of action, suit, legal or administrative proceeding covered by the indemnities in Section 10.6 (Indemnities), or otherwise has Actual Knowledge of such a claim, cause of action, suit, legal or administrative proceeding that it believes is within the scope of the indemnities under Section 10.6 (Indemnities), as soon as practicable after receipt of the claim, cause of action, suit, legal or administrative proceeding, City shall:

- (a) inform Principal Project Company in writing of the claim, cause of action, suit, legal or administrative proceeding, and
- (b) send to Principal Project Company a copy of all relevant written materials City has received asserting such claim, cause of action suit, legal or administrative proceeding.

**10.8.2** As soon as is practicable after Principal Project Company receives Notice of a claim, cause of action, suit, legal or administrative proceeding covered by the indemnities in Section 10.6 (Indemnities), Principal Project Company shall promptly provide Notice to City in writing and, unless subject to evidentiary privilege, promptly furnish to City copies of all factual reports and factual portions of any other reports given to Principal Project Company's insurance carrier or carriers.

## **10.9 SFMTA O&M Facilities Warranty Bond**

**10.9.1** Upon achieving Final Acceptance, Principal Project Company shall provide a warranty bond to City in an amount equal to 20% of the value of the SFMTA O&M Facilities in the form attached hereto as Exhibit 6F (Form of SFMTA O&M Facilities Warranty Bond), with such nonmaterial modifications, if any, as City may approve in its sole discretion (the "**SFMTA O&M Facilities Warranty Bond**").

**10.9.2** The SFMTA O&M Facilities Warranty Bond shall guarantee performance of Work on the SFMTA O&M Facilities required to be performed during the period following Final Acceptance, including warranty Work, which shall also constitute a payment bond guaranteeing payment to Persons performing such Work.

**10.9.3** City will release the SFMTA O&M Facilities Warranty Bond upon the expiration of the warranty period set forth in Section 6.11.1.1; provided, however, that all of the following conditions have been met: (a) Principal Project Company is not in default under the Contract Documents and no event has occurred which, with the passage of time or the giving of Notice, would constitute a default under the Contract Documents, (b) receipt by City of (i) evidence

satisfactory to City that all Persons eligible to file a Third Party claim against the SFMTA O&M Facilities Warranty Bond have been fully paid and (ii) unconditional releases of liens and Notices from all Contractors who filed preliminary notices of a Third Party claim against the SFMTA O&M Facilities Warranty Bond, using applicable California statutory forms, (c) the statutory period for Subcontractors to file a Third Party claim against the SFMTA O&M Facilities Warranty Bond has expired and no Third Party claims have been filed, and (d) Principal Project Company assigns to City any Contractor and Supplier warranties that may still be in effect as of the effective date of the expiration of the warranty period set forth in Section 6.11.1.1.

---

## ARTICLE 11. PAYMENTS TO PRINCIPAL PROJECT COMPANY

### 11.1 Milestone Payment

11.1.1 Subject to any limitations and exceptions expressly provided in this Agreement, City will pay the Milestone Payment to Principal Project Company upon achievement of Substantial Completion, calculated and otherwise in accordance with the process in Exhibit 4A (Milestone Payment Mechanism).

### 11.2 Availability Payments

11.2.1 Commencing from the Substantial Completion Date and subject to any limitations and exceptions expressly provided in this Agreement, City will make Availability Payments to Principal Project Company as provided in this Section 11.2 (Availability Payments) and Exhibit 4B (Availability Payment Mechanism). Principal Project Company is not entitled to earn any Availability Payments before the Substantial Completion Date.

11.2.2 City will make Availability Payments to Principal Project Company through Quarterly Availability Payments calculated and otherwise in accordance with Exhibit 4B (Availability Payment Mechanism).

11.2.3 Principal Project Company acknowledges and agrees that any Availability Payment or portion thereof not received by Principal Project Company as a result of a delay in achieving Substantial Completion for which Principal Project Company is not entitled to compensation under this Agreement represents the liquidated amount of delay damages suffered by City due to such delay.

### 11.3 Pass-Through Costs

11.3.1 City shall reimburse PPC for Pass-Through Costs during the IFM Period as set out in this Section 11.3.

11.3.2 PPC shall deliver to the City Authorized Representative copies of each invoice, which must be in a format reasonably approved by City, and receipt of payment of Pass-Through Costs issued to PPC.

11.3.3 PPC's invoices for Pass-Through Costs may not include any mark-up, profit or overhead on costs paid or payable by PPC to Contractors or utility owners. Such mark-up, profit and overhead together with PPC's reasonable expenses for general administration, insurance premiums, overhead and other business expenses that relate to the provision of services rendered by PPC in connection with Pass-Through Costs shall not be considered as Pass-Through Costs and are to be compensated as part of the Availability Payment.

### 11.4 Invoice, Other Amounts and Payments

11.4.1 Prior to issuing any invoice required by this Agreement, Principal Project Company must submit to City a form invoice to be approved by City, and any invoice issued in accordance with this Agreement must be substantially in the form agreed by the City.

**11.4.2** Principal Project Company shall submit an invoice (i) for the Availability Payment with the Quarterly Report delivered to City in accordance with the IFM Specifications no later than the 10th day of the month immediately following the relevant Contract Quarter; (ii) for any other proposed payment adjustments in accordance with this Agreement, including Milestone Payments Compensable Delay Events, Compensable Relief Events or Termination Compensation (collectively, "**Other Amounts**") no later than the 10th day of the month immediately following the applicable event triggering such invoice, unless a different time period is set out in the Agreement for such event. All invoices shall include any supporting mathematical corrections or reconciliations to enhance the accuracy of payments due to Principal Project Company under this Agreement, to the satisfaction of City.

**11.4.3** City shall review each properly submitted invoice within 7 days of receipt. If City, in its sole discretion, determines that the invoice is improper, the invoice will be returned to Developer not later than 7 days after receipt, along with a document setting forth the reasons why the invoice is not proper.

**11.4.4** Unless otherwise specified in this Agreement, City will pay PPC any amount owing under this Agreement within 45 days after receipt of a properly submitted invoice for such payment.

## **11.5 Disputed Amounts**

**11.5.1** City may dispute, in good faith, any amount specified in an invoice submitted under Section 11.4 (Invoice, Other Amounts and Payments), or any other invoice submitted by Principal Project Company under this Agreement. City shall pay all undisputed amounts for which payment is requested and that are not subject to withholding in accordance with Section 11.4 (Invoice, Other Amounts and Payments).

**11.5.2** Principal Project Company and City shall use reasonable efforts to resolve any invoice dispute within 30 days after the dispute arises.

## **11.6 Withholding from Payments**

**11.6.1** City may deduct from any payment owing to Principal Project Company under this Agreement or make a demand of Principal Project Company for:

- (a) any amount due and payable by Principal Project Company to City (whether in connection with this Agreement or any other Contract Document);
- (b) any sums expended by City in performing any of Principal Project Company's obligations under this Agreement which Principal Project Company has failed to perform; and
- (c) amounts in respect of any other Claim or Losses by City against Principal Project Company in connection with the Work, the IFM Services or the Project.

**11.6.2** The failure by City to deduct any of the sums under this Section 11.6 (Withholding from Payments) from a payment must not constitute a waiver of City's right to such sums.

## **11.7 Interest on Late Payments and Overpayments**

**11.7.1** If Principal Project Company fails to pay any undisputed amount due and owing from Principal Project Company to the City under this Agreement, Principal Project Company shall pay to City interest on such amount at the Late Payment Rate commencing 90 days after the due date thereof until the date of payment.

**11.7.2** If any properly submitted invoice is disputed and an amount is determined to be due under the Contract Dispute Procedures, payment of the disputed amount shall be made within 30 Business Days following resolution of the dispute, together with interest at the Late Payment Rate on the amount owing from the date that the payment was originally due (based on the agreement of the parties or the decision of the dispute resolver) until the date of payment.

**11.7.3** If as a result of any inaccuracy in an invoice any overpayment is made by City to Principal Project Company then, in addition to the adjustments provided in Section 11.2 (Availability Payments), City shall be entitled to deduct or receive as a payment from Principal Project Company interest on such amount at the Late Payment Rate, starting on the date of City's payment of the invoice to the date the overpayment is deducted or paid. City's right to deduct or receive payment of interest is without prejudice to any other rights City may have under this Agreement.

## **11.8 Taxes**

Except as provided in Section 2.4.2 (Possessory Interest Tax), Principal Project Company shall pay all applicable Taxes on or before the due date (or delinquency date if applicable). Principal Project Company is solely responsible for and has no right to make any Claim due to its misinterpretation of laws respecting Taxes or incorrect assumptions regarding applicability of Taxes. In the event that an exemption from applicable sales or use taxes becomes available for the Project, City shall have no obligation to reimburse Principal Project Company for any such taxes, and City shall be entitled to an upfront payment from Principal Project Company or a reduction in payments made by City, as agreed upon by the Parties, equal to the amount actually saved following the date such exemption becomes available.

## **11.9 Payment Not Evidence of Approval**

No payment by City is or must be construed as:

- (a) evidence of the value of Work or that Work has been satisfactorily carried out in accordance with this Agreement;
- (b) an admission of liability by City;
- (c) approval by City of Principal Project Company's performance or compliance with this Agreement;
- (d) acknowledgement that City has inspected or accepted the Work; or
- (e) waiver of any Claim or right that City may then or thereafter have, including among others, warranty and indemnity rights.

---

## 11.10 Other Adjustments; Full Compensation

Principal Project Company acknowledges and agrees:

- (a) the Milestone Payment and Availability Payments calculated in accordance with this Article 11 (Payments to Principal Project Company) and Exhibit 4 (Payment Mechanism) are subject to adjustment to reflect previous over-payments and/or under-payments, any interest payable in respect of any amounts owed, and any other amount due and payable from Principal Project Company to City or from City to Principal Project Company under this Agreement, including credits, deductions or offsets for failure to meet Performance Requirements or pursuant to the Noncompliance and Deduction regime; and
- (b) that the payments provided for in this Article 11 (Payments to Principal Project Company) constitute full compensation for performance of all the Work, subject only to Principal Project Company's rights under Articles 12 (City Change Process; Unilateral Change Orders; Deviations), 13 (General Provisions Applying to Delay Events and Relief Events), 14 (Compensation and Other Relief for Delay Events and Relief Events) and 17 (Termination).

## 11.11 Appropriation; Certification of Funds

**11.11.1** All payments due from City to Principal Project Company under this Agreement, including any Termination Compensation, shall be paid solely from monies made available to City from an appropriation of funds for the purpose of making all such payments coming due in such fiscal year. SFMTA, or the San Francisco Board of Supervisors, as applicable, shall have the absolute and unconditional right, to be exercised in their discretion, for any reason, not to appropriate such funds.

**11.11.2** This Agreement is subject to the fiscal provisions of the City's Charter and the budget decisions of its Mayor and Board of Supervisors, each acting in its sole discretion. No funds will be available hereunder until prior written authorization certified by the City's Controller. The City's Controller cannot authorize payments unless funds have been certified as available in the budget or in a supplemental appropriation. City shall use commercially reasonable efforts to obtain the certification from the City's Controller if the funds have been appropriated for such purpose. Without prejudice to Principal Project Company's rights and remedies as set forth in this Agreement for unexcused and undisputed non-payment by City of any payment due Principal Project Company when due, City's obligations hereunder shall never exceed the amount certified by the City's Controller for the purpose and period stated in such certification. City, its employees and officers are not authorized to offer or promise any additional funding without City's Controller certification of such additional funding. Without such lawful approval and certification, City shall not be required to provide such additional funding.

**11.11.3** City shall:

- (a) make a timely submission for the fiscal year in which Substantial Completion of the Infrastructure Facility will occur of a budget proposal to the SFMTA

Board of Directors requesting a budget that includes the Milestone Payment and initial Availability Payment;

- (b) for each fiscal year beyond the fiscal year in which the initial Availability Payment is made, make a timely submission of a budget proposal to the SFMTA Board of Directors requesting a budget for each and every Availability Payment, including any subsequent change to the Maximum Availability Payment; and
- (c) request an appropriation of funds for the purpose of paying any Termination Payment payable by City or any other amount due from City under this Agreement other than the Availability Payments.

**11.11.4** City shall respond promptly in writing to any reasonable written request submitted by Principal Project Company for information regarding the status of any request City is obligated to make under Section 11.11.3.

**11.11.5** If City fails to appropriate money to make a Termination Payment, there shall be no contractual obligation of the City to make such payment that may be enforced; such contractual payment obligation shall arise only if and when any such amounts have been appropriated by City.

**11.11.6** City shall provide written Notice to Principal Project Company no later than ten Business Days following the enactment of any City budget with respect to a particular Fiscal Year that does not make an appropriation of funds for the purpose of paying the scheduled Availability Payments or Milestone Payment due for such Fiscal Year. City shall consult with Principal Project Company to discuss the situation and the possible solutions, it being understood that such discussions shall be without prejudice to Principal Project Company's right to termination for unexcused and undisputed non-payment by City of any payment due Principal Project Company when due, as set forth in Section 17.4.1 (Termination for City Default).

**11.11.7** The obligation of City to make any payments under this Agreement does not constitute a debt of the City under applicable Law and does not constitute a liability of or a lien or charge upon the funds or property of the City beyond the fiscal year for which there has been an appropriation of funds to make such payments. The obligation of City to make payments hereunder does not constitute an obligation of City for which City is obligated to levy or pledge any form of taxation or for which City has levied or pledged any form of taxation.

## **11.12 Allowances**

***[NOTE TO PNC: ALLOWANCE AMOUNTS UNDER DEVELOPMENT; CITY-FURNISHED IT/COMMS ALLOWANCE MAY BE JUST DISBURSED AND HELD FOR CITY IT/COMMS]***

### **11.12.1 Allowances, Generally**

- (a) Each of the Allowances is available to pay for certain portions of the D&C Work, with payments from the Allowance to be made on the basis identified with respect to each such Allowance under this Section 11.12 (Allowances).

- (b) Principal Project Company shall be entitled to use Office/Admin and Training Spaces FF&E Allowance as set forth in this Section 11.12 (Allowances).
- (c) City shall be entitled to be reimbursed from the City-Furnished IT/Comms Allowance for amounts incurred with respect to procurement, purchase and installation of the IT/Comms Equipment. To the extent that City directs Principal Project Company to procure, purchase or install any City-Furnished IT/Comms FF&E, the provisions in Section 11.11.1(b), (e) and (g) shall apply to the City-Furnished IT/Comms FF&E Allowance.
- (d) The initial amount of each Allowance is identified in Section 11.12 (Allowances). Principal Project Company acknowledges and agrees that the Milestone Payment and the Availability Payment include the Allowances and represent full compensation to Principal Project Company on account of the Allowances.
- (e) Principal Project Company shall keep detailed records of the quantities, units, or other agreed metrics with respect to the Office/Admin and Training Spaces FF&E Allowance and shall submit to City supporting documentation of such quantities with its invoices, and such other information as City may require, in its sole discretion.
- (f) Notwithstanding that the Allowances have been developed for specific elements of the D&C Work, City, in its sole discretion, may elect to use some or all of any Allowance as a source of payment for D&C Work for which Principal Project Company may be entitled under another Allowance or in connection with a Compensable Delay Event.
- (g) No Change Order is required for invoicing amounts remaining (with respect to relevant portions of the D&C Work) within any Allowance. Principal Project Company shall promptly provide Notice to City if it becomes apparent that the amount with respect to Office/Admin and Training Spaces FF&E Allowance will be exceeded, in which event the Parties shall negotiate a Change Order increasing the Office/Admin and Training Spaces FF&E Allowance and/or modifying the scope of the D&C Work to avoid the need to increase the Office/Admin and Training Spaces FF&E Allowance; provided, however, that in lieu of modification to the Office/Admin and Training Spaces FF&E Allowance amount and/or scope of D&C Work, City may, in its sole discretion, issue a Change Order, and such D&C Work otherwise eligible for invoicing against the Office/Admin and Training Spaces FF&E Allowance will not be invoiced against the Office/Admin and Training Spaces FF&E Allowance, but, instead, be invoiced under such Change Order, and such Change Order shall be on the same unit and other pricing terms as if the D&C Work were invoiced against the Office/Admin and Training Spaces FF&E Allowance.
- (h) If the amount with respect to Office/Admin and Training Spaces FF&E Allowance will be exceeded, City will bear the cost of such items.

- 
- (i) As part of Final Acceptance, all remaining amounts of any Allowance shall be refunded and paid to City.

### **11.12.2 Office/Admin and Training Spaces FF&E Allowance**

Principal Project Company shall be eligible to invoice against the Office/Admin and Training Spaces FF&E Allowance to address City-approved Office/Admin and Training Spaces FF&E, as set forth herein.

- (a) The Office/Admin and Training Spaces FF&E Allowance shall be in an initial amount of \$6,220,000.
- (b) The Office/Admin and Training Spaces FF&E Allowance shall be used for Office/Admin and Training Spaces FF&E.
- (c) For all Office/Admin and Training Spaces FF&E, Principal Project Company shall obtain at least three arms-length competitive price quotes (or, if Principal Project Company believes it is impractical to obtain such number of competitive price quotes, Principal Project Company may submit a request for waiver or modification of the competitive price quote requirement to City, which shall consider such request in its good faith discretion).
- (d) Invoicing for completed Office/Admin and Training Spaces FF&E Work shall be included in the monthly invoice described in Section 11.3 (Invoice, Other Amounts and Payments).
- (e) This Section 11.11.2 (Office/Admin and Training Spaces FF&E Allowance) shall not apply to, and the Office/Admin and Training Spaces FF&E Allowance shall not be useable for, repair and replacement of Office/Admin and Training Spaces FF&E that is damaged, defective or missing prior to Substantial Completion.

### **11.12.3 City-Furnished IT/Comms Allowance**

City shall be eligible to (i) invoice against the City-Furnished IT/Comms Allowance for City-Furnished IT/Comms FF&E; or (ii) direct Principal Project Company to procure and install such FF&E in which case Principal Project Company shall be eligible to invoice against the Office/Admin and Training Spaces FF&E Allowance to address City-approved Office/Admin and Training Spaces FF&E, each as set forth herein.

- (a) The City-Furnished IT/Comms Allowance shall be in an initial amount of \$2,850,000.
- (b) The City-Furnished IT/Comms Allowance is to be used for City-Furnished IT/Comms FF&E.
- (c) City shall provide Principal-Project-Company a monthly invoice for the procurement, purchase and installation of City-Furnished IT/Comms FF&E.

- (d) Invoicing for completed City-Furnished IT/Comms FF&E Work shall be included in the monthly invoice described in Section 11.3 (Invoice, Other Amounts and Payments).

#### **11.12.4 Partnering Allowance**

Principal Project Company shall be eligible to invoice against the Partnering Allowance for Partnering, as set forth herein.

- (a) The Partnering Allowance shall be in an initial amount of \$200,000.
- (b) The Partnering Allowance is to be used for Partnering costs and expenses.
- (c) City shall provide Principal Project Company a monthly invoice for Partnering.
- (d) Invoicing for completed Partnering shall be included in the monthly invoice described in Section 11.3 (Invoice, Other Amounts and Payments).

---

**ARTICLE 12. CITY CHANGE PROCESS; UNILATERAL CHANGE ORDERS;  
DEVIATIONS**

**12.1 General**

Exhibit 9 (Change Procedures) sets out the process with respect to (a) Change Orders issued by City following a Proposed Change Order request by City; (b) Unilateral Change Orders unilaterally issued by City; and (c) Change Orders issued by City following a PPC Change Request.

**12.2 City Changes**

**12.2.1** Subject to Section 12.2.2 and in accordance with the procedure set forth in Exhibit 9 (Change Procedures), City may at any time make changes to the Work, including additions or reductions in the scope of the D&C Work or IFM Services, or changes to the requirements applicable to the Work, as it may direct in its sole discretion (each, a “**City Change**”).

**12.2.2** Principal Project Company shall not be required to implement any City Change to the extent the City Change would:

- (a) result in a breach of Law, a breach of Good Industry Practice or a breach of any conditions of a Regulatory Approval or revocation of any Regulatory Approval;
- (b) require a new Regulatory Approval which would not be reasonably obtainable;
- (c) render any Insurance Policy void or voidable;
- (d) materially and adversely affect the health and safety of any person; or
- (e) materially and adversely affect the nature of the Project as a whole, such that the City Change would constitute a cardinal change under California law.

Principal Project Company acknowledges that a City Change relating to a Joint Development Alternative would not fall under clause (e).

---

**ARTICLE 13. GENERAL PROVISIONS APPLYING TO DELAY EVENTS AND RELIEF EVENTS**

**13.1 Interface with Other Portions of the Facility**

**13.1.1** Principal Project Company acknowledges and agrees that if any PPC-Related Entity, any JDA-Related-Entity, or any entity that is not a PPC-Related Entity or a JDA-Related-Entity but that executes an interface agreement substantially in the form of Exhibit 8 (Form of Interface Agreement), is involved in any aspect of the development, design, construction, operations or maintenance of a Joint Development Alternative, then:

- (a) any interference or delay in the performance of the D&C Work or the IFM Services or damage affecting the Infrastructure Facility, in each case, caused in whole or in part by or in any way related to a Joint Development Alternative, shall be entirely Principal Project Company's responsibility and liability;
- (b) Principal Project Company shall not make any Claim for, and shall not receive or be entitled to, any additional compensation, time extensions, or relief from its obligations under this Agreement for any delay, additional costs, or failure to perform due to Losses, interference, delay, or damage caused in whole or in part by or in any way related to a Joint Development Alternative;
- (c) City shall have no liability or responsibility to Principal Project Company for any Losses, interference, delay, or damage incurred or suffered by Principal Project Company or any PPC-Related Entity with respect to the Infrastructure Facility, including the D&C Work and IFM Services, that is caused, in whole or in part, by a JDA-Related Entity or in any way related to or arising out of a Joint Development Alternative; and
- (d) City shall continue to enforce all of City's rights and remedies under this Agreement in circumstances where Principal Project Company cannot perform its obligations hereunder due to any Losses, interference, delay, or damage caused in whole or in part by or in any way related to a Joint Development Alternative or a JDA Related-Entity, including City's rights to assess and collect Deductions, declare a PPC Default, declare a Persistent PPC Default and terminate this Agreement.

**13.1.2** With respect to the D&C Work performed by the D&C Contractor, the provisions of Section 13.1.1 shall not apply to the extent that the City commences construction of a Joint Development Alternative prior to the earlier of (i) Substantial Completion; or (ii) the Substantial Completion Deadline, unless, in either case, the prime contractor undertaking such construction is the D&C Contractor or an affiliate thereof (in which case, the provisions of Section 13.1.1 shall apply);

**13.2 Delay Event and Relief Event Process**

**13.2.1** If a Delay Event or Relief Event occurs, subject to the limitations and exclusions provided in this Agreement, Principal Project Company may seek additional compensation, time

extension, and/or other relief, if applicable, in accordance with the entitlements specified in Article 14 (Compensation and Other Relief for Delay Events and Relief Events).

**13.2.2** The agreement of the Parties as to the specific compensation, time extension, or other relief to be given Principal Project Company on account of a Delay Event or Relief Event, as applicable, shall be evidenced by a written amendment or change order to this Agreement.

**13.2.3** Either Party may initiate the Contract Dispute Procedures if:

- (a) the Parties are unable to agree as to the specific compensation, time extension, or other relief to be given Principal Project Company on account of an alleged Delay Event or Relief Event; or
- (b) City rejects the Delay Event or Relief Event claim, as applicable.

### **13.3 Mitigation**

**13.3.1** If a Delay Event, Relief Event or any other event occurs as a result of which Principal Project Company considers that it is entitled to claim an extension of time, compensation or relief from performance of its obligations under this Agreement (together “**Relevant Events**”), then Principal Project Company shall, and shall require all PPC-Related Entities to, use and continue to use commercially reasonable efforts to:

- (a) Eliminate or mitigate the liability, Losses, schedule impact and other consequences of such event upon the performance of its obligations under this Agreement, including by re-sequencing, rescheduling, reallocating or redeploying Principal Project Company forces to other work, as appropriate;
- (b) Continue to perform and remain liable and responsible for its obligations under this Agreement notwithstanding the Relevant Event; and
- (c) Resume performance of its obligations under this Agreement affected by the Relevant Event as soon as practicable and in no event later than promptly after the cessation of the Relevant Event.

**13.3.2** To the extent that Principal Project Company does not comply with its obligations under this Section 13.3 (Mitigation), then Principal Project Company’s entitlement to claim an extension of time, compensation or relief from performance of its obligations under this Agreement with respect to the Relevant Event will be reduced to the extent of such failure.

### **13.4 Deductions for Relevant Events**

The compensation payable to Principal Project Company with respect to any Relevant Event will be reduced by:

- (a) any amount which a PPC-Related Entity recovers under any Insurance Policy, or would have recovered if it had complied with the requirements of this Agreement in respect of any Insurance Policy in respect of the Relevant Event, which amount, for greater certainty, will not include any excess or

deductibles or any amount over the maximum amount insured under any such Insurance Policy; and

- (b) the amount of any Extra Work Costs, other direct costs and margins calculated in accordance with Exhibit 13 (Costs Schedule) avoided or otherwise reduced as a result of the Relevant Event.

### **13.5 Acts of a PPC-Related Entity**

Principal Project Company's entitlement to claim an extension of time, compensation or relief from performance of its obligations under this Agreement with respect to any Relevant Event will be reduced to the extent the Relevant Event arises out of, relates to or was caused or contributed to by the acts or omissions of any PPC-Related Entity or any PPC Fault.

### **13.6 Notification; Delay in Notification**

**13.6.1** Principal Project Company shall provide Notice regarding Relevant Events:

- (a) as provided in Section 14.1.1 (Claim for Delay Event) with respect to Delay Events;
- (b) as provided in Section 14.2.2 (Claim for a Relief Event) with respect to Relief Events; and

**13.6.2** as provided in accordance with this Agreement with respect to all other Relevant Events.

### **13.7 Multiple and Overlapping Claims**

Principal Project Company may make multiple but not duplicative Claims with respect to a Relevant Event.

### **13.8 Burden of Proof and Mitigation**

Principal Project Company bears the burden of proof in establishing (a) the occurrence of a Relevant Event and (b) the entitlement to, and amount of, relief for such Relevant Event, including demonstrating that Principal Project Company complied with its mitigation obligations under Section 13.3 (Mitigation).

### **13.9 Sole Entitlement**

Principal Project Company acknowledges and agrees that:

- (a) Subject to the express terms of this Agreement, the Milestone Payment and Availability Payments constitute full compensation for performance of all of the Work; and
- (b) Principal Project Company's sole right to claim an extension of time, compensation or relief from performance of its obligations under this Agreement or otherwise make any Claim for any liability in connection with a

Delay Event or Relief Event is as set out in Article 13 (General Provisions Applying to Delay Events and Relief Events) and Article 14 (Compensation and Other Relief for Delay Events and Relief Events).

### **13.10 Compensation**

City will pay the compensation due to Principal Project Company under Article 13 (General Provisions Applying to Delay Events and Relief Events) and Article 14 (Compensation and Other Relief for Delay Events and Relief Events) in accordance with Exhibit 13 (Costs Schedule).

### **13.11 Waiver**

As a condition precedent to City's obligation to pay any compensation, grant an extension of time or provide any other relief to fully resolve or address a Delay Event or a Relief Event, Principal Project Company shall execute a full, unconditional, irrevocable waiver and release, in favor of and in a form reasonably acceptable to City, of any other Claims, Losses or rights to relief arising out of such Delay Event or a Relief Event, as applicable, that is not the subject of a Contract Dispute.

---

## ARTICLE 14. COMPENSATION AND OTHER RELIEF FOR DELAY EVENTS AND RELIEF EVENTS

### 14.1 Relief During the D&C Period

This Section 14.1 (Relief During the D&C Period) sets out Principal Project Company's entitlement to an extension of time, Extra Work Costs, Financing Delay Costs and Delay Costs (as applicable) as a result of Delay Events. Principal Project Company's entitlement to relief and compensation under this Section 14.1 (Relief During the D&C Period) is subject to the limitations on compensation in Article 13 (General Provisions Applying to Delay Events and Relief Events), Exhibit 13 (Costs Schedule), and this Agreement.

#### 14.1.1 Claim for Delay Event

**14.1.1.1** Principal Project Company shall provide Notice to City's Authorized Representative within 30 days of obtaining Actual Knowledge of the occurrence of Delay Event (or, if earlier, on such date that Principal Project Company should have discovered such Relief Event if Principal Project Company was in full compliance with the terms of the Contract Documents). Failure to do so shall result in a waiver of and forfeiture of any relief, compensation or time extension related to the event or occurrence.

**14.1.1.2** Principal Project Company shall, within 10 Business Days after such initial Notice, provide further details to City's Authorized Representative, which shall, to the extent Principal Project Company has obtained Actual Knowledge, include:

- (a) A summary of the provisions of this Agreement that entitle Principal Project Company to relief. If Principal Project Company seeks relief for City's alleged breach of this Agreement, then Principal Project Company shall identify the provisions of this Agreement which allegedly have been breached and the actions or failures to act constituting such breach;
- (b) Details of the Delay Event, the circumstances from which the Delay Event arises including its nature, the date of its occurrence, its duration (to the extent that the Delay Event and the effects thereof have ceased or estimated duration to the extent that the Delay Event and the effects thereof have not ceased), the portions of the Infrastructure Facility affected;
- (c) Details of the contemporary records which Principal Project Company shall maintain to substantiate its claim for extra time and the substance of any oral communications, if any, relating to the Delay Event and the name of the person or persons making such material oral communications;
- (d) Analysis of consequences (whether direct or indirect, financial or non-financial) the Delay Event may have upon achieving the Substantial Completion Date or the Final Acceptance Date, as applicable, including a TIA indicating all activities represented or affected by the change, with activity numbers, durations, predecessor and successor activities, resources and cost, and with a narrative report, in form satisfactory to City, which compares the proposed new schedule to the Project Schedule, as appropriate. Principal

Project Company shall reschedule activities not otherwise affected by the event, in order to take advantage of additional Float available as the result of the time extension. Any such rescheduling shall be reflected in the Project Schedule;

- (e) Where the Delay Event is also a Compensable Delay Event, an itemized estimate of all amounts claimed under Section 14.1.1 (Claim for Delay Event). Extra Work Costs and Delay Costs (as applicable) and Financing Delay Costs shall be broken down in accordance with Exhibit 13 (Costs Schedule);
- (f) Where the Delay Event is also an Unavoidable Delay Event, an itemized estimate of any Financing Delay Costs claimed under Sections 14.1.6 or 14.1.7 (Additional Limits Relating to Force Majeure Events or Unavoidable Delay Events During D&C Period) broken down in accordance with Exhibit 13 (Costs Schedule);
- (g) The type and amount of insurance that may be applicable and amounts that have been or are anticipated to be collected under such insurance; and
- (h) Details of any measures that Principal Project Company has taken to date and proposes to adopt to mitigate the consequences of such Delay Event in accordance with Section 13.3 (Mitigation).

**14.1.1.3** Within 7 days of Principal Project Company receiving, or becoming aware of, any supplemental information which may further substantiate or support Principal Project Company's Claim, Principal Project Company shall submit further particulars based on such information to City's Authorized Representative.

**14.1.1.4** City's Authorized Representative shall, after receipt of details under Section 14.1.1.2, or of further particulars under Section 14.1.1.3, be entitled by Notice to Principal Project Company to require that Principal Project Company provide such further supporting particulars as City's Authorized Representative may reasonably consider necessary. Principal Project Company shall provide City's Authorized Representative full access and facilities for investigating and assessing the validity of Principal Project Company's Claim, including, on-site inspection.

**14.1.1.5** Principal Project Company shall provide City with monthly updates, together with further details and supporting documentation, as it receives or develops additional information pertaining to the Delay Event and the matters described in Section 14.1.1.2. Without limiting the foregoing, Principal Project Company shall notify City as soon as the Delay Event has ceased and when performance of its affected obligations can be resumed.

## **14.1.2 Extension of Deadlines for Delay Events**

**14.1.2.1** Except as provided in Section Error! Reference source not found., upon the occurrence of a Delay Event, Principal Project Company shall be entitled to an extension of the Contract Deadlines equal to the delay to the Critical Path directly caused by the Delay Event.

**14.1.2.2** City's Authorized Representative shall determine revised Contract Deadlines arising out of a Delay Event, as soon as reasonably practicable and in any event within 30 days of the later of:

- (a) The date of receipt by City's Authorized Representative of Principal Project Company's Notice given in accordance with Section 14.1.1.1 and the date of receipt of any further particulars (if such are required under Section 14.1.1.2 or Section 14.1.1.3), whichever is later; and
- (b) The date of receipt by City's Authorized Representative of any supplemental information supplied by Principal Project Company in accordance with Section 14.1.1.3 (if such are required under Section 14.1.1.4), whichever is later.

### **14.1.3 Concurrent Delays**

If Principal Project Company has made a Claim for an extension of time in accordance with Section 14.1.2 (Extension of Deadlines for General Delay Events) which is caused by City Fault and there is another unrelated delay to a Critical Path for which a PPC-Related Entity is responsible under this Agreement, Principal Project Company shall remain entitled to an extension of time to the Substantial Completion Deadline or Final Acceptance Deadline, as applicable, in accordance with, and subject to, Section 14.1.2 (Extension of Deadlines for General Delay Events), but shall not be entitled to any compensation or monetary relief associated with such extension of time or Claim. If Principal Project Company has made a Claim for an extension of time in accordance with Section 14.1.2 (Extension of Deadlines for General Delay Events) which is not caused by City Fault and there is another unrelated delay to a Critical Path for which a PPC-Related Entity is responsible under this Agreement, Principal Project Company shall not be entitled to an extension of time to the Substantial Completion Deadline or Final Acceptance Deadline, as applicable, to the extent and for so long as the Delay Event is concurrent with any other unrelated delay to a Critical Path for which any PPC-Related Entity is responsible under this Agreement.

### **14.1.4 Costs Payable for Compensable Delay Events**

Subject to the limitations on compensation in Article 13 (General Provisions Applying to Delay Events and Relief Events), this Section 14.1 (Relief During the D&C Period) and Exhibit 4 (Payment Mechanism), if a Compensable Delay Event occurs, City shall reimburse Principal Project Company for:

- (a) Extra Work Costs calculated in accordance with Exhibit 13 (Costs Schedule) directly attributable to the Compensable Delay Event;
- (b) Delay Costs calculated in accordance with Exhibit 13 (Costs Schedule) attributable to the Compensable Delay Event, but only where an extension of time is granted under Section 14.1.2 (Extension of Deadlines for General Delay Events) for a City-Caused Delay Event; and
- (c) Financing Delay Costs calculated in accordance with Exhibit 13 (Costs Schedule) but only where an extension of time is granted under Section 14.1.2 (Extension of Deadlines for General Delay Events) for the Compensable

---

Delay Event and Principal Project Company is unable to achieve Substantial Completion by the original Substantial Completion Deadline.

#### **14.1.5 Additional Limits Relating to Hazardous Materials Event During D&C Period**

If a Delay Event is a Hazardous Materials Event, no compensation or time relief shall be provided for ((i) once Principal Project Company obtains Actual Knowledge of the Hazardous Materials (or should have discovered such Hazardous Materials if Principal Project Company was in full compliance with the terms of the Contract Documents), any Hazardous Materials that could have been reasonably avoided by use of available construction techniques or incorporation of anticipated or minor design changes which are consistent with Good Industry Practice; (ii) once Principal Project Company obtains Actual Knowledge of the Hazardous Materials (or should have discovered such Hazardous Materials if Principal Project Company was in full compliance with the terms of the Contract Documents, including by performing a Reasonable Investigation), any Hazardous Materials encountered, to the extent Principal Project Company is required and failed to manage or mitigate against the risk of such Hazardous Materials in accordance with this Agreement; and (iii) once Principal Project Company obtains Actual Knowledge of the Hazardous Materials (or should have discovered such Hazardous Materials if Principal Project Company was in full compliance with the terms of the Contract Documents, including by performing a Reasonable Investigation), any Hazardous Materials encountered, to the extent a contractor, acting in accordance with Good Industry Practice, would have taken preventative measures to prevent or minimize such Hazards Materials, and Principal Project Company has failed to take such preventative measures. With respect to Extra Work Costs, Principal Project Company's entitlement to compensation for a Hazardous Materials Event shall be limited to Extra Work performed under the City-approved plans required to be provided under Section 01 35 44 of Division 10 of the Technical Requirements, and as otherwise limited in accordance with Section 7.7 (Hazardous Materials Management; Risk Allocation).

#### **14.1.6 Costs Payable for Force Majeure Events During the D&C Term**

**14.1.6.1** If a Delay Event for which an extension of time was granted under Section 14.1.2 (Extension of Deadlines for General Delay Events) is:

- (a) a Force Majeure Event; and
- (b) the Force Majeure Event is not insured against and is not required to be insured against in accordance with this Agreement,

City will reimburse Principal Project Company for Financing Delay Costs (if any) and any Extra Work Costs, if any, authorized pursuant to a Change Order under Section 14.6 (Loss or Damage Due to Force Majeure Termination Event).

**14.1.6.2** In addition, if (i) Principal Project Company is unable to perform all or substantially all of its obligations under the Contract Documents for a period of 180 consecutive days or more; and (ii) such inability to perform its obligations is not attributable to a concurrent non-Force Majeure Termination Event, City will reimburse Principal Project Company for Delay Costs incurred after such 180 day period until 255 days after the occurrence of such Force Majeure

Termination Event, after which Section 17.2 (Termination for Force Majeure Termination Events or Insurance Unavailability) applies.

#### **14.1.7 Costs Payable for Unavoidable Delay Events During the D&C Term**

If a Delay Event for which an extension of time was granted under Section 14.1.2 (Extension of Deadlines for General Delay Events) is an Unavoidable Delay Event, City will reimburse Principal Project Company for Financing Delay Costs (if any), such reimbursement to be Principal Project Company's sole entitlement to compensation for such Unavoidable Delay Event.

#### **14.1.8 Impact of Delay Event on Performance of D&C Work**

**14.1.8.1** Any failure by Principal Project Company to perform the D&C Work during the D&C Term, to the extent directly arising out of any Delay Event, will:

- (a) not constitute a breach of this Agreement by Principal Project Company;
- (b) not result in accrual of Noncompliance Points or Deductions with respect to any Delay Event ;
- (c) relieve Principal Project Company of its obligations to perform such directly affected D&C Work for the duration and to the extent directly prevented by such Delay Event as described in Section 13 of Exhibit 4 (Payment Mechanism); and
- (d) not result in a Principal Project Company Default or right of termination or other claim by City, other than either Party's right to terminate this Agreement under Section 17.2 (Termination for Force Majeure Events or Insurance Unavailability).

**14.1.8.2** Notwithstanding Section 14.1.7 (Impact of Delay Event on Performance of D&C Work), Principal Project Company shall remain fully responsible for performance of all elements of the D&C Work not directly impacted or affected by any Delay Event.

#### **14.1.9 Relief for Adverse Weather Event**

**14.1.9.1** The occurrence of Adverse Weather alone shall not be a prima facie reason for an Adverse Weather Event, and Principal Project Company shall make every effort to continue to work under prevailing conditions. Such efforts by Principal Project Company shall include: providing temporary gravel roads; installing a rain dewatering system; protecting interior and exterior areas exposed to rain, wind, and extreme temperatures; and providing temporary heat where required for Work to proceed without delay.

**14.1.9.2** Principal Project Company shall plan the D&C Work to allow for 17 days of Adverse Weather per year during normal working hours. The Project Schedule shall incorporate 17 days per year for the anticipated number of days of Adverse Weather. As used in this Section 14.1.8.2, "year" shall mean the period measured between May 1-April 30 of each calendar year

during the D&C Period. If the D&C Period commences or ends during a partial year, the foregoing 17-day period shall be prorated and rounded up to the nearest day.

**14.1.9.3** Principal Project Company shall not be entitled to a time extension or relief from its obligations under this Agreement for Adverse Weather until the 18<sup>th</sup> day of occurrence of Adverse Weather in a year, or such lesser applicable amount for any prorated year, as determined pursuant to Section 14.1.8.2.

**14.1.9.4** If there are years with less days of Adverse Weather than 17 days, or such lesser applicable amount for any prorated year, as determined pursuant to Section 14.1.8.2, the unused days shall be rolled into Float.

## **14.2 Relief During the IFM Period**

### **14.2.1 Overview**

This Section 14.1.7 (Relief During the IFM Period) sets out Principal Project Company's entitlement to Extra Work Costs and relief from performance as a result of Relief Events occurring during the IFM Period. Principal Project Company's right to relief and compensation under this Section 14.1.7 (Relief During the IFM Period) is subject to the limitations on compensation in Article 13 (General Provisions Applying to Delay Events and Relief Events), Exhibit 13 (Costs Schedule), and this Agreement.

### **14.2.2 Claim for a Relief Event**

**14.2.2.1** Principal Project Company shall provide Notice to City's Authorized Representative within 30 days of obtaining Actual Knowledge of the occurrence of Relief Event (or, if earlier, on such date that Principal Project Company should have discovered such Relief Event if Principal Project Company was in full compliance with the terms of the Contract Documents). Failure to do so shall result in a waiver and forfeiture of any relief, compensation or time extension related to the event or occurrence.

**14.2.2.2** Principal Project Company shall, within 10 Business Days after its Notice under Section 14.2.2.1, provide a further Notice to City's Authorized Representative, which shall, to the extent Principal Project Company has obtained Actual Knowledge, include:

- (a) A summary of the provisions of this Agreement that entitle Principal Project Company to relief. If Principal Project Company seeks relief for City's alleged breach of this Agreement, then Principal Project Company shall identify the provisions of this Agreement which allegedly have been breached and the actions constituting such breach;
- (b) Details of the Relief Event, circumstances from which the Relief Event arises including its nature, the date of its occurrence, its duration (to the extent that the Relief Event and the effects thereof have ceased or estimated duration to the extent that the Relief Event and the effects thereof have not ceased) and any portions of the Infrastructure Facility affected. Impacts to the IFM Services, if any, shall be stated by Term year;

- 
- (c) Details of the contemporary records which Principal Project Company shall maintain to substantiate its claim for relief or compensation and the substance of any oral communications, if any, relating to the Relief Event and the name of the person or persons making such material oral communications;
  - (d) Where the Relief Event is also a Compensable Relief Event, an itemized estimate of all amounts claimed under Section 14.2.3 (Costs Payable for Compensable Relief Events) broken down into Extra Work Costs identified in Exhibit 13 (Costs Schedule). The estimate shall include, to the extent applicable, Extra Work Costs for additional work for future IFM Services, and a proposal for how to reasonably net present value such amount to current dollars should the City wish to pay such amount in a lump sum payment;
  - (e) The type and amount of insurance that may be applicable and amounts that have been or are anticipated to be collected under such insurance; and
  - (f) Details of any measures that Principal Project Company has taken to date and proposes to adopt to mitigate the consequences of such Relief Event in accordance with Section 13.3 (Mitigation).

**14.2.2.3** As soon as possible but in any event within 7 days of Principal Project Company receiving, or becoming aware of, any supplemental information which may further substantiate or support Principal Project Company's Claim, Principal Project Company shall submit further particulars based on such information to City's Authorized Representative.

**14.2.2.4** City's Authorized Representative shall, after receipt of details under Section 14.2.2.2, or of further particulars under Section 14.2.2.3, be entitled by Notice to require Principal Project Company to provide such further supporting particulars as City's Authorized Representative may reasonably consider necessary. Principal Project Company shall afford City's Authorized Representative full access and facilities for investigating and assessing the validity of Principal Project Company's Claim, including, on-site inspection.

**14.2.2.5** Principal Project Company shall provide City with monthly updates, together with further details and supporting documentation, as it receives or develops additional information pertaining to the Relief Event and the matters described in Section 14.2.2.2. Without limiting the foregoing, Principal Project Company shall notify City as soon as the Relief Event has ceased and when performance of its affected obligations can be resumed.

### **14.2.3 Costs Payable for Compensable Relief Events**

Subject to the limitations on compensation in Article 13 (General Provisions Applying to Delay Events and Relief Events), this Section 14.1.7 (Relief During the IFM Period) and Exhibit 4 (Payment Mechanism), upon the occurrence of a Compensable Relief Event, City will reimburse Principal Project Company for all Extra Work Costs incurred by Principal Project Company as a direct result of the Compensable Relief Event calculated in accordance with Exhibit 13 (Costs Schedule). City will not be entitled to make Deductions/assess Noncompliance Points for non-performance that is caused directly as a result of a Compensable Relief Event; provided; however, that the Availability Payment shall be reduced for any avoided costs resulting from the Compensable Relief Event.

---

#### 14.2.4 Costs Payable for Force Majeure During IFM Period

##### 14.2.4.1 If a Force Majeure Event:

- (a) is not insured and is not required to be insured in accordance with this Agreement; and
- (b) directly and adversely impacts the IFM Services after Substantial Completion, then,
- (c) City will reimburse Principal Project Company for Extra Work Costs, if any, authorized pursuant to a Change Order under Section 14.6 (Loss or Damage Due to Force Majeure Termination Event); and
- (d) City is entitled to deduct from the Availability Payments the amount of avoided and/or reduced costs which are not in fact incurred by Principal Project Company during the period where IFM Services is not required to be performed by Principal Project Company pursuant to the Contract Documents. The deduction shall be in the amount of any costs (including applicable Extra Work Costs, Delay Costs, Financing Delay Costs, profit, overhead and margins calculated in accordance with Exhibit 13 (Costs Schedule) that are avoided or otherwise reduced. .

#### 14.2.5 Additional Limits Relating to Hazardous Materials Event During IFM Period

If a Relief Event is a Hazardous Materials Event, no compensation, performance or time relief shall be provided for (i) once Principal Project Company obtains Actual Knowledge of the Hazardous Materials (or should have discovered such Hazardous Materials if Principal Project Company was in full compliance with the terms of the Contract Documents), any Hazardous Materials that could have been reasonably avoided by use of available construction techniques or incorporation of anticipated or minor design changes which are consistent with Good Industry Practice; (ii) once Principal Project Company obtains Actual Knowledge of the Hazardous Materials (or should have discovered such Hazardous Materials if Principal Project Company was in full compliance with the terms of the Contract Documents), any Hazardous Materials encountered, to the extent Principal Project Company is required and failed to manage or mitigate against the risk of such Hazardous Materials in accordance with this Agreement; and (iii) once Principal Project Company obtains Actual Knowledge of the Hazardous Materials (or should have discovered such Hazardous Materials if Principal Project Company was in full compliance with the terms of the Contract Documents), any Hazardous Materials encountered, to the extent a contractor, acting in accordance with Good Industry Practice, would have taken preventative measures to prevent or minimize such Hazards Materials, and Principal Project Company has failed to take such preventative measures. Principal Project Company's entitlement to compensation for a Compensable Relief Event that is a Hazardous Materials Event shall be limited to the Extra Work Costs associated with the Hazardous Materials Event for Extra Work performed under the approved plans required to be provided under Section 01 35 44 of Division 10 of the Technical Requirements, and as otherwise limited in accordance with Section 7.7 (Hazardous Materials Management; Risk Allocation).

## **14.2.6 Impact of Relief Event on Performance of IFM Services**

**14.2.6.1** Any failure by Principal Project Company to perform the IFM Services from the Substantial Completion Date until the expiration of the IFM Period, to the extent directly arising out of any Relief Event, will:

- (a) not constitute a breach of this Agreement by Principal Project Company;
- (b) not result in accrual of Noncompliance Points or Deductions with respect to any Relief Event;
- (c) relieve Principal Project Company of its obligations to perform such directly affected IFM Services for the duration and to the extent directly prevented by such Relief Event as described in Section 13 of Exhibit 4 (Payment Mechanism); and
- (d) not result in a Principal Project Company Default or right of termination or other claim by City, other than either Party's right to terminate this Agreement under Section 17.2 (Termination for Force Majeure Termination Events or Insurance Unavailability).

**14.2.6.2** Notwithstanding Section 14.2.6.1, Principal Project Company shall remain fully responsible for performance of all elements of the IFM Services not directly impacted or affected by any Relief Event.

## **14.3 Method of Payment of Compensation for Compensable Delay Events and Compensable Relief Events**

**14.3.1** Additional compensation due for a Compensable Delay Event or a Compensable Relief Event shall be paid in accordance with Section 7.0 (Form and Timing of Compensation) of Exhibit 13 (Costs Schedule).

**14.3.2** City shall provide Principal Project Company with prompt written Notice of the method chosen for paying Principal Project Company for the amounts owed under this Article 14 (Compensation and Other Relief for Delay Events and Relief Events).

**14.3.3** If City elects to pay for such amounts by periodic payments, progress payments, milestone payments or a lump sum payment, Principal Project Company shall submit an invoice, in a format acceptable to City, for the amount of each such payment, and City will make payment of all undisputed amounts to Principal Project Company within 30 Business Days of receipt of a complete and proper invoice.

## **14.4 Open Book Basis**

Principal Project Company shall share with City all data, documents and information, and shall conduct all discussions and negotiations, pertaining to any claimed Delay Event or Relief Event, as applicable, on an Open Book Basis.

## **14.5 Excavations; Public Contract Code 7104**

Information regarding site conditions included in the Technical Requirements and Reference Documents (including any information, reports, or studies about site conditions, geotechnical conditions, Utilities or structure and bridge design, and any interpretations, extrapolations, analyses and recommendations contained therein) shall not be considered “indicated” therein as such term is used in Public Contract Code section 7104. Principal Project Company is responsible for investigating and satisfying itself as to the site conditions affecting the Project Site and the Work. To the maximum extent permitted by Law, Principal Project Company knowingly, unconditionally, irrevocably and specifically waives each and every right and benefit of Public Contract Code section 7104 to the extent that it may be inconsistent with any provision of the Contract Documents. Principal Project Company acknowledges and agrees that this waiver and the risk allocations set forth in the Contract Documents are a material consideration for City to award and enter into this Agreement with Principal Project Company.

## **14.6 Loss or Damage Due to Force Majeure Event**

**14.6.1** If the D&C Work or the Infrastructure Facility are wholly or substantially destroyed or damaged by:

- (a) a Force Majeure Event which is not insured against and is not required to be insured against in accordance with this Agreement or Insurance Unavailability; and
- (b) City requires Principal Project Company to repair, replace or rebuild the D&C Work or the Infrastructure Facility,

the Parties will use reasonable efforts to negotiate and agree on how the D&C Work or the Infrastructure Facility will be repaired, replaced or rebuilt in accordance with Exhibit 9 (Change Procedure) and the Extra Work Costs of doing so in accordance with Exhibit 13 (Costs Schedule).

**14.6.2** The Parties’ attempts to negotiate must not limit City’s right to issue a Change Order or Unilateral Change Order in accordance with this Agreement or the Parties’ right to terminate under Section 17.2 (Termination for Force Majeure Termination of Insurance Unavailability).

---

## ARTICLE 15. DEDUCTIONS AND NONCOMPLIANCE POINTS

### 15.1 Failure Events

**15.1.1** Appendix A of Exhibit 4 (Payment Mechanism) identifies certain D&C Failure Events applicable from the Effective Date until the Final Acceptance Date.

**15.1.2** The Performance Measurements Table identifies certain IFM Failure Events which may become an Availability Failure or Service Failure during the IFM Period as described in Exhibit 4 (Payment Mechanism).

**15.1.3** Each Noncompliance Event will result in either or both:

- (a) the assessment of Noncompliance Points;
- (b) the assessment of Deductions,

in each case in accordance with Exhibit 4 (Payment Mechanism).

### 15.2 Deductions

**15.2.1** In accordance with Exhibit 4 (Payment Mechanism) and Section 15.4, City may:

- (a) assess D&C Period Deductions (i) immediately for any D&C Failure Event for which no Rectification Time is specified in the Performance Measurements Table; (ii) at the end of each Rectification Time or any additional Rectification Time for any D&C Failure Event if Principal Project Company has not Rectified the Noncompliance Event; and
- (b) assess IFM Period Deductions (i) immediately for any IFM Failure Event or D&C Failure Event for which no Rectification Time is specified in the Performance Measurements Table; (ii) at the end of the Response Time (if any) if Principal Project Company has not Responded to the Noncompliance Event; and (iii) the end of each Rectification Time if Principal Project Company has not Rectified the Noncompliance Event.

**15.2.2** Principal Project Company acknowledges that any Deductions, are reasonable liquidated damages under the circumstances existing at the Effective Date, to compensate City for:

- (a) City's increased costs of administering the Contract Documents, including any obligations to pay or reimburse Governmental Entities over the Project for their increased costs of monitoring and enforcing Principal Project Company's compliance with applicable Regulatory Approvals;
- (b) City's potential loss of revenues due to a reduction in its operations at the Infrastructure Facility;
- (c) potential harm to the public; and

- (d) potential harm to the credibility and reputation of City with stakeholders, policy makers and with the general public.

**15.2.3** Principal Project Company further acknowledges that such increased costs and loss of revenue, credibility and reputation, would be difficult and impracticable to measure and prove, because, among other things, the costs of administering the Contract Documents prior to increases in the level thereof will be variable and extremely difficult to quantify and the variety of factors that influence use of and demand for the Infrastructure Facility and associated SFMTA services generally make it difficult to sort out causation and quantify the precise revenue loss attributable to the matters that will trigger these liquidated damages.

**15.2.4** Except for other remedies expressly provided in this Agreement, including City's right to assess Noncompliance Points and to be indemnified for Third Party claims, any Deduction assessed in accordance with this Agreement shall constitute City's sole remedy in respect of City's damages arising from the Noncompliance Event, for which such Deduction is assessed.

### **15.3 Noncompliance and Failure Reporting, Notification and Cure Process**

#### **15.3.1 Noncompliance Database**

**15.3.1.1** Principal Project Company shall establish and maintain an electronic database for recording and tracking Failure Events and Noncompliance Events (the "**Noncompliance Database**"). The format and design of the database shall be subject to City's approval, in its reasonable discretion. At a minimum, the database shall:

- (a) include a description of each Failure Event in reasonable detail;
- (b) provide for automatic notification to City of the entry of a Failure Event in the Noncompliance Database;
- (c) identify the location of the Failure Event (if applicable);
- (d) identify the date and time of each Failure Event;
- (e) identify the applicable Response Time and Rectification Time of the IFM Failure Event, if any, stated in the Performance Measurements Table;
- (f) indicate date and time of Response and Rectification for any Failure Event;
- (g) indicate when a Noncompliance Event has developed; and
- (h) record the number of assessed Noncompliance Points, the date of each assessment, and the date when each Noncompliance Event is cured.

**15.3.1.2** Principal Project Company shall provide City with full access to the Noncompliance Database at all times, including the ability to enter Failure Events into the Noncompliance Database as provided in Section 15.3.2 (Notification Initiated by City).

### **15.3.1.3 Notification Initiated by Principal Project Company**

As an integral part of Principal Project Company's self-monitoring obligations, Principal Project Company shall record in the Noncompliance Database, in real time and upon discovery, the occurrence of any Failure Event specified in the Performance Measurements Table.

### **15.3.2 Notification Initiated by City**

If City believes a Failure Event has occurred that Principal Project Company has not recorded in the Noncompliance Database, City may enter the Failure Event into the Noncompliance Database or deliver to Principal Project Company a Notice of Determination as provided in Section 15.3.3.2 via the Noncompliance Database, and delivery shall be deemed given upon proper entry of the information into the Noncompliance Database.

### **15.3.3 Performance Reports**

**15.3.3.1** Principal Project Company shall include in each Monthly Report and in each Monthly Progress Status Report required under Section 1.2.4.1 of Division 1 and Section B.11 of the IFM Specifications, a report of all Failure Events and Noncompliance Events that occurred during the preceding calendar month, which reports shall include the same detailed information required to be recorded in the Noncompliance Database. Principal Project Company shall correct any inaccuracies in reporting of Failure Events, Noncompliance Events and Noncompliance Points, within 10 Business Days of City's notification to Principal Project Company of such inaccuracies.

**15.3.3.2** Within a reasonable time after receiving the Monthly Report, City will deliver to Principal Project Company a Notice setting forth for each Failure Event City's determination whether the Failure Event was Responded to or Rectified (as applicable) during the applicable Rectification Time, City's determination whether a Noncompliance Event occurred, and the Noncompliance Points and Deductions to be assessed with respect to such Noncompliance Event (a "**Notice of Determination**").

### **15.3.4 Response and Rectification Times**

**15.3.4.1** Principal Project Company shall Respond to each IFM Failure Event by the end of the Response Time (if any) for each such Failure Event.

**15.3.4.2** Principal Project Company shall Rectify each IFM Failure Event by the end of the Rectification Time (if any) for each such Failure Event.

**15.3.4.3** For each IFM Failure Event identified, Principal Project Company's applicable Response Time and Rectification Time with respect to the IFM Failure Event shall be deemed to start on the date and time Principal Project Company first obtained Actual Knowledge or should have first reasonably known of (if Principal Project Company was in full compliance with the terms of the Contract Documents) the IFM Failure Event. For this purpose, if the Notice of the IFM Failure Event is initiated by City, Principal Project Company shall be deemed to first obtain Actual Knowledge of the IFM Failure Event not later than the date of delivery of the Notice to Principal Project Company.

**15.3.4.4** Following the occurrence of an Availability Deduction or Service Failure Deduction, Principal Project Company shall be allowed an additional Rectification Time as set out in

Section 6.3 of Exhibit 4 (Payment Mechanism). If, before the expiry of this additional period, Principal Project Company Rectifies the Availability Failure or Service Failure, no further Availability Deduction or Service Failure Deduction shall be made. Otherwise, a further Deduction shall be made of the applicable amount and a further Rectification Time of equal duration shall apply. This process and application shall continue until Principal Project Company Rectifies the Availability Failure or Service Failure, subject to any other rights and remedies of City in connection with such Availability Failure or Service Failure.

### **15.3.5 Notification of Response and Rectification**

**15.3.5.1** When Principal Project Company determines that its Response or Rectification (as applicable) of an IFM Failure Event has been completed, Principal Project Company shall make an entry in the Noncompliance Database that:

- (a) identifies the IFM Failure Event;
- (b) states that Principal Project Company has completed Response or Rectification; and
- (c) briefly describes the applicable Response or Rectification, including any modifications to the Project Management Plan to prevent future similar IFM Failure Events.

**15.3.5.2** Principal Project Company shall include the same information in the next Monthly Report.

**15.3.5.3** City may, via written Notice of rejection, reject any Principal Project Company Notice of completed Response or Rectification if it determines that Principal Project Company has not rectified the Failure Event and shall, upon making this determination, deliver a written Notice of rejection to Principal Project Company.

### **15.4 Assessment of Noncompliance Points**

**15.4.1** City may assess Noncompliance Points in accordance with this Section 15.4 (Assessment of Noncompliance Points), Section 6 of Exhibit 4 (Payment Mechanism) and the Performance Measurements Table upon the occurrence of Noncompliance Events.

**15.4.2** If, at any time, the Noncompliance Database or a Monthly Report indicates, or City is notified or otherwise obtains Actual Knowledge of, a Failure Event or Noncompliance Event, or City provides Principal Project Company with a Notice of Determination, then, without prejudice to any other right or remedy available to City, City may assess Noncompliance Points, subject to the following terms and conditions:

- (a) except as provided in Section 15.4.2(b), City may assess Noncompliance Points at each of the following times: (i) immediately for any IFM Failure Event or D&C Failure Event for which no Rectification Time is specified in the Performance Measurements Table; (ii) the end of the Response Time (if any) if Principal Project Company has not Responded to the Noncompliance Event; and (iii) the end of each Rectification Time if Principal Project Company has not Rectified the Noncompliance Event;

- 
- (b) if City initiated Notice of a Failure Event that becomes a Noncompliance Event entitling City to assess Noncompliance Points, and to the extent City has determined to assess Noncompliance Points, City may allocate the applicable Noncompliance Points at the commencement of the applicable Response Time or Rectification Time. If City and Principal Project Company deliver concurrent written Notices of the same Failure Event, or concurrently seek to enter the details of the Failure Event into the Noncompliance Database, Principal Project Company's Notice shall prevail, if complete and compliant;
  - (c) the number of points listed in Appendix A and Appendix D to Exhibit 4 (Payment Mechanism) or the Performance Measurements Table (as applicable) for any particular Noncompliance Event is the maximum number of Noncompliance Points that may be assessed for each event or circumstance that is a Noncompliance Event. City may, in its sole discretion, assess less than the maximum;
  - (d) if a Noncompliance Event continues beyond its relevant Response Time or Rectification Time (as applicable), if any, each subsequent Response Time or Rectification Time (as applicable), shall be treated as a new and separate Noncompliance Event, without necessity for further Notice and Noncompliance Points will continue to accrue for every additional Response Time or Rectification Time (as applicable), shall be treated as a new and separate Noncompliance Event; and
  - (e) 100% of the Noncompliance Points assessed during the D&C Period may be carried forward and used by City to calculate, after the Substantial Completion Date, accumulated Noncompliance Points for determining the occurrence of a Persistent PPC Default and for the purposes specified in Sections **Error!** **Reference source not found.** (Persistent PPC Default and Increased Oversight), 15.8 (Cure Plan for Persistent PPC Default), and 16.1.1(r).

**15.4.3** Regardless of the continuing assessment of Noncompliance Points under this Section 15.4 (Assessment of Noncompliance Points), City may exercise its step-in rights under Section 16.2.5 (City Step-in Rights) and, if applicable, its Work suspension rights under Section 16.2.8 (Suspension of Work), after expiration of the applicable Rectification Time.

## **15.5 Performance Notice**

**15.5.1** In addition to other remedies available under this Agreement, City may provide Principal Project Company, a Notice, indicating unsatisfactory performance and establishing the matters that give rise to such Notice, if the Performance Notice Threshold is reached ("Performance Notice").

**15.5.2** If a Performance Notice is given by the City, then:

- (a) Principal Project Company shall, within 20 days of receiving the Performance Notice, submit to the City a cure plan for review and approval in accordance with Exhibit 11 (Submittals Review Process) ("Performance Cure Plan"). The Performance Cure Plan will include reasons for the unsatisfactory

performance and specific actions (including timeframes) to be taken by Principal Project Company to improve its performance.

- (b) The Parties shall consult to develop and agree the Performance Cure Plan within 10 days of Principal Project Company's submittal of such plan; and
- (c) Following agreement or determination of the Performance Cure Plan, Principal Project Company shall implement and comply with the Performance Cure Plan and any failure to do so shall result in a second Performance Notice.

## **15.6 Increased Oversight**

**15.6.1** In addition to other remedies available under this Agreement, City may provide Principal Project Company, a Notice for increased Oversight, if the Increased Oversight Threshold is reached.

**15.6.2** In addition to other remedies available under this Agreement, City may, by Notice to Principal Project Company direct Principal Project Company to increase its own oversight or change the type and/or increase the level of City's Oversight of the Project, in such manner and to such level considered fit, if the Increased Oversight Threshold is reached.

**15.6.3** If City changes the type or increases the level of its Oversight due to Principal Project Company reaching the Increased Oversight Threshold, then Principal Project Company shall pay and reimburse City, within 30 days after receipt of written demand and reasonable supporting documentation, all reasonable increased costs and fees City incurs in connection with such action, including City's Recoverable Costs.

**15.6.4** If City directs Principal Project Company to increase its own oversight or changes the type or increases the level of its Oversight, then:

- (a) Principal Project Company shall, within 30 days of Notice submit to the City a cure plan for review and approval in accordance with Exhibit 11 (Submittals Review Process) ("Increased Oversight Cure Plan"). The Increased Oversight Cure Plan shall include specific actions (including timeframes) to be taken by Principal Project Company to improve its performance; and
- (b) the Parties shall consult to develop and agree to the Increased Oversight Cure Plan within 20 days of Principal Project Company's submittal of the Increased Oversight Cure Plan.

**15.6.5** Principal Project Company's obligation to pay and reimburse City for increased Oversight costs shall apply to all changes in the type or increases in the level of City's Oversight occurring until Principal Project Company has:

- (a) implemented and complied with the Increased Oversight Cure Plan;
- (b) fully and completely cured the breaches and failures that gave rise to the Increased Oversight;
- (c) diligently pursued cure of all other Failure Events; and

- (d) during the D&C Period, has accumulated less than 40 Noncompliance Points in the subsequent 90 days following notice of Increased Oversight; or
- (e) during the IFM Period, has accumulated less than 375 Noncompliance Points in the subsequent 90 days following notice of Increased Oversight

## **15.7 Persistent PPC Default**

**15.7.1** In addition to other remedies available under this Agreement including Section 15.6, City may provide PPC with a Notice of Persistent PPC Default (“Persistent PPC Default Notice”).

## **15.8 Cure Plan for Persistent PPC Default**

**15.8.1** Upon the occurrence of a Persistent PPC Default:

- (a) Principal Project Company shall, within 30 days of the Persistent PPC Default, submit to City a cure plan for review and approval in accordance with Exhibit 11 (Submittals Review Process) (“Persistent PPC Default Cure Plan”). The Persistent PPC Default Cure Plan shall include specific actions (including timeframes) to be taken by Principal Project Company to improve performance
- (b) City may require, in its good faith discretion, that Principal Project Company’s actions under this Section 15.8.1 include improving Principal Project Company’s quality management practices, plans and procedures, revising and restating the Project Management Plan, changing organizational and management structure, increasing monitoring and inspections, changing Key Personnel and other important personnel, replacement of IFM Provider, replacement of Subcontractors;
- (c) The Parties shall consult to develop and agree to the Persistent PPC Default Cure Plan within 20 days of Principal Project Company’s submittal of the plan; and
- (d) Following agreement or determination of the Persistent PPC Default Cure Plan, Principal Project Company shall implement and comply with the cure plan and any failure to do so shall result in an additional PPC Default which shall not be subject to any additional Notice or cure period.

**15.8.2** If:

- (a) Principal Project Company complies in all material respects with the approved Persistent PPC Default Cure Plan

As of the date it achieves such requirements, there exist no other uncured PPC Defaults for which a Default Notice was given; and

- 
- (b) During the D&C Period, Principal Project Company has accumulated less than 100 points in the subsequent 90 days, following notice of Persistent PPC Default; or
  - (c) During the IFM period, Principal Project Company has accumulated less than 750 Noncompliance points in the subsequent 6-month period, following notice of Persistent PPC Default

Upon successfully curing the Persistent PPC Default, during the IFM Period only, City will reduce the number of cumulative Noncompliance Points that would otherwise then be counted toward Persistent PPC Default by 50%. Such reduction will be taken from the earliest assessed Noncompliance Points that would otherwise then be counted toward Persistent PPC Default.

## **15.9 Amendment of IFM Period Performance Measurements Table**

**15.9.1** The Performance Measurements Table contains a representational, but not exhaustive, list of IFM Failure Events possible during the IFM Period under the Contract Documents. Subject to Sections 15.9.2 and 15.9.3, City may:

- (a) replace IFM Failure Events in the Performance Measurements Table by removing an IFM Failure Event and adding in its place an alternate IFM Failure Event identified in accordance with Section 15.9.2(a); and
- (b) establish the category applicable to, and set a reasonable “Performance Measurement,” “Response Time” and “Rectification Time”, each alternate Failure Event.

**15.9.2** City’s right to revise the Performance Measurements Table is subject to the following restrictions:

- (a) any existing contractual obligation of Principal Project Company may become an alternate IFM Failure Event if:
  - (i) Principal Project Company has failed to comply with that contractual obligation at least twice;
  - (ii) City provided Notice to Principal Project Company within 15 days of Principal Project Company’s second failure to comply and such Notice identifies the contractual obligation and the instances of Principal Project Company’s failure to comply, and indicates that City will add that contractual obligation to the Performance Measurements Table if Principal Project Company at any time again fails to comply with the specified contractual obligation; and
  - (iii) Principal Project Company fails a third time to comply with the contractual obligation specified in the Notice;
- (b) the total number of Noncompliance Points in the Performance Measurements Table as existing on the Financial Close Date shall not increase by more than

10% for the Term. City may elect to remove contractual obligations and reduce Noncompliance Points allocated to listed contractual obligations in order to comply with the 10% growth limit; and

- (c) the number of Noncompliance Points associated with any alternate IFM Failure Event added to the Performance Measurements Table shall not exceed 20 Noncompliance Points.

**15.9.3** Changes to the Performance Measurements Table made in accordance with this Section 15.9 (Amendment of IFM Period Performance Measurements Table) will be applied prospectively, starting three days after delivery to Principal Project Company of the revised table or such later date stated in the Notice delivering any revised table.

---

**ARTICLE 16. DEFAULT; REMEDIES**

**16.1 Default by Principal Project Company; Cure Periods**

**16.1.1 PPC Default**

Principal Project Company shall be in breach under this Agreement upon the occurrence of any one or more of the following events or conditions (each a “**PPC Default**”):

- (a) Principal Project Company fails to satisfy the conditions set forth in Section 7.4.3 (Commencement of Non-Construction Work) within 30 days after City’s issuance of NTP 1, to begin the D&C Work within 10 days following City’s issuance of NTP 2, or to diligently prosecute the Work to completion in accordance with the Contract Documents;
- (b) Principal Project Company abandons all or a material part of the Project, which abandonment is deemed to occur if (i) Principal Project Company demonstrates through statements, acts or omissions an intent not to continue, for any reason other than a Delay Event or Relief Event that materially impairs Principal Project Company’s ability to continue, to design, construct, operate or maintain all or a material part of the Project, or (ii) no significant Work (taking into account the Project Schedule, if applicable, and any Delay Event or Relief Event) on the Project is performed for a continuous period of more than 30 days unless due to Principal Project Company’s compliance with a City suspension order issued under this Agreement;
- (c) Principal Project Company fails to achieve Substantial Completion by the Long Stop Date;
- (d) Principal Project Company (i) fails to make any payment owing to City under the Contract Documents when due, or (ii) fails to deposit other funds into any custodial account, trust account or other reserve or account (including the Handback Requirements Reserve Account) in the amount and within the time period required by the Contract Documents;
- (e) Principal Project Company fails to begin the IFM Services within 30 days following the Substantial Completion Date;
- (f) (i) any representation or warranty in the Contract Documents made by Principal Project Company is false in any material respect, materially misleading or inaccurate in any material respect when made or omits material information when made, or (ii) any certificate, schedule, report, instrument or other document delivered by or on behalf of Principal Project Company, any Equity Member, Controlling Affiliate of Principal Project Company, Prime Contractor or Supplier to City as part of the Implementation Proposal or under the Contract Documents is false in any material respect, materially misleading or inaccurate in any material respect when made or omits material information when made;

- (g) Principal Project Company fails to obtain, provide and maintain any insurance, bonds, guarantees, letters of credit or other payment or performance security as required under the Contract Documents for the benefit of relevant parties, or Principal Project Company fails to comply with any requirement of the Contract Documents pertaining to the amount, terms or coverage of the insurance or security or fails to pay the associated premiums, deductibles, retain self-insured retentions, co-insurance or any other such amounts as and when due;
- (h) Principal Project Company ceases performing a substantial portion of its business, or a substantial portion of such business is suspended or is not being performed, whether voluntarily or involuntarily, that has or will have a material adverse effect on Principal Project Company's ability to perform its obligations under this Agreement;
- (i) (i) Principal Project Company makes, attempts to make or suffers a voluntary or involuntary assignment or transfer of all or any portion of the Contract Documents, the Project or PPC's Interest in violation of the limitations on assignment or transfer under this Agreement, (ii) there occurs an Equity Transfer or a Change of Control not permitted under this Agreement, or (iii) any other violation of the limitations on assignment or transfer under this Agreement occurs;
- (j) Principal Project Company fails to timely observe or perform, or cause to be observed or performed any material covenant, agreement, obligation, term or condition required to be observed or performed by Principal Project Company under the Contract Documents, including failure to pay for or perform the Design Work, Construction Work, IFM Services or any portion thereof (except to the extent payment is subject to a good faith payment dispute with a subcontractor) in accordance with the Contract Documents in any material respect, provided that any failure that constitutes a Noncompliance Event or Failure Event is not considered a default under this clause (j) although such failure may become a PPC Default in accordance with clause (r) or (s) below;
- (k) Principal Project Company, any Equity Member, any Controlling Affiliate of Principal Project Company, any Prime Contractor, any Supplier, or any of their respective partners, members, officers, directors, responsible managing officers, or responsible managing employees, has been convicted in a court of competent jurisdiction of any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in California Public Contract Code section 1101, with any public entity, as defined in California Public Contract Code section 1100, provided that, if the conviction relates to an Equity Member, a Controlling Affiliate of Principal Project Company, a Prime Contractor, a Supplier, or any of their or Principal Project Company's respective partners, members, officers, directors, responsible managing officers, or responsible managing employees, (i) such Person is involved in the Project at the time of such conviction and (ii) Principal Project Company fails to remove such Person from the Project;

- 
- (l) Principal Project Company fails to comply with City's order to suspend Work issued in accordance with Sections 9.8.6, 10.1.2.4(c), 16.2.4.5(b) or 16.2.8 (Suspension of Work) within the time reasonably allowed in such order;
  - (m) A Bankruptcy Event arises with respect to:
    - (i) Principal Project Company except to the extent such Bankruptcy Event is caused by a failure by City to pay Principal Project Company as required under this Agreement, and/or
    - (ii) Any D&C Contractor or IFM Provider, unless Principal Project Company:
      - (A) enters into a replacement D&C Contract, guarantee or IFM Contract (as relevant) with a reputable counterparty acceptable to City, in its good faith discretion, within 60 days of the relevant Bankruptcy Event; provided, however, that, if Principal Project Company has commenced and is diligently pursuing meaningful steps to secure a replacement D&C Contract, guarantee or IFM Contract (as relevant) immediately after the Bankruptcy Event, Principal Project Company shall have such additional period of time, up to a maximum period of 120 days after the Bankruptcy Event;
      - (B) in the absence of entering into a replacement D&C Contract, Principal Project Company otherwise demonstrates to the satisfaction of City, in its good faith discretion, that Principal Project Company possesses the technical and financial capacity to perform all remaining D&C Work in accordance with this Agreement; or
      - (C) in the absence of entering into a replacement IFM Contract, Principal Project Company otherwise demonstrates to the satisfaction of City, in its good faith discretion, that Principal Project Company possesses the technical and financial capacity to perform all remaining IFM Services in accordance with this Agreement;
  - (n) Principal Project Company draws against any custodial account, trust account, allowance or other reserve or account in violation of the Contract Documents or makes a false or materially misleading representation in connection with a draw against any such account, allowance or reserve;
  - (o) Principal Project Company fails to comply with applicable Regulatory Approvals or Laws, including the Laws described in Exhibit 16 (Federal, State and City Requirements) in any material respect;
  - (p) any use of the Project by any PPC-Related Entity that violates requirements of applicable Regulatory Approvals or Laws or otherwise is not permitted under the Contract Documents;

- (q) any D&C Contract or IFM Contract is terminated (other than non-default termination on its scheduled termination date) and Principal Project Company has not either:
  - (i) entered into a replacement D&C Contract or IFM Contract (as relevant) with a reputable counterparty acceptable to City, in its good faith discretion, within 60 days of the termination of the relevant D&C Contract or IFM Contract (as relevant); provided, however, that, if Principal Project Company has commenced and is diligently pursuing meaningful steps to secure a replacement D&C Contract or IFM Contract (as relevant) immediately after the termination, Principal Project Company shall have such additional period of time, up to a maximum period of 120 days after the termination; or
  - (ii) in the absence of entering into a replacement IFM Contract, Principal Project Company otherwise demonstrates to the satisfaction of City, in its good faith discretion, that Principal Project Company possesses the technical and financial capacity to perform all remaining IFM Services in accordance with this Agreement;
- (r) a Persistent PPC Default occurs, City delivers to Principal Project Company a Default Notice, and either (i) Principal Project Company fails to deliver to City, within 30 days after such Notice is delivered, a cure plan meeting the requirements for approval in Section 15.8 (Cure Plan for Persistent PPC Default) or (ii) Principal Project Company fails to fully comply with the schedule or specific elements of, or actions required under, the approved cure plan;
- (s) after any rights of appeal have been exhausted, Principal Project Company, any PPC-Related Entity or any Subcontractor (i) is determined to be disqualified, suspended or debarred, or otherwise excluded from bidding, proposing or contracting with a federal, State, or City department or agency, or (ii) has not dismissed any Subcontractor whose work is not substantially complete and who is determined to be disqualified, suspended or debarred, or otherwise excluded from bidding, or proposing or contracting with a federal, State, or City department or agency; or
- (t) In the event that LEED BD+C Gold Rating, including the mandatory 12x EAc2 Optimize Energy Performance credits, is not obtained within 24 months after the Final Acceptance Date, other than as a sole and direct result of any affirmative act or omission of City or unless unreasonably withheld by USGBC or an equivalent body.

## **16.1.2 Default Notice and Cure Periods**

### **16.1.2.1** Principal Project Company shall promptly:

- (a) provide Notice to City upon the occurrence of a PPC Default; and

- 
- (b) take steps to commence the cure of and mitigate the effects of any PPC Default.

**16.1.2.2** If Principal Project Company notifies City of a PPC Default in accordance with Section 16.1.2.1 or City considers a PPC Default has occurred, City may give PPC a Notice (“**Default Notice**”) which contains:

- (a) details of the PPC Default;
- (b) the cure period (if any) by which Principal Project Company shall cure the PPC Default in accordance with Section 16.1.2.3; and
- (c) if the PPC Default is not capable of being cured or no cure period is applicable, a date by which Principal Project Company shall comply with any requirements of City in connection with that PPC Default.

**16.1.2.3** The following list identifies Principal Project Company’s rights to receive Notice and opportunity to cure before City may exercise its right to terminate this Agreement or enforce its Performance Bond in accordance with Section 16.2.7 (Performance Bond), and identifies other PPC Defaults that are not subject to cure:

- (a) respecting any PPC Default under Sections 16.1.1(h) or 16.1.1(m), a period of 15 days after delivery by City to Principal Project Company of a Default Notice;
- (b) respecting a PPC Default under Sections 16.1.1(a), 16.1.1(b), 16.1.1(d), 16.1.1(i), 16.1.1(n), 16.1.1(o), or 16.1.1(p), a cure period of 30 days after City delivers to Principal Project Company a Default Notice; provided that City may effect cure, at Principal Project Company’s expense, if a PPC Default under Section 16.1.1(g) continues beyond five days after such Notice is delivered;
- (c) respecting a PPC Default under Sections 16.1.1(f), 16.1.1(j) or 16.1.1(k), a cure period of 30 days after City delivers to Principal Project Company a Default Notice; provided that:
  - (i) if the nature of such PPC Default is such that the cure cannot with diligence be completed within such time period and Principal Project Company has commenced and is diligently pursuing meaningful steps to cure immediately after receiving the Default Notice, Principal Project Company shall have such additional period of time, up to a maximum cure period of 60 days after City delivers the Default Notice, as is reasonably necessary to diligently effect cure; and
  - (ii) as to Section 16.1.1(f), cure will be regarded as complete when the adverse effects of the breach are cured;
- (d) respecting a PPC Default under Sections 16.1.1(c), 16.1.1(e), 16.1.1(l), 16.1.1(q), 16.1.1(r), or 16.1.1(s), no cure period is allowed; and

- (e) respecting a PPC Default under Section 16.1.1(t), a cure period of 30 days after City delivers to Principal Project Company a Default Notice, provided that if the nature of such PPC Default is such that the cure cannot with diligence be completed within such time period and Principal Project Company has commenced and is diligently pursuing meaningful steps to cure immediately after receiving the Default Notice, Principal Project Company shall have such additional period of time, up to a maximum cure period of 365 days after City delivers the Default Notice, as is reasonably necessary to diligently effect cure.

### **16.1.3 Warning Notices**

**16.1.3.1** Without prejudice to any other right or remedy available to City, City may deliver a Notice (a “**Warning Notice**”) to Principal Project Company, with a copy to the Collateral Agent, stating explicitly that it is a “Warning Notice” of a material PPC Default and stating in reasonable detail the matter or matters giving rise to the Warning Notice and, if applicable, amounts due from Principal Project Company, whenever there occurs a PPC Default.

**16.1.3.2** If City issues a Warning Notice for any PPC Default after it issues a Default Notice, then the remaining cure period available to Principal Project Company, if any, for such PPC Default before City may terminate this Agreement on account of such PPC Default will be extended by the time period between the date the Default Notice was issued and the date the Warning Notice is issued. However, this shall not affect the time when City may exercise any remedy other than termination respecting such PPC Default.

### **16.1.4 Principal Project Company to Comply with Default Notice and Provide Cure Plan**

**16.1.4.1** If City gives a Default Notice to Principal Project Company, then:

- (a) Principal Project Company shall comply with the Default Notice;
- (b) Except for a PPC Default under Sections 16.1.1(b), 16.1.1(e), 16.1.1(i), 16.1.1(m), 16.1.1(q), and 16.1.1(r), and PPC Defaults for which no cure period is applicable, Principal Project Company shall, as soon as possible, give City a plan for review and approval in accordance with Exhibit 11 (Submittal Review Process) to cure the PPC Default and comply with any requirements of City in accordance with the terms of City’s Default Notice (which plan shall also specify steps to address the underlying cause of the PPC Default and to avoid similar PPC Defaults occurring in the future);
- (c) The Parties shall consult to develop and agree to the cure plan; and
- (d) Following agreement or determination of the cure plan, Principal Project Company shall implement and comply with the cure plan. Any failure to implement the cure plan or comply with the agreed cure plan will result in a PPC Default which is not subject to any cure period.

**16.1.4.2** In the case of a Persistent PPC Default, Principal Project Company shall comply with Section 15.8 (Cure Plan for Persistent PPC Default).

---

## 16.2 City Remedies for PPC Default

**16.2.1** Subject to the rights of Lenders under any Direct Agreement, upon occurrence of a PPC Default that has not been cured within the applicable cure period, if any, City may:

- (a) Terminate this Agreement as provided in Section 17.3 (Termination for PPC Default);
- (b) Exercise its step-in rights in Section 16.2.5 (City Step-In Rights);
- (c) Recover any Losses on account of the occurrence of a PPC Default, regardless of when the Default Notice is given, whether the Losses accrue after the occurrence of the PPC Default or whether the PPC Default is subsequently cured;
- (d) Where such PPC Default is not cured within the applicable cure period, if any, specified in Section 16.1.2.3 make demand upon and enforce any performance security, and make demand upon, draw on and enforce and collect any letter of credit, guaranty or other payment or performance security (including the Handback Requirements Reserve Account and City's rights to withhold payment) available to City under this Agreement with respect to the PPC Default in any order, in City's sole discretion, without Notice to Principal Project Company. City will apply the proceeds of any such action to the satisfaction of Principal Project Company's obligations under this Agreement, including payment of amounts due City;
- (e) Suspend the Work in whole or part in accordance with Section 16.2.8 (Suspension of Work); or
- (f) Exercise any other remedies available under this Agreement or at law or in equity.

**16.2.2** Each right and remedy of City upon the occurrence of a PPC Default is cumulative as set out in Section 16.2.10 (Cumulative, Non-Exclusive Remedies).

### 16.2.3 Immediate City Entry and Cure of Wrongful Use

Without Notice and without awaiting lapse of the period to cure, in the event of any PPC Default under Section 16.1.1(p), City may enter and take control of the relevant portion of the Project to restore the permitted uses and reopen and continue operations for the benefit of the public, until such breach is cured or City terminates this Agreement; provided, however, that the foregoing shall be subject to the rights of Lenders under any Direct Agreement except in the event of an Emergency, an imminent safety risk, an unauthorized use of the Project by Principal Project Company or a PPC Default that materially precludes the use of the Project by City in the manner contemplated under this Agreement. Principal Project Company shall pay to City on demand City's Recoverable Costs in connection with such action, which payment will be reimbursed by City if a determination is ultimately made that no PPC Default occurred, promptly following such a determination. So long as City undertakes such action in good faith, even if under a mistaken belief in the occurrence of such a PPC Default, such action shall not be deemed unlawful or a breach of this Agreement, shall not expose City to any liability to Principal

Project Company, other than the reimbursement obligation described above, and shall not entitle Principal Project Company to any other remedy except if City's action constitutes gross negligence, recklessness or willful misconduct. Principal Project Company acknowledges that City has a high priority, paramount public interest in maintaining the authorized uses of the Project and continuous access to the Project. City's good faith determination that such action is needed shall be deemed conclusive in the absence of clear and convincing evidence to the contrary. City will promptly relinquish control and possession of the relevant portion of the Project to Principal Project Company once City determines that such PPC Default has been cured.

#### **16.2.4 Remedies for Failure to Meet Safety Standards or Perform Safety Compliance**

**16.2.4.1** If at any time Principal Project Company or its Surety fails to meet any Safety Standard or timely perform Safety Compliance or if City and Principal Project Company cannot reach an agreement regarding the interpretation or application of a Safety Standard or the valid issuance of a Safety Compliance Order within a period of time acceptable to City, City may undertake or direct Principal Project Company to undertake any work required to ensure implementation of and compliance with Safety Standards as interpreted or applied by City or with the Safety Compliance Order. If at any time a condition or deficiency of the Project violates any Law respecting health, safety or right of use and access, including the Americans with Disabilities Act of 1990, 42 U.S.C. Sections 12101 et seq., and regulations of the United States Occupational Safety and Health Administration (OSHA), City may take any immediate corrective actions required.

**16.2.4.2** Subject to Section 16.2.4.3, to the extent that any work done under Section 16.2.4.1 is undertaken by City and is reasonably necessary to comply with Safety Standards, perform valid previously issued Safety Compliance Orders or correct a violation of Law or a Regulatory Approval respecting health, safety or right of use and access, Principal Project Company shall pay to City on demand the costs of such work including City's Recoverable Costs in connection with such work. In such event, City (whether it undertakes the work or has directed Principal Project Company to undertake the work) shall have no obligation or liability to compensate Principal Project Company for any Losses Principal Project Company suffers or incurs arising from, resulting to or resulting from such work.

**16.2.4.3** To the extent that City requires Principal Project Company to perform Work under Section 16.2.4.1 that is not reasonably necessary to comply with Safety Standards, perform valid previously issued Safety Compliance Orders or correct a violation of Law or Regulatory Approval respecting health, safety or right of use and access, such requirement shall be considered a City Change, and Principal Project Company's obligation to pay City's Recoverable Costs shall not include City's costs relating to the City Change.

**16.2.4.4** Notwithstanding anything to the contrary contained in this Agreement and without limiting City's other rights and remedies under this Agreement, City shall have the rights and remedies specified in Section 16.2.4.5 if, in the good faith judgment of City:

- (a) Principal Project Company has failed to meet any Safety Standards or perform Safety Compliance and the failure results in an Emergency or danger to persons or property; or

- (b) Principal Project Company is not then diligently taking all necessary steps to rectify or deal with such Emergency or danger.

**16.2.4.5** Upon the occurrence of any event described in Section 16.2.4.4, City may without Notice and without awaiting lapse of the period to cure any breach:

- (a) immediately take such action as may be reasonably necessary to rectify the Emergency or danger, in which event Principal Project Company shall pay to City on demand the cost of such action, including City's Recoverable Costs, which payment will be reimbursed by City if a determination is ultimately made that Principal Project Company did not fail to meet applicable Safety Standards or to perform Safety Compliance; or
- (b) suspend Work and/or close or cause to be closed any and all portions of Project affected by the Emergency or danger.

**16.2.4.6** So long as City undertakes any action under Section 16.2.4.5 in good faith, even if under a mistaken belief in the occurrence of such failure or existence of an Emergency or danger, such action shall not be deemed unlawful or a breach of this Agreement, shall not expose City to any liability to Principal Project Company, other than the reimbursement obligation described in Section 16.2.4.5, and shall not entitle Principal Project Company to any other remedy, except if City's action was undertaken in bad faith or constitutes gross negligence, recklessness or willful misconduct.

**16.2.4.7** Principal Project Company acknowledges that City has a high priority, paramount public interest in protecting public and worker safety at the Project and adjacent areas. City's good faith determination of the existence of such a failure, Emergency or danger shall be deemed conclusive in the absence of clear and convincing evidence to the contrary. Immediately following rectification of such Emergency or danger, as determined by City, City will allow the Work to continue or such portions of the Project to reopen, as applicable.

## **16.2.5 City Step-in Rights**

**16.2.5.1** If Principal Project Company has not fully and completely cured a PPC Default by the expiration of the applicable cure period, if any, City may, subject to the terms of any Direct Agreement and in accordance with the terms and conditions of this Section 16.2.5 (City Step-in Rights), pay and perform all or any portion of Principal Project Company's obligations under the Contract Documents that are the subject of such PPC Default.

**16.2.5.2** Upon exercising its rights pursuant to Section 16.2.5.1, City may, to the extent necessary to cure a PPC Default:

- (a) perform or attempt to perform, or cause to be performed, such Work;
- (b) employ security guards and other safeguards to protect the Project;
- (c) spend such sums as City deems reasonably necessary to employ and pay such architects, engineers, consultants and contractors and obtain materials and equipment as may be required to perform such Work, without obligation or liability to Principal Project Company or any Contractors for loss of

opportunity to perform the same Work or supply the same materials and equipment;

- (d) in accordance with Section 16.2.7 (Performance Bond), draw on and use proceeds from the Performance Bond and any other available security or source of funds available to Principal Project Company for the purposes set forth in this Section 16.2.5.2 including amounts held in an operating account, to the extent such instruments provide recourse to pay such sums, provided City's right to access amounts held in an operating account shall not include a security interest in such funds nor shall the exercise of such right by City interfere with the right of the Lenders, if any, under the Security Documents and the Direct Agreement to access such funds;
- (e) execute all applications, certificates and other documents as may be required;
- (f) make decisions respecting, assume control over and continue Work as may be reasonably required;
- (g) modify or terminate any contractual arrangements in Principal Project Company's Contracts in City's sole discretion, without liability for termination fees, costs or other charges in accordance with the terms of those Contracts, including the requirements for each Contract listed in Section 9.3.2 (Key Contract Provisions);
- (h) meet with, coordinate with, direct and instruct Contractors and Suppliers, process invoices and applications for payment from Contractors and Suppliers, pay Contractors and Suppliers, and resolve claims of Contractors and Suppliers;
- (i) take any and all other actions it may consider necessary to effect cure and perform the Work; and
- (j) prosecute and defend any action or proceeding incident to the Work.

**16.2.5.3** Principal Project Company shall reimburse City on demand for its Recoverable Costs incurred in connection with the performance of any act or work authorized by this Section 16.2.5 (City Step-in Rights).

**16.2.5.4** In addition to its continuing ownership of the Project Site and rights to have access to the Project Site throughout the Term, including the rights described in Section 6.7 (Coordination, Cooperation and Access), City and its Authorized Representatives, contractors, subcontractors, vendors and employees shall have the right to enter onto all Temporary Areas, exercisable at any time or times without Notice, for the purpose of carrying out City's step-in rights under Section 16.2.3 (Immediate City Entry and Cure of Wrongful Use) and this Section 16.2.5 (City Step-in Rights). Principal Project Company grants City a perpetual, non-rescindable right of entry onto the Temporary Areas for such purpose.

**16.2.5.5** If City exercises any right to pay or perform under this Section 16.2.5 (City Step-in Rights), it nevertheless shall have no liability to Principal Project Company for the sufficiency, adequacy or quality of any such payment or performance, or for any effect of such payment or

performance on the Work or the Project, unless caused by the gross negligence, recklessness or willful misconduct of City. City and its Authorized Representatives, contractors, subcontractors, vendors and employees shall have no liability to Principal Project Company for any inconvenience or disturbance arising out of any entry onto the Project Site or Temporary Areas as contemplated by Section 16.2.3 (Immediate City Entry and Cure of Wrongful Use) or this Section 16.2.5 (City Step-in Rights), provided that the foregoing shall not absolve any Person of liability as a matter of law for its gross negligence, recklessness or willful misconduct.

**16.2.5.6** City's rights under this Section 16.2.5 (City Step-in Rights) (but not City's rights under Section 16.2.3 (Immediate City Entry and Cure of Wrongful Use) regarding City's immediate right of entry and right to cure wrongful use of the Project) are subject to the right of any Surety to assume performance and completion of all bonded work under a Performance Bond.

**16.2.5.7** If City takes action described in this Section 16.2.5 (City Step-in Rights) and it is later finally determined that City lacked the right to do so because there did not occur a PPC Default or because Principal Project Company had previously fully cured the default in accordance with this Agreement, then City's action shall be treated as a City Change.

#### **16.2.6 Damages; Offset**

**16.2.6.1** Except as limited by City's agreement to liquidate certain damages as specified in this Agreement, and subject to the limitations in Section 16.6 (Limitation on Consequential Damages), City shall be entitled to recover any and all damages available at law on account of the occurrence of a PPC Default. Principal Project Company shall owe any such damages that accrue after the occurrence of PPC Default regardless of when Default Notice is given or whether PPC Default is subsequently cured.

**16.2.6.2** In the case of a termination for PPC Default, City may deduct and offset any damages owing to it under the Contract Documents from and against any amounts City may owe to Principal Project Company. If the amount of damages owing to City is not liquidated or known with certainty at the time a payment is due from City to Principal Project Company with respect to such termination for a PPC Default, City may deduct and offset the amount it reasonably estimates will be due, subject to City's obligation to adjust such deduction or offset when the amount of damages owing to City is liquidated or becomes known with certainty.

**16.2.6.3** Damages owed to City under this Section 16.2.6 (Damages; Offset) shall bear interest at the Late Payment Rate from and after the date any amount becomes due to City until the date paid.

**16.2.6.4** Without limiting Section 16.2.6.2:

- (a) the amount of any damages attributable to Principal Project Company may be deducted or offset from periodic payments owing by City under Section 11.1 (Milestone Payment) (including damages attributable to any PPC Default that concerns the D&C Work and is the subject of a Notice delivered to Principal Project Company before the date such payments are owing), subject to Section 2.4 of Exhibit 4A (Milestone Payment Mechanism); and
- (b) the amount of any damages attributable to Principal Project Company may be deducted or offset from the Availability Payments (including damages

attributable to any PPC Default), provided that in certain cases damages are liquidated by the Deductions under Exhibit 4B (Availability Payment Mechanism).

**16.2.6.5** If the amount of damages owing to City from Principal Project Company is not liquidated or known with certainty at the time the payment is due, City may deduct and offset up to 105% of the amount it reasonably estimates will be due, in which case, the Parties shall adjust such deduction or offset when the amount of damages owing to City becomes known with certainty, with interest at the Late Payment Rate payable by City on excess amounts withheld and interest at the same rate payable by Principal Project Company on any shortfall.

**16.2.6.6** City's right of offset includes all amounts paid by City to satisfy, discharge and defend against any claim of lien, stop Notice, equitable lien or any other demand for payment or security made or filed with City, City's property or the Project by any Person claiming that any PPC-Related Entity has failed to perform its contractual obligations or to make payment for any obligation incurred for or in connection with the Work, provided that no such offset shall be made if Principal Project Company has filed surety bonds fully releasing City and City's property from such claim or lien under applicable Law.

## **16.2.7 Performance Bond**

**16.2.7.1** Subject to Sections 10.5.2 and 16.2.6.2, upon the occurrence of a PPC Default and expiration, without full and complete cure, of the applicable cure period, if any, under Section 16.1.2 (Default Notice and Cure Periods), without waiving or releasing Principal Project Company from any obligations or limiting other remedies that may be available to City, City may make demand upon and enforce any Performance Bond, and make demand upon, draw on and enforce and collect any letter of credit, guaranty or other payment or performance security available to City under this Agreement with respect to such PPC Default in any order. City will apply the proceeds of any such action to the satisfaction of Principal Project Company's obligations under this Agreement, including payment of amounts due to City.

**16.2.7.2** If City is an additional obligee under a Performance Bond, or is a transferee beneficiary under any letter of credit or guaranty, then City will forbear from exercising remedies as additional obligee or transferee beneficiary so long as Principal Project Company or the Collateral Agent commences the good faith, diligent exercise of remedies within 10 days after City delivers Notice to Principal Project Company and the Collateral Agent of City's intent to make a claim under such security, letter of credit or guaranty and subsequently continues such good faith, diligent exercise of remedies until the default is cured.

**16.2.7.3** Section 16.2.7.2 shall not apply where access to a bond, letter of credit, guaranty or other payment or performance security is for the purpose of satisfying damages owing to City, in which case City shall be entitled to make demand, draw, enforce and collect regardless of whether PPC Default is subsequently cured.

**16.2.7.4** City will provide Notice to Principal Project Company at the same time or promptly after City takes any action to make demand upon, draw on, enforce or collect any Performance Bond.

## 16.2.8 Suspension of Work

**16.2.8.1** Subject to the rights of the Lenders as provided in the Direct Agreement, in addition to any other right to suspend the Work under the Contract Documents, City may suspend all or part of the Work by Notice to Principal Project Company if Principal Project Company fails to cure and correct, within the applicable cure period available to Principal Project Company (if any), the following:

- (a) failure to perform the Work in compliance with the Contract Documents, where such failure is not substantially cured within 15 days after City delivers Notice thereof to Principal Project Company;
- (b) failure to comply with any Law or Regulatory Approval (including failure to implement protective measures for Threatened or Endangered Species, failure to handle, preserve and protect paleontological and cultural (including archaeological and historic) resources, or failure to handle Hazardous Materials, in accordance with applicable Laws and Regulatory Approvals);
- (c) performance of Design Work before achieving all conditions in Section 7.4.3 (Commencement of Non-Construction Work), or performance of Construction Work before all conditions precedent to commencement of Construction Work have been met;
- (d) discovery of Nonconforming Work not corrected within 15 days after City delivers Notice of such Nonconforming Work to Principal Project Company or, if correction will require more than 15 days, failure of Principal Project Company to deliver to City, within 15 days of said Notice, a plan acceptable to City for correction of the Nonconforming Work or to diligently execute and complete such plan;
- (e) failure to pay in full when due sums owing to any Contractor or Supplier for services, materials or equipment, except only for retainage provided in the relevant Contract and amounts in dispute, which amounts in dispute may include amounts withheld on account of damage caused by such Contractor or Supplier or arising out of such Contractor or Supplier's failure to comply with the relevant Contract;
- (f) failure to provide proof of required insurance coverage under Section 10.1.2.4 (Verification of Coverage);
- (g) failure to deliver or maintain Payment Bonds or Performance Bonds;
- (h) the existence of conditions unsafe for workers, other Project personnel or the general public, including failures to comply with Safety Standards or perform Safety Compliance in accordance with Section 16.2.4 (Remedies for Failure to Meet Safety Standards or Perform Safety Compliance) (and in any such case the order of suspension may be issued without awaiting any cure period);

- (i) failure to carry out and comply with Unilateral Change Orders, where such failure is not substantially cured within 15 days after City delivers Notice thereof to Principal Project Company; and
- (j) for the reasons specified in Sections 9.8.6, 10.1.2.4(c) and 16.2.4.4.

**16.2.8.2** In addition to the protections from liability under Section 16.2.4.6, City shall have no liability to Principal Project Company, and Principal Project Company shall have no right to make any Claim against City, due to any suspension under Section 16.2.8.1

**16.2.8.3** City shall have the right and authority to order suspension of Work, in whole or in part, for reasons other than those in Section 16.2.8.1. If City purports to order suspension of Work under Section 16.2.8.1 but it is finally determined under the Contract Dispute Procedures that no grounds under Section 16.2.8.1 exist for such suspension, then it shall be deemed a suspension under this Section 16.2.8.3

**16.2.8.4** Principal Project Company shall promptly comply with any such suspension order, even if Principal Project Company disputes the grounds for suspension. Principal Project Company shall promptly recommence the Work upon receipt of Notice from City directing Principal Project Company to resume work. City will lift the suspension order promptly after Principal Project Company fully cures and corrects the applicable breach or failure to perform or any other reason for the suspension order ceases to apply.

**16.2.8.5** Without limiting Principal Project Company's rights with respect to a Compensable Delay Event under clause (g) of the definition thereof or a Compensable Relief Event under clause (p) of the definition thereof, in case of suspension of work for any cause, Principal Project Company shall be responsible for the Project and shall take such precautions as may be necessary to prevent loss or damage to the materials, equipment and Work, provide for normal drainage and shall erect any necessary temporary structures, signs, or other facilities at Principal Project Company's expense.

#### **16.2.9 Other Rights and Remedies**

City shall also be entitled to exercise any other rights and remedies available under this Agreement, or available at law.

#### **16.2.10 Cumulative, Non-Exclusive Remedies**

Subject to the exception specified in Section 16.1.1(j) regarding failures that constitute a Noncompliance Event or Failure Event not being considered defaults under Section 16.1.1(i), each right of City under this Agreement shall be cumulative and shall be in addition to every other right provided under this Agreement or at law, and the exercise or beginning of the exercise by City of any one or more of any of such rights or remedies shall not preclude the simultaneous or later exercise by City of any or all other such rights or remedies.

## **16.3 Default by City; Cure Periods**

### **16.3.1 City Default**

City shall be in breach under this Agreement upon the occurrence of any one or more of the following events or circumstances (each a “**City Default**”):

- (a) City fails to make any payment due to Principal Project Company under this Agreement when due, provided that such payment is not subject to a Contract Dispute;
- (b) City ceases to be legally authorized to make any undisputed payment to the Principal Project Company under this Agreement; provided, however, that a failure to appropriate or an injunction or other legal or administrative constraint on making such payment shall not be considered a City Default; or
- (c) any representation or warranty made by City to Principal Project Company in the Agreement is false in any material respect, materially misleading or inaccurate in any material respect when made or omits material information when made.

### **16.3.2 Cure Periods**

City shall have the following cure periods to cure City Defaults:

**16.3.2.1** Respecting a City Default under Section 16.3.1(a), a period of 45 days after Principal Project Company delivers to City Notice of such City Default; and

**16.3.2.2** Respecting a City Default under Section 16.3.1(c), a period of 90 days after Principal Project Company delivers to City Notice of such City Default; provided that:

- (a) if the City Default is of such a nature that the cure cannot with diligence be completed within such time period and City has commenced meaningful steps to cure promptly after receiving the default Notice, City shall have such additional period of time, up to a maximum cure period of 180 days, as is reasonably necessary to diligently effect cure; and
- (b) cure will be regarded as complete when the adverse effects of the breach are cured.

## **16.4 Principal Project Company Remedies for City Breach**

### **16.4.1 Termination**

Refer to Section 17.4 (Principal Project Company Rights to Terminate) for provisions regarding Principal Project Company’s right to terminate for City Default.

### **16.4.2 Interest on Late Payment**

If City fails to make payments of undisputed Availability Payments or the Milestone Payment that are due and owing to Principal Project Company under this Agreement, then Principal Project Company shall be entitled to interest at the Late Payment Rate commencing 90 days after the due date thereof in accordance with Section 11.7 (Interest on Late Payments and Overpayments).

#### **16.4.3 Limitations on Remedies**

**16.4.3.1** Principal Project Company shall have no right to seek, and irrevocably waives and relinquishes any right to, non-monetary relief against City, except for (a) any sustainable action for relief available in mandamus, (b) any sustainable action to stop, restrain or enjoin use, reproduction, duplication, modification, adaptation or disclosure of PPC Intellectual Property in violation of the licenses granted, or to specifically enforce City's duty of confidentiality, under Section 21.4 (Intellectual Property), (c) declaratory relief under the Contract Dispute Procedures declaring the rights and obligations of the Parties under the Contract Documents, or (d) declaratory relief under the Contract Dispute Procedures declaring specific terms that shall bind the Parties.

**16.4.3.2** If City wrongfully withholds an approval or consent required under this Agreement, or wrongfully issues an objection to or disapproval of a Submittal or other matter under this Agreement, Principal Project Company's sole remedies against City shall be compensation and extensions of time, each to the extent provided in Articles 13 (General Provisions Applying to Delay Events and Relief Events) and 14 (Compensation and Other Relief for Delay Events and Relief Events). Principal Project Company shall have no right to suspend Work.

#### **16.4.4 Remedies at Law and in Equity**

Subject to Section 16.4.3 (Limitations on Remedies) and except as specifically provided otherwise in this Agreement, upon breach of this Agreement by City, Principal Project Company may exercise any remedies available at law or in equity.

#### **16.4.5 Principal Project Company Right to Suspend**

Principal Project Company may suspend Work based on City's failure, after required Notice and the expiration of the applicable cure period, to pay undisputed amounts owing to Principal Project Company with a cumulative value of \$1,000,000 or more, subject to the following:

- (a) Principal Project Company shall provide City with Notice regarding its intent to suspend at least 30 days before implementing the suspension, and may implement the suspension only if the breach remains uncured as of the suspension date; and
- (b) a suspension by Principal Project Company under this Section 16.4.5 (Principal Project Company Right to Suspend) shall be deemed to be a suspension of Work order issued by City for its convenience under Section 16.2.8.2, and the suspension order shall be deemed lifted upon Principal Project Company's receipt of payment in full of all undisputed amounts owing.

## **16.5 No Duplicative Payment**

Notwithstanding any other provisions of this Agreement to the contrary, neither Party shall be entitled to recover compensation or make a claim under this Agreement with respect to any loss that it has incurred to the extent that it has already been compensated with respect to that loss under this Agreement or otherwise.

## **16.6 Limitation on Consequential Damages**

**16.6.1** Except as stated here, Principal Project Company shall have no liability to City for any type of special, consequential, or incidental damages arising out of or connected with Principal Project Company's performance of the Work. This limit of liability applies under all circumstances including the breach, completion, termination, suspension or cancellation of the services under this Agreement, and negligence or strict liability of Principal Project Company. This limit of liability, however, shall not apply to, limit or preclude:

- (a) Principal Project Company's obligation to pay liquidated damages as set forth in the Contract Documents, including any credits, deductions or offsets for failure to meet performance requirements or pursuant to the noncompliance/deduction regime;
- (b) damages caused by a PPC Fault (other a PPC Fault that is a breach by a PPC-Related Entity of any obligations under the Contract Documents);
- (c) Principal Project Company's obligations to indemnify, defend and hold City and other Indemnities harmless for Third Party Claims as set forth in the Contract Documents;
- (d) Principal Project Company's liability damages that fall within the insurance coverages required under this Agreement;
- (e) Principal Project Company's liability for statutory damages imposed by City as a Governmental Entity under applicable Law;
- (f) statutory fines, penalties, and statutory damages, including punitive damages, treble damages, and statutory attorney fees and costs, including those due as a result of violations of environmental regulations and laws;
- (g) amounts that Principal Project Company is obligated to reimburse City under the express provisions of this Agreement, including any Recoverable Costs and any express interest thereon;
- (h) damages and other liability arising under claims by Third Parties for loss or damage to property or personal injuries, including wrongful death; or
- (i) damages and other liability for infringement of any Intellectual Property right.

---

## ARTICLE 17. TERMINATION

### 17.1 Termination for Convenience; Condemnation

**17.1.1** City may terminate this Agreement in whole, but not in part, if City determines in its sole discretion that termination is in City's best interest (a "**Termination for Convenience**").

**17.1.2** City may exercise a Termination for Convenience by delivering to Principal Project Company a Notice of Termination for Convenience specifying the election to terminate and its effective date, which shall not be earlier than 30 days after the date of delivery of such Notice.

**17.1.3** In the event of a Termination for Convenience, City shall pay compensation to Principal Project Company (or to the Collateral Agent as provided in the Direct Agreement) in an amount (without double counting) equal to:

- (a) (i) all amounts shown in the Financial Model as payable by Principal Project Company to Equity Members from the Early Termination Date, either as Distributions on Committed Investments or as payments of interest or repayments of principal made by Principal Project Company in respect of Equity Members Funding Agreements, each amount discounted back at the Equity IRR from the date on which it is shown to be payable in the Financial Model to the date on which the Termination Compensation is paid, minus  
(ii) Deferred Equity Amounts, discounted back at the Equity IRR from the date on which it is shown to be payable in the Financial Model to the date on which the Termination Compensation is paid; plus
- (b) Lenders' Liabilities; plus
- (c) PPC Employee and Contractor Breakage Costs; minus
- (d) Account Balances; minus
- (e) Insurance Proceeds; minus
- (f) any Deductions to the extent not deducted in full from the Milestone Payment or Quarterly Availability Payments.

**17.1.4** If:

- (a) City confiscates, sequesters, condemns or appropriates the PPC's Interest or any material part thereof; or
- (b) as a direct result of a City ordinance Principal Project Company is unable to perform all or substantially all of its obligations under the Contract Documents for a period of 180 consecutive days or more,

then this Agreement shall be deemed terminated for convenience and City shall pay compensation to Principal Project Company in the amount described in Section 17.1.3.

---

## 17.2 Termination for Force Majeure Termination Events or Insurance Unavailability

### 17.2.1 Notice of Conditional Election to Terminate – Force Majeure Termination Events

Subject to Section 17.2.2, either Party may deliver to the other Party Notice of its conditional election to terminate this Agreement (“**Notice of Conditional Termination**”) if a Force Majeure Event (excluding a Force Majeure Event under clauses (i) or (j) of the definition of Force Majeure Event) (“**Force Majeure Termination Event**”) has occurred and:

- (a) (i) the Notice of Conditional Termination is delivered before the Substantial Completion Date; (ii) as a direct result of the Force Majeure Termination Event, Principal Project Company is unable to perform all or substantially all of its obligations under the Contract Documents for a period of 255 consecutive days or more; and (iii) such inability to perform its obligations is not attributable to a concurrent non-Force Majeure Termination Event; or
- (b) (i) the Notice of Conditional Termination is delivered on or after the Substantial Completion Date; (ii) as a direct result of the Force Majeure Termination Event, all or substantially all of the Project has become and remains inoperable for a period of 255 consecutive days or more; and (iii) such suspension of operations is not attributable to another concurrent non-Force Majeure Termination Event; and
- (c) Principal Project Company could not have mitigated or cured such result through the exercise of diligent efforts; and
- (d) such result is continuing at the time of delivery of the written Notice; and
- (e) the written Notice sets forth in reasonable detail a description of the Force Majeure Termination Event, a description of the direct result and its duration, and a statement that the notifying Party’s intends to terminate this Agreement.

### 17.2.2 No Right to Termination Election

Notwithstanding the foregoing, if, following the occurrence of any Force Majeure Termination Event that results in damage or partial destruction of the Project:

- (a) the conditions listed in Section 17.2.1 (Notice of Conditional Election to Terminate – Force Majeure Termination Events) are satisfied;
- (b) insurance proceeds are available to fund work required to remedy the effects of the Force Majeure Termination Event; and
- (c) the Parties agree to a restoration plan in respect of such work required to remedy the effect of the Force Majeure Termination Event,

then neither Party shall have the right to elect to terminate this Agreement pursuant to Section 17.2.1 (Notice of Conditional Election to Terminate – Force Majeure Termination Events).

### **17.2.3 Principal Project Company Options Upon City Notice**

**17.2.3.1** If City delivers a Notice of Conditional Termination, Principal Project Company shall have the option either to accept such Notice or to continue this Agreement in effect by delivering to City Notice of Principal Project Company's choice not later than 30 days after City delivers its Notice. If Principal Project Company does not deliver such Notice within such 30 day period, then Principal Project Company shall be deemed to have accepted City's election to terminate this Agreement.

**17.2.3.2** If Principal Project Company delivers timely Notice under Section 17.2.3.1 choosing to continue this Agreement in effect, then:

- (a) City shall have no obligation to compensate Principal Project Company for any Extra Work Costs, Financing Delay Costs, Delay Costs, costs of restoration, repair or replacement arising out of the Force Majeure Termination Event and incurred after the date on which City gives written Notice of conditional election to terminate under this Section 17.2 (Termination for Force Majeure Events or Insurance Unavailability), except as provided in Section 17.2.3.2(b);
- (b) if the Force Majeure Termination Event occurred before the Substantial Completion Date and resulted in a Relief Event Delay, Principal Project Company shall be entitled to an extension of the applicable deadlines in accordance with Section 14.1.2 (Extension of Deadlines for General Delay Events); and
- (c) this Agreement shall continue in full force and effect and City's election to terminate shall not take effect.

### **17.2.4 City Options Upon Principal Project Company Notice**

**17.2.4.1** If Principal Project Company delivers a Notice of Conditional Termination, including an estimate (with supporting documentation) of the compensation that would be paid or reimbursed to Principal Project Company under Section 17.2.4.2, City shall have the option either: (a) to accept such Notice; or (b) to continue this Agreement in effect if City in its reasonable discretion determines that the Project can be completed or re-opened, as applicable, on a commercially reasonable basis. City shall exercise such option by delivering to Principal Project Company written Notice of City's choice not later than 30 days after Principal Project Company delivers its Notice of Conditional Termination. If City does not deliver such written Notice within such 30-day period, then it shall be conclusively deemed to have accepted Principal Project Company's election to terminate this Agreement.

**17.2.4.2** If City delivers timely written Notice under Section 17.2.4.1 choosing to continue this Agreement in effect, then:

- (a) subject to Section 13.8 (Burden of Proof and Mitigation), City shall be obligated to pay or reimburse Principal Project Company an amount equal to (without double-counting):
  - (i) where the Force Majeure Termination Event occurs prior to Substantial Completion, Financing Delay Costs and the Extra Work Costs directly

- caused by the Force Majeure Termination Event which are incurred after the date Principal Project Company delivers its written Notice of conditional election to terminate; plus
- (ii) where the Force Majeure Termination Event occurs prior to Substantial Completion, Delay Costs which are incurred after the date Principal Project Company delivers its written Notice of conditional election to terminate; plus
  - (iii) such other amounts so as to result in Principal Project Company achieving the same Equity IRR (with reference to the Base Case Equity IRR) from and after the date Principal Project Company delivers its written Notice of conditional election to terminate as if such Force Majeure Termination Event had not occurred; and
- (b) From and after the date which is 255 days after the occurrence of the Force Majeure Termination Event, Principal Project Company shall not be subject to Deductions or Noncompliance Points with respect to such Force Majeure Termination Event; and
  - (c) this Agreement shall continue in full force and effect and Principal Project Company's election to terminate shall not take effect for the period specified in City's written Notice under this Section 17.2.4 (City Options Upon Principal Project Company Notice) or such longer period as may be mutually agreed to in writing by the Parties.

#### **17.2.5 No Waiver**

No election by Principal Project Company under Section 17.2.3 (Principal Project Company Options Upon City Notice) or by City under Section 17.2.4 (City Options Upon Principal Project Company Notice) to continue this Agreement in effect shall prejudice or waive such Party's right to thereafter, at any time, give a Notice of conditional election to terminate with respect to the same or any other Force Majeure Termination Event.

#### **17.2.6 Termination for Insurance Unavailability**

If it becomes apparent that insurance required under the Contract Documents is not available as a result of Insurance Unavailability, City may deliver to Principal Project Company Notice of its election to terminate this Agreement for Insurance Unavailability and the effective date of the termination, which shall not be earlier than 30 days after the date of delivery of such Notice. Such Notice shall include reasonable details regarding the affected coverages and associated risks, as well as the estimated cost of premiums if Commercially Reasonable Insurance Rates are not available. In the event of a termination for Insurance Unavailability, City shall pay compensation to Principal Project Company (or to the Collateral Agent as provided in the Direct Agreement) calculated in accordance with Section 17.2.8 (Termination Compensation for Force Majeure Termination Events and Insurance Unavailability).

### 17.2.7 Concurrent Notices

If City and Principal Project Company deliver concurrent Notices of Conditional Termination under this Section 17.2 (Termination for Force Majeure Termination Events or Insurance Unavailability), Principal Project Company's Notice shall prevail. Notices shall be deemed to be concurrent if each Party sends its Notice before actually receiving the Notice from the other Party. Knowledge of the other Party's Notice obtained before actual receipt of the Notice shall have no effect on determining whether concurrent Notice has occurred.

### 17.2.8 Termination Compensation for Force Majeure Termination Events and Insurance Unavailability

If either Party accepts, or is deemed to accept, the other Party's conditional election to terminate under Section 17.2.3 (Principal Project Company Options Upon City Notice) or Section 17.2.4 (City Options Upon Principal Project Company Notice), as applicable, then this Agreement shall be deemed terminated on an Early Termination Date that is 30 days after the date of acceptance or deemed acceptance of the conditional election to terminate; and Principal Project Company will be entitled to compensation calculated as follows (calculated at the Early Termination Date and without double-counting):

- (a) an amount equal to its Equity Investments less Distributions paid to the Equity Members, which shall never be a negative number; plus
- (b) Lenders' Liabilities; plus
- (c) PPC Employee and Contractor Breakage Costs; minus
- (d) Account Balances; minus
- (e) Insurance Proceeds; minus
- (f) any Deductions to the extent not deducted in full from Milestone Payments or Quarterly Availability Payments.

### 17.3 Termination for PPC Default

#### 17.3.1 PPC Defaults Triggering City Termination Rights

17.3.1.1 Subject to the rights of the Lenders pursuant to any Direct Agreement, in the event that:

- (a) any PPC Default occurs and has not been cured within the applicable cure period, if any, set out in Section 16.1.2 (Default Notice and Cure Periods) or (if relevant) in accordance with any cure plan accepted by City under Section 15.8 (Cure Plan for Persistent PPC Default); or
- (b) any PPC Default occurs for which there is no cure period under Section 16.1.2 (Default Notice and Cure Periods);

(each a "Default Termination Event")

---

City may terminate this Agreement with immediate effect upon written Notice to Principal Project Company.

**17.3.1.2** Termination of this Agreement for a Default Termination Event in accordance with this Section 17.3 (Termination for PPC Default) will take effect on the date stated in the Notice given by City to Principal Project Company under Section 17.3.1.1.

### **17.3.2 Compensation to Principal Project Company**

**17.3.2.1** Subject to Section 17.3.2.2, if City issues a Notice of termination of this Agreement due to a PPC Default:

- (a) if termination occurs before the Substantial Completion Date, Principal Project Company will be entitled to compensation in an amount equal to the lesser of:
  - (i) the D&C Work Value; and
  - (ii) the amount equal to:
    - (A) Lenders' Liabilities; minus
    - (B) Account Balances; minus
    - (C) Insurance Proceeds (excluding proceeds of personal injury, property damage or other Third Party liability insurance payable to or for the account of a Third Party); minus
    - (D) any D&C Period Deductions to the extent not deducted in full from Milestone Payments;
- (b) if termination occurs on or after the Substantial Completion Date, Principal Project Company will be entitled to compensation equal to the amount calculated at the Early Termination Date (without double-counting) as follows:
  - (i) eighty percent (80%) of Lenders' Liabilities; minus
  - (ii) Maintenance Rectification Costs; minus
  - (iii) Account Balances; minus
  - (iv) Deferred Equity Amounts; minus
  - (v) Insurance Proceeds; minus;
  - (vi) any Deductions to the extent not deducted in full from the Milestone Payment or Quarterly Availability Payments; plus
  - (vii) the balance standing to the credit of the Handback Requirements Reserve Account on the Early Termination Date.

**17.3.2.2** If the calculation described in Section 17.3.2.1 results in a negative number, the negative value shall represent damages recoverable by City in accordance with Section 16.2.6.2.

### **17.3.3 Finality**

If City issues Notice of termination of this Agreement due to a PPC Default, termination shall be effective and final regardless of whether City is correct in determining that it has the right to terminate for PPC Default. If it is determined that City lacked such right, then such termination shall be treated as a Termination for Convenience as provided in Section 17.1 (Termination for Convenience; Condemnation) for the purpose of determining the Termination Compensation due.

## **17.4 Principal Project Company Rights to Terminate**

### **17.4.1 Termination for City Default**

**17.4.1.1** If a City Default under Section 16.3.1 (City Default) remains uncured following (a) Notice and expiration of the applicable cure period under Section 16.3.2 (Cure Periods), and (b) Principal Project Company's compliance with the warning requirements set forth in Section 17.4.1.2, Principal Project Company shall have the right to terminate this Agreement, effective immediately upon delivery of written Notice of termination to City. In the event of such termination, City shall pay compensation to Principal Project Company equal to the amount described in Section 17.1.3.

**17.4.1.2** Principal Project Company shall provide a warning Notice to City at least 15 Business Days before terminating, which Notice may not be delivered until 30 Business Days after delivery of the Notice under Section 16.3.2.1 Principal Project Company shall provide a second warning Notice to City at least five Business Days before terminating, which Notice may not be delivered until 10 Business Days after delivery of the first warning Notice. If City fails to effect cure within five Business Days after the date of delivery of the second warning Notice, Principal Project Company shall have the right to terminate this Agreement in accordance with Section 17.4.1.1

### **17.4.2 Termination for Suspension of Work**

**17.4.2.1** If City issues a suspension order under Section 16.2.8.3 that suspends the Work for a period of 270 days or more, and provided that (a) such suspension is not the result of any PPC Fault; and (b) Principal Project Company has delivered a warning Notice to City at least 15 days before terminating, Principal Project Company shall have the right to terminate this Agreement, effective immediately upon delivery of written Notice of termination to City. In the event of such termination, Principal Project Company will be entitled to compensation equal to the amount described in Section 17.1.3.

**17.4.2.2** Principal Project Company may not terminate under this Section 17.4.2 (Termination for Suspension of Work) if, at the time Principal Project Company's right to terminate would arise, circumstances exist entitling either Party to terminate under Sections 17.2 (Termination for Force Majeure Termination Events or Insurance Unavailability), 17.3 (Termination for PPC Default), 17.4.3 (Termination Due to Court Ruling) or 17.5 (Termination if Financial Close Fails to Occur).

### **17.4.3 Termination Due to Court Ruling**

Termination Due to Court Ruling means, and becomes effective upon: (a) issuance of a final order by a court of competent jurisdiction after exhaustion of all appeals to the effect that this Agreement is void, voidable, and/or unenforceable or impossible to perform in its entirety for reasons beyond the reasonable control of Principal Project Company; or (b) issuance of a final order by a court of competent jurisdiction after exhaustion of all appeals upholding the binding effect on Principal Project Company and/or City of a Change in Law that causes impossibility of performance of a fundamental obligation by Principal Project Company or City under the Contract Documents or impossibility of exercising a fundamental right of Principal Project Company or City under the Contract Documents. The final court order shall be treated as the Notice of termination. In the event of such termination, Principal Project Company will be entitled to compensation in an amount equal to the amount described in Section 17.2.8 (Termination Compensation for Force Majeure Termination Events and Insurance Unavailability); provided that if the Termination Due to Court Ruling is caused solely and directly by a City Default or a City Fault, Principal Project Company will be entitled to compensation in the amount described in Section 17.1.3.

### **17.5 Termination if Financial Close Fails to Occur**

Sections 3.6 (No-Fault Termination) and 3.7 (Principal Project Company's Failure to Achieve Financial Close) set forth the terms applicable to termination before Financial Close.

### **17.6 Termination Procedures and Duties**

The provisions of this Section 17.6 (Termination Procedures and Duties) shall apply upon expiration of the Term or earlier termination of this Agreement. Principal Project Company shall timely comply with such provisions independently of, and without regard to, the timing for determining, adjusting, settling and paying any amounts due Principal Project Company or City on account of termination. If City determines that Principal Project Company has failed to comply with the provisions of this Section 17.6 (Termination Procedures and Duties), then upon Notice from City to Principal Project Company making reference to this Section 17.6 (Termination Procedures and Duties), Principal Project Company acknowledges and agrees it shall be deemed to have surrendered its access rights in accordance with the Contract Documents.

#### **17.6.1 Performance of Work Pending Early Termination Date**

In any case where Notice of termination precedes the effective Early Termination Date, Principal Project Company shall continue performing the Work in accordance with all the standards, requirements and terms of the Contract Documents.

#### **17.6.2 Transition Plan**

**17.6.2.1** Within 90 days before expiration of the Term, or, if applicable, within three days after Principal Project Company receives or delivers a Notice of termination, Principal Project Company shall meet and confer with City for the purpose of developing a transition plan for the orderly transition of Work, demobilization and transfer of Project management, maintenance, operation, care, custody and control to City. The Parties shall use diligent efforts to complete preparation of the transition plan within 30 days before expiration of the Term or, if applicable,

within 15 days after the date Principal Project Company receives or delivers the Notice of termination.

**17.6.2.2** The transition plan shall include a plan to promptly deliver to City or its designee possession of all the property, data and documents described in Sections 17.6.5.1 and 17.6.5.2.

**17.6.2.3** The transition plan shall include an estimate of costs and expenses to be incurred by both Parties in connection with implementation of the transition plan. Neither Party shall be liable for the other Party's transition costs and expenses, regardless of the reason for termination.

**17.6.2.4** The transition plan shall:

- (a) be in form and substance acceptable to City and shall include and be consistent with the other provisions and procedures in this Section 17.6 (Termination Procedures and Duties);
- (b) reserve the last calendar month for City's operation of the system with technical support and other necessary management support from Principal Project Company similar to the demonstration test performed by Principal Project Company before Substantial Completion; and
- (c) if required by City, provide for Principal Project Company to continue to perform specified Work during the period between the Termination Date and the effective date of the release and discharge, following payment of Termination Compensation.

### **17.6.3 Relinquishment and Possession of Project**

**17.6.3.1** On or as soon as possible after the Termination Date as provided in the approved transition plan, Principal Project Company shall relinquish and surrender care, custody and control of the Project, to City, and shall cause all persons and entities claiming under or through Principal Project Company to do likewise (except as may be set forth in any Direct Agreement), in at least the condition required by Section 8.5.1 (Handback Condition).

**17.6.3.2** On the later of the Termination Date or the date Principal Project Company relinquishes all care, custody and control as provided in the transition plan, City shall have the exclusive right to, and shall assume responsibility at its expense for, care, custody and control of the Project and the Project Site, subject to any rights to damages against Principal Project Company where the termination is due to a Termination for PPC Default.

**17.6.3.3** If the transition plan developed under Section 17.6.2 (Transition Plan) requires Principal Project Company to perform any obligations under this Agreement after the Termination Date, this Agreement will remain in full force and effect only to the extent necessary for Principal Project Company to perform such obligations. On the Termination Date, or such later date provided in the approved transition plan, City grants to Principal Project Company a right to access the Project Site for the limited purpose of carrying out Principal Project Company's obligations contemplated by this Section 17.6 (Termination Procedures and Duties), including execution of the transition plan contemplated in Section 17.6.2 (Transition Plan). This right of access is subject to rescission by City for Principal Project Company's failure to perform

any of its obligations under this Agreement after the Termination Date, and shall automatically expire upon Principal Project Company's fulfillment of such obligations.

#### **17.6.4 Continuance or Termination of Key Contracts Before Work Completion**

**17.6.4.1** If, as of the Termination Date, Principal Project Company has not completed the Work, in whole or in part, City may elect, by written Notice to Principal Project Company to continue in effect some or all of the Key Contracts or to require their termination. If City elects to continue any Key Contracts, then Principal Project Company shall execute and deliver (or shall cause the relevant Key Contractor(s) to execute and deliver) to City a written assignment, in form and substance acceptable to City, acting reasonably, of all Principal Project Company's (or Key Contractor's) right, title and interest in and to such Key Contracts, and City shall assume in writing Principal Project Company's (or such Key Contractor's) obligations thereunder that arise from and after the Termination Date.

**17.6.4.2** If City elects (or is deemed to elect) to require termination of any Key Contracts, then Principal Project Company shall:

- (a) take such steps as are necessary to terminate the relevant Key Contracts, including providing Notice to each Key Contractor that its Key Contract is being terminated and that each of them is to stop Work on the date and to the extent specified in the Notice of termination and stop and cancel orders for materials, services or facilities, unless otherwise approved by City;
- (b) promptly and orderly demobilize and secure in a safe manner the Project Site in a manner satisfactory to City, remove all debris and waste materials and complete any Hazardous Materials Management Work already in process, except as otherwise approved by City;
- (c) take such other actions as are necessary or appropriate to mitigate further costs;
- (d) subject to City's reasonable prior approval, settle all outstanding liabilities and all claims arising out of, relating to or resulting from such Key Contracts;
- (e) as a condition to City's obligation to make payments to Principal Project Company under this Article 17 (Termination) and under the requirements of the transition plan, cause each of the Key Contractors to execute and deliver to City a written assignment, in form and substance acceptable to City, of all of their interest in (i) all Regulatory Approvals, Third Party agreements and permits pertaining to the Project or the Work (excluding Subcontracts), provided that City assumes in writing all of the Key Contractor's obligations under said approvals, agreements and permits that arise after the Termination Date; and (ii) all warranties, to the extent assignable, claims and causes of action held by each of them against Subcontractors and other Third Parties pertaining to the Project or the Work, provided that Principal Project Company shall retain the right to pursue any cause of action against the Subcontractor or other Third Parties for damages incurred by Principal Project Company; and

- 
- (f) as a condition to City's obligation to make payments to Principal Project Company under this Article 17 (Termination) and under the requirements of the transition plan, carry out such other reasonable directions as City may give for termination of the Work in accordance with the transition plan.

#### **17.6.5 Other Close-Out Activities**

**17.6.5.1** Within 90 days before expiration of the Term, or within 30 days after any earlier Notice of termination is delivered, Principal Project Company shall deliver to City a true and complete list of all materials, goods, machinery, equipment, hardware, parts, supplies and other tangible property in inventory or storage (whether then held by Principal Project Company or any Person on behalf of or for the account of Principal Project Company) for use in or respecting the Work or the Project, or on order or previously completed but not yet delivered from Suppliers for use in or respecting the Work or the Project. In addition, on or as soon after the Termination Date as is possible or as is provided in the approved transition plan, Principal Project Company shall transfer title through bills of sale or other documents of title, as directed by City, and deliver to City's Authorized Representative, all such materials, goods, machinery, equipment, hardware, parts, supplies and other property, provided City assumes in writing all of Principal Project Company's obligations under any contracts relating to the foregoing that arise after the later of the Termination Date or the effective date of the transfer.

**17.6.5.2** Within 90 days before the expiration of the Term, or within 30 days after any earlier Notice of termination is delivered, Principal Project Company shall provide City with a true and complete list of all the data and documents identified in this Section 17.6.5.2. Subject to Sections 21.4 (Intellectual Property) and 21.5 (Intellectual Property Escrows), Principal Project Company shall execute and deliver to City an executed bill of sale or other written instrument, in form and substance reasonably acceptable to City, assigning and transferring to City the following:

- (a) all completed or partially completed drawings (including plans, elevations, sections, details and diagrams), specifications, designs, Design Documents, Record Documents, plans, surveys, and other documents and information pertaining to the design or construction of the Project or the Utility Adjustments;
- (b) all samples, borings, boring logs, geotechnical data and similar data and information relating to the Project or the Project Site;
- (c) all Books and Records, reports, test reports, studies and other documents of a similar nature relating to the Work, the Project or the Project Site; and
- (d) all Intellectual Property, and IP Materials, documents evidencing licenses of PPC Intellectual Property and Third Party IP to City, other work product and other materials relating to all such Intellectual Property and PPC Intellectual Property.

Such bill of sale or other instrument shall be delivered to City as provided in the approved transition plan (or if not specified in the transition plan, shall be delivered on the Termination Date or as soon thereafter as possible), and shall be accompanied by originals or copies, as appropriate, of all of the materials described therein.

**17.6.5.3** Principal Project Company shall take all action that may be necessary, or that City may direct, for the protection and preservation of the Project, the Work and such materials, goods, machinery, equipment, hardware, parts, supplies, data, documentation and other property.

**17.6.5.4** On or as soon as possible after the Termination Date or as provided in the approved transition plan, Principal Project Company shall execute and deliver to City a written assignment, in form and substance acceptable to City, all of Principal Project Company's interest in any IP Escrows or similar arrangements for the protection of Source Code and Source Code Documentation of others used for or relating to the Project or the Work.

**17.6.5.5** On or as soon as possible after the Termination Date or as provided in the approved transition plan, Principal Project Company shall execute and deliver to City a written assignment, in form and substance acceptable to City, of all Principal Project Company's interest in all warranties, claims and causes of action held by Principal Project Company against Third Parties in connection with the Project or the Work, including claims under casualty and business interruption insurance, except to the extent that City has already received credit for such matters in calculating Termination Compensation amounts, in which case they may be pursued by Principal Project Company for its own account.

**17.6.5.6** Principal Project Company shall otherwise assist City in such manner as City may require before and for a reasonable period following the Termination Date to ensure the orderly transition of management, maintenance, operation, care, custody and control of the Project, to City, and shall, if appropriate and if requested by City, take all steps as may be necessary to enforce the provisions of the Key Contracts pertaining to the surrender of Project management, maintenance, operation, care, custody and control.

**17.6.5.7** For a period of four years following the Termination Date, Principal Project Company shall maintain a secure archive copy of all electronic data transferred to City.

## **17.6.6 Calculation of Compensation**

**17.6.6.1** Within 30 days after the Early Termination Date for termination pursuant to Section 17.3 (Termination for PPC Default), and within 15 days after the Early Termination Date for termination pursuant to Section 17.1 (Termination for Convenience; Condemnation), Section 17.2 (Termination for Force Majeure Termination Events or Insurance Unavailability) or Section 17.4 (Principal Project Company Rights to Terminate), Principal Project Company shall:

- (a) provide City with a written statement prepared by the Collateral Agent as to (i) the Lenders' Liabilities and (ii) the Account Balances, to the extent such accounts are controlled by the Collateral Agent, with documentation reasonably required by City to support such statement and the Collateral Agent's certification that such amounts are true and correct;
- (b) provide a written statement as to the following amounts, (without duplication of any Account Balances verified by the Collateral Agent under Section 17.6.6.1(a)(ii)), together with documentation reasonably required by City to support such statement and a certification that such amounts are true and correct:

- 
- (i) for termination pursuant to Section 17.1 (Termination for Convenience; Condemnation) or Section 17.4 (Principal Project Company Rights to Terminate), amounts described in clauses (i) and (ii) of Section 17.1.3(a) and Sections 17.1.3(c) through 17.1.3(f);
  - (ii) for termination pursuant to Section 17.2 (Termination for Force Majeure Termination Events or Insurance Unavailability), amounts described in Sections 17.2.8(a) and 17.2.8(c) through 17.2.8(f); or
  - (iii) for termination pursuant to Section 17.3 (Termination for PPC Default), (A) the amounts described in clauses (ii) through (vii) of Section 17.3.2.1(b), and (B) the Insurance Proceeds (excluding proceeds of personal injury, property damage or other Third Party liability insurance payable to or for the account of a Third Party; and
- (c) for termination pursuant to Section 17.1 (Termination for Convenience Condemnation), Section 17.2 (Termination for Force Majeure Termination Events or Insurance Unavailability), or Section 17.4 (Principal Project Company Rights to Terminate), an estimate of any interest and fees that will accrue (on a daily basis) on the outstanding principal due to Lenders at the rate due (excluding default interest), under the Financing Documents over the period between the Early Termination Date and the anticipated date that the Termination Compensation will be paid by City.

**17.6.6.2** From and after the Termination Date, except as otherwise stated in this Article 17 (Termination), Principal Project Company shall cease to have any right to (a) Availability Payments except for those accrued and owing before the Early Termination Date and (b) any other compensation, except as provided under Section 17.8.2.

## **17.7 Payment of Termination Compensation**

**17.7.1** For termination under Section 17.1 (Termination for Convenience; Condemnation) or Section 17.4 (Principal Project Company Rights to Terminate), provided Principal Project Company has timely provided to City the statements and information required under Section 17.6.6.1, City shall, within 120 days of the Early Termination Date, pay to Principal Project Company an amount equal to the:

- (a) Termination Compensation; plus
- (b) interest and fees that accrued on the outstanding principal due to Lenders (excluding default interest) under the Financing Documents over the period between the Early Termination Date and such payment date.

**17.7.2** For termination under Section 17.2 (Termination for Force Majeure Termination Events or Insurance Unavailability), provided Principal Project Company has timely provided to City the statements and information required under Section 17.6.6.1, City shall, within 120 days of the Early Termination Date, pay to Principal Project Company an amount equal to the:

- (a) Termination Compensation; plus

- (b) interest and fees that accrued on the outstanding principal due to Lenders (excluding default interest) under the Financing Documents over the period between the Early Termination Date and such payment date.

**17.7.3** For termination pursuant to Section 17.3 (Termination for PPC Default), provided Principal Project Company has timely provided to City the statements and information required under Section 17.6.6.1, City shall, within 120 days of the Early Termination Date, pay to Principal Project Company an amount equal to the Termination Compensation.

**17.7.4** If as of the date that City is required to tender payment of Termination Compensation under Sections 17.7.1, 17.7.2 or 17.7.3, as applicable, the Parties have not agreed upon the amount of Termination Compensation due, then:

- (a) City shall proceed to make payment to Principal Project Company of the undisputed portion of the Termination Compensation;
- (b) Within 30 days after receiving such payment Principal Project Company shall deliver to City written Notice of the additional amount of Termination Compensation that Principal Project Company in good faith determines is still owing (the “**disputed portion**”); and
- (c) City shall pay the disputed portion of the Termination Compensation to Principal Project Company in immediately available funds after the disputed portion is agreed to by the Parties or otherwise determined to be payable pursuant to **Error! Reference source not found.** (Contract Dispute Procedures), as the case may be.

## **17.8 Effect of Termination**

**17.8.1** Except to the extent set out in Section 17.6.3.3, and regardless of City’s prior Actual Knowledge or constructive knowledge thereof:

- (a) no Contract or agreement to which Principal Project Company is a party as of the Termination Date shall bind City, unless City elects to assume such Contract or agreement; and
- (b) except in the case of City’s express written assumption, no such Contract or agreement shall entitle the contracting party to continue performance of work or services respecting the Project following Principal Project Company’s relinquishment to City of Project care, custody and control, or to any claim, legal or equitable, against City.

**17.8.2** Termination of this Agreement shall not:

- (a) relieve Principal Project Company or any Surety of its obligation for any claims arising before the Termination Date;
- (b) excuse either Party from any liability arising out of, related to or resulting from any default as provided in this Agreement that occurred before the Termination Date; and

- (c) relieve City of claims of Principal Project Company to payment of Compensation Amounts for adverse cost and revenue impacts accruing before the Termination Date due to Compensable Delay Events or Compensable Relief Events that occurred before the Termination Date.

### **17.9 Liability after Termination; Final Release**

Notwithstanding the foregoing, any termination of this Agreement under Sections 17.2 (Termination for Force Majeure Termination Events or Insurance Unavailability), 17.3 (Termination for PPC Default), 17.4.3 (Termination Due to Court Ruling) or 17.5 (Termination if Financial Close Fails to Occur) shall automatically extinguish any claim of Principal Project Company to payment of Compensation Amounts for adverse cost and revenue impacts accruing after the Early Termination Date due to Relief Events that occurred before termination. Except as otherwise expressly provided in this Agreement (other than Section 16.2.10 (Cumulative, Non-Exclusive Remedies)), if this Agreement is earlier terminated for any reason, then City's payment to Principal Project Company of the amounts required under this Agreement (if any) shall constitute full and final satisfaction of, and upon payment City shall be forever released and discharged from, any and all claims, causes of action, suits, demands and Losses, known or unknown, suspected or unsuspected, that Principal Project Company may have against City arising out of, relating to or resulting from this Agreement or termination thereof, the other Contract Documents, or the Project, excluding any proceedings that are pending as of 30 days after the Termination Date, remain unresolved at the time of such payment, and are not related to termination or Termination Compensation. Upon such payment, Principal Project Company shall execute and deliver to City all such releases and discharges, including a release pursuant to Civil Code Section 1542, as City may reasonably require to confirm the foregoing, but no such written release and discharge shall be necessary to give effect to the foregoing satisfaction and release.

### **17.10 Exclusive Termination Rights**

This Article 17 (Termination) contain the entire and exclusive provisions and rights of City and Principal Project Company regarding termination of this Agreement, and each Party waives, to the maximum extent permitted by Law, any and all other rights to terminate at law.

### **17.11 Access to Information**

Principal Project Company shall conduct all discussions and negotiations to determine any Termination Compensation, and shall share with City all data, documents and information pertaining to the termination, on an Open Book Basis.

## **ARTICLE 18. PARTNERING; CONTRACT DISPUTE PROCEDURES**

### **18.1 Introduction**

**18.1.1** The Parties acknowledge fostering a collaborative working relationship during the entire Term is critical to early identification and resolution of issues, claims, and Contract Disputes. This Article 18 provides a structured approach for the Parties to address issues, claims, and Contract Disputes within the framework of informal project-level partnering and formal Contract Dispute procedures.

**18.1.2** The procedures in this Article 18 (Partnering; Contract Dispute Procedures) are necessary for the City to address potential and actual Contract Disputes. Prior knowledge of potential Contract Disputes before Principal Project Company starts disputed Work, and proper documentation from Principal Project Company during that Work, are critical for the City to make informed decisions affecting the Project's budget and schedule.

### **18.2 Partnering**

#### **18.2.1 Collaborative Partnering**

The Parties will engage in a partnering process to foster effective communication, enhance cooperation, and proactively address issues and claims to prevent them from escalating into Contract Disputes. The requirements for the partnering process are set forth in Part 3 of Section 01 31 33 (Partnering Procedures) of Division 10 of the Technical Requirements.

#### **18.2.2 Confidentiality**

In accordance with California Evidence Code sections 1119 and 1152, and Federal Rule of Evidence 408, and similar prohibitions, statements made during the partnering process, including the workshops and informal negotiations within the framework of the Issue Resolution Ladder, are confidential and not admissible or discoverable in any proceeding to resolve a Contract Dispute.

### **18.3 Contract Dispute Procedures**

#### **18.3.1 Disputes Generally**

##### **18.3.1.1 Outline of Dispute Process**

The following is an outline of the sequential process for submitting and resolving Contract Disputes, with each step serving as a condition precedent for Principal Project Company to proceed to subsequent steps, beginning with the Notice of Potential Dispute. These steps must be completed prior to submission by Principal Project Company of any Contract Dispute to litigation in San Francisco Superior Court.

- (a) Principal Project Company must submit a timely Notice of Contract Dispute in compliance with Section 18.3.2 before Principal Project Company can file a Contract Dispute.

- (b) Principal Project Company must submit a timely Contract Dispute in compliance with Section 18.3.3 before Principal Project Company can participate in the Issue Resolution Ladder.
- (c) Principal Project Company must timely comply with the Issue Resolution Ladder provisions in compliance with Section 18.3.3.5 before Principal Project Company can participate in mediation.
- (d) Principal Project Company must timely comply with the mediation provisions in Section 18.3.3.6 in order to exhaust its administrative remedies under this Agreement.
- (e) Principal Project Company must complete all steps outlined in this Section 18.3.1.1 above prior to commencing litigation against the City for disputes arising out of or related to this Agreement that are not expressly excluded from the Contract Dispute process by Section 18.3.1.3. The Principal Project Company must also submit a timely Government Code Claim in order to commence litigation against the City for disputes arising out of or related to this Agreement pursuant to Section 18.3.3.7.

**18.3.1.2** Disputed issues not timely raised and properly documented by Principal Project Company in conformance with this Section 18.3 will be deemed waived by Principal Project Company and may not be asserted in any subsequent litigation, or legal action. Furthermore, by executing this Agreement, Principal Project Company waives any and all claims or defenses of waiver, estoppel, or any other type of excuse of non-compliance with the Contract Dispute submission requirements.

**18.3.1.3** The Contract Dispute procedures specified in this Section 18.3 (Contract Dispute Procedures) do not apply to the following:

- (a) claims respecting penalties for forfeitures prescribed by statute or regulation that a government agency is specifically authorized to administer, settle, or determine;
- (b) claims respecting personal injury, death, reimbursement, or other compensation arising out of or resulting from personal injury of death;
- (c) claims by the City;
- (d) stop notices.
- (e) any matters that this Contract expressly states are final, binding, or not subject to Dispute resolution (including any Person's exercise of sole discretion);
- (f) disputes regarding compliance with applicable Law, the rights of City to terminate this Contract, or indemnification;
- (g) any claim for injunctive relief;
- (h) claims arising solely in tort;

- (i) any claim against an insurance company, including any Contractor Dispute that is covered by insurance;
- (j) Disputes regarding matters under the jurisdiction of OSHA;
- (k) issues regarding DBE participation;
- (l) any claim for, or Dispute based on, remedies expressly created by statute;
- (m) any Dispute that is actionable only against a Surety;
- (n) any claim arising out of or relating to the Work where a third party is a necessary or appropriate party (excluding any PPC-Related Entity); and
- (o) any claim or dispute that does not arise under the Contract.

### **18.3.2 Notice of Contract Dispute**

#### **18.3.2.1 Timely Submission**

Principal Project Company must submit a Notice of Contract Dispute to the City within seven-Days of the event, activity, occurrence, or other cause that gives rise to the Contract Dispute. If the Contract Dispute pertains to a Change or the rejection of a Relief Event by the City, the seven-Day period starts when the City's Authorized Representative issues a final written decision denying, in whole or in part, the corresponding PPC Change Request or Relevant Event claim.

#### **18.3.2.2 Content Requirements**

Notices of Contract Dispute must include:

- (a) description of the Contract Dispute's nature and circumstances;
- (b) reasons Principal Project Company believes additional compensation or time may be due, including Contract Document references and citations supporting its position;
- (c) good faith estimates of the potential cost and/or time impacts; and
- (d) for Contract Disputes related to a disputed Relevant Event, identification of items in the Implementation Proposal that form the basis for Principal Project Company's performance the affected Work.

### **18.3.3 Contract Dispute**

#### **18.3.3.1 Timely Submission**

- (a) Principal Project Company must submit a Contract Dispute to the City no later than 30 Days after the City's receipt of the corresponding Notice of Contract Dispute.

### 18.3.3.2 Content Requirements of all Contract Disputes

Contract Disputes must include:

- (a) cover letter;
- (b) certification, signed by Principal Project Company's Authorized Representative, stating, under penalty of perjury, that:
  - (i) the Contract Dispute is made in good faith;
  - (ii) supporting data are accurate and complete, to the best of their knowledge and belief; and
  - (iii) the amount requested accurately reflects adjustment in compensation or time for which Principal Project Company believes the City is liable;
- (c) narrative summary of Contract Dispute's merits and amount, and the specific provisions of Contract Documents under which the Contract Dispute is made;
- (d) list and copy of documents relating to Contract Dispute:
  - (i) Contract Documents;
  - (ii) correspondence; and
  - (iii) Agreement Exhibits;
- (e) detailed chronology of events and correspondence;
- (f) analysis of Contract Dispute merit; and
- (g) analysis of Contract Dispute cost (money and time).

### 18.3.3.3 Additional Requirements for Contract Disputes Relating to Delay Events Impacting the Critical Path

- (a) In addition to the contents required under Section 18.3.3.3 (Content Requirements of all Contract Disputes), Contract Disputes related to Delay Events prior to Substantial Completion and seeking time extensions or challenging the assessment of delay or liquidated damages shall include a written analysis of all changes and all delays impacting the Critical Path, including a TIA.
- (b) The TIA shall be updated to include the most recent information about the Project Schedule and the TIA shall include all activities represented or affected by the change, with activity numbers, durations, predecessor and successor activities, resources and cost, and with a narrative report, in form satisfactory to City, which compares the proposed new schedule to the Project Schedule, as appropriate. Principal Project Company shall reschedule

activities not otherwise affected by the event, in order to take advantage of additional Float available as the result of the time extension. Any such rescheduling shall be reflected in the Project Schedule.

- (c) The TIA shall account for all Delay Events in the relevant time frame with actual logic ties.

#### **18.3.3.4 Procedure for City Review and Determination**

- (a) The City will review only a timely, certified, and properly documented Contract Dispute.
- (b) The City will respond to a Contract Dispute in writing, within 45 days of receipt of such Contract Dispute. In its response, City will either grant or deny the Contract Dispute in whole or in part. If City does not respond to a Contract Dispute within the 45-day period, the Contract Dispute is deemed denied in its entirety.

#### **18.3.3.5 Issue Resolution Ladder**

After the City issues its written decision under Section 18.3.3.4 or the Contract Dispute is deemed denied in its entirety, the Parties shall utilize the Issue Resolution Ladder to negotiate and attempt to resolve the Contract Dispute in a timely and efficient manner before proceeding to mediation in accordance with Section 18.3.3.6. The requirements for the Issue Resolution Ladder are set forth in Part 3 of Section 01 31 33 (Partnering Procedures) of Division 10 of the Technical Requirements.

#### **18.3.3.6 Non-binding Mediation**

If the Parties are unable to resolve a Contract Dispute during the Issue Resolution Ladder process, either Party may submit the dispute to mediation, by written notice to the other, that a mutually acceptable third-party mediator shall be selected for the purpose of facilitating a negotiated resolution of the Contract Dispute. The Contract Dispute shall be submitted to mediation within 10 Days of the conclusion of the Issue Resolution Ladder process. The Parties will share the costs of the mediation equally. If the mediation is unsuccessful, the Principal Project Company shall submit a Government Claims Act claim pursuant to Section 18.3.3.7, Government Code Claim Requirement.

#### **18.3.3.7 Government Code Claim**

The timely submittal of a complete and proper PPC Change Request or Relevant Event claim and compliance with the procedures specified in this Article 18 (Partnering; Contract Dispute Procedures) shall operate to toll Principal Project Company's compliance with the Government Code dispute requirements under California Government Code section 900, et seq., and Administrative Code Chapter 10 until the Parties complete mediation. The Principal Project Company must comply with California Government Code section 900, et seq. and Administrative Code Chapter 10 prior to submitting a Contract Dispute to litigation in San Francisco Superior Court.

---

## ARTICLE 19. REPRESENTATIONS AND WARRANTIES

### 19.1 Principal Project Company Representations and Warranties

Principal Project Company represents and warrants to City, as of the Effective Date, as follows:

**19.1.1** The Financial Model (a) was prepared by or on behalf of Principal Project Company in good faith, (b) uses financial formulas that, as of the Effective Date are mathematically and formulaically correct and suitable for making reasonable projections, (c) was audited and verified by an independent recognized model auditor immediately before the Effective Date, (d) fully discloses all cost, revenue and other financial assumptions and projections that Principal Project Company has used or is using in making its decision to enter into this Agreement and in making disclosures to potential equity investors and Lenders under the Initial Financing Agreements and (e) as of the Effective Date represents the projections that Principal Project Company believes in good faith are the most realistic and reasonable for the Project; subject to the understanding that such projections are based upon a number of estimates and assumptions and are subject to significant business, economic and competitive uncertainties and contingencies, and that Principal Project Company's stated belief regarding the projections does not constitute a representation that any of the assumptions are correct, that such projections will be achieved or that the forward-looking statements expressed in such projections will correspond to actual results.

**19.1.2** Principal Project Company has evaluated the feasibility of performing the Work by the Contract Deadlines and for the Milestone Payment and Availability Payments, and has reasonable grounds for believing and does believe, subject to the express terms of this Agreement, that such performance is feasible and practicable.

**19.1.3** Principal Project Company has reviewed all applicable Laws relating to Taxes, and has taken into account all requirements imposed by such Laws in preparing the Financial Model.

**19.1.4** Based upon the work undertaken by PPC-Related Entities pursuant to the Predevelopment Agreement, review of information provided by City, and other Reasonable Investigations undertaken by PPC-Related Entities, Principal Project Company has evaluated the constraints affecting the development, design, and construction of the Project, including the Project Site, surface and subsurface conditions discoverable through such investigation, the terms of the CEQA Approval, the terms of the NEPA Approval and requirements of applicable Laws, and, based on the foregoing, Principal Project Company has reasonable grounds for believing and does believe that the Project can be developed, designed, and constructed.

**19.1.5** Principal Project Company conducted a Reasonable Investigation of property to which it had access and other available information regarding conditions at the Project Site, and as a result of such investigation, Principal Project Company is familiar with and accepts the physical requirements of the Work, subject to Principal Project Company's rights regarding Relief Events. Principal Project Company shall undertake and complete the Work and the Project at its sole cost and without any additional compensation, any extension of time, excuse from compliance or other relief on account of such compliance, regardless of whether such compliance would require additional time for performance or additional design, construction operations, maintenance, financing, labor, equipment, supplies and/or materials not expressly

provided for in the Contract Documents or would have an adverse effect on costs, subject only to Principal Project Company's rights regarding Delay Events and Relief Events.

**19.1.6** Principal Project Company familiarized itself with the requirements of all applicable Laws and the conditions of any required Regulatory Approvals.

**19.1.7** Principal Project Company has no reason to believe that any Regulatory Approval required to be obtained by Principal Project Company will not be granted in due course and thereafter remain in effect so as to enable the Work to proceed in accordance with the Contract Documents.

**19.1.8** All Work furnished by Principal Project Company will be performed by or under the supervision of Persons who hold all necessary licenses, certifications, registrations, permits or approvals to practice in the State, by personnel who are experienced, competent and skilled in their respective trades or professions, who are professionally qualified to perform the Work in accordance with the Contract Documents and who shall assume professional responsibility for the accuracy and completeness of the Design Documents, Construction Documents and other documents prepared or checked by them.

**19.1.9** Principal Project Company is a [\_\_\_\_\_], duly organized and validly existing under the laws of the [\_\_\_\_\_], has the requisite power and all required licenses to carry on its present and proposed activities, and has full power, right and authority to execute, and deliver this Agreement and to perform each and all of the obligations of Principal Project Company provided for under this Agreement. Principal Project Company is duly qualified to do business and is in good standing in the State as of the Effective Date, and will remain duly qualified and in good standing throughout the Term and for as long as any obligations remain outstanding under the Contract Documents.

**19.1.10** The execution, delivery and performance of this Agreement has been duly authorized by all necessary action of Principal Project Company's governing body, each person executing this Agreement has been duly authorized to execute and deliver each such document on behalf of Principal Project Company and this Agreement has been duly executed and delivered by Principal Project Company.

**19.1.11** No default under, violation of, or conflict with the governing instruments of Principal Project Company or any agreement, judgment or decree to which Principal Project Company is a party or is bound will result from (a) the execution and delivery by Principal Project Company of this Agreement, or (b) performance by Principal Project Company of its obligations under this Agreement.

**19.1.12** The execution and delivery by Principal Project Company of this Agreement, and the performance by Principal Project Company of its obligations under this Agreement will not conflict with any Laws applicable to Principal Project Company that are valid and in effect on the date of execution and delivery. As of the Effective Date, Principal Project Company is not in breach of any applicable Law that would have a material adverse effect on the Work or the performance of any of its obligations under the Contract Documents.

**19.1.13** This Agreement constitutes the legal, valid and binding obligation of Principal Project Company, enforceable against Principal Project Company in accordance with its terms, subject

only to applicable bankruptcy, insolvency and similar laws affecting the enforceability of the rights of creditors generally and the general principles of equity.

**19.1.14** No proceeds of or commitments to provide the Committed Investment, as applicable, is or shall be from a Prohibited Person.

**19.1.15** There is no action, suit, proceeding, investigation or litigation pending and served on Principal Project Company which challenges Principal Project Company's authority to execute, deliver or perform, or the validity or enforceability of, this Agreement or which challenges the authority of the representative of Principal Project Company executing this Agreement; and Principal Project Company has disclosed to City any pending and un-served or threatened action, suit, proceeding, investigation or litigation with respect to such matters of which Principal Project Company is aware. No current, pending or outstanding criminal, civil, or enforcement actions have been initiated against Principal Project Company by City or the State, and Principal Project Company agrees that it will immediately provide Notice to City if any such action is initiated during the Term.

**19.1.16** Principal Project Company has disclosed to City in writing all organizational conflicts of interest of Principal Project Company and its Contractors of which Principal Project Company was actually aware, which have not been approved in writing by City.

**19.1.17** As of the effective date of the relevant Key Contract, (a) each Key Contractor is duly organized, validly existing and in good standing under the laws of the state of its organization and is duly qualified to do business, and is in good standing, in the State, (b) the ownership interests (including options, warrants and other rights to acquire ownership interests) of each Key Contractor that is a single purpose entity formed for the Project are held by those Persons identified in a written certification delivered by Principal Project Company to City before such effective date; (c) each Key Contractor has the power and authority to do all acts and things and execute and deliver all other documents as are required to be done, observed or performed by it in connection with its engagement by Principal Project Company; (d) each Key Contractor has (i) obtained and will maintain all required registrations, licenses, certifications, permits and approvals required under applicable Law as of such date and (ii) expertise, qualifications, experience, competence, and skills and is qualified to perform the Work for which it is responsible; (e) each Key Contractor will be required by the applicable Key Contract to comply with all health, safety and Environmental Laws in the performance of any work activities for, or on behalf of, Principal Project Company for the benefit of City; and (f) no Key Contractor is in breach of any applicable Law that would have a material adverse effect on any aspect of the Work.

**19.1.18** Principal Project Company has not employed or retained, and Principal Project Company shall not employ or retain, any Person other than employees, agents, attorneys, consultants and advisors of a PPC-Related Entity, to solicit or secure this Agreement, and that it has not paid or agreed to pay any Person any fee or any other consideration contingent on the making of this Agreement.

**19.1.19** Principal Project Company warrants that it owns, or will own, and has, or will have, good and marketable title and sufficient rights to all materials, Intellectual Property, equipment, tools and supplies furnished, or to be furnished, by any PPC-Related Entity that become part of the Project or are purchased for City for the development, operation, maintenance or repair of

the Project, free and clear of all liens, royalties, fees or other charges of any kind or nature. All such materials, Intellectual Property, equipment, devices, or processes shall be delivered free of any claim of any Third Party for infringement of any Intellectual Property rights or ownership. Refer to Section 2.4.3 (Passage of Title) for provisions regarding transfer of title to City.

**19.1.20** Principal Project Company warrants that the individual signing this Agreement on behalf of Principal Project Company is the properly authorized representative, agent, member or officer of Principal Project Company, that he/she has not, nor has any other member, employee, representative, agent or officer of Principal Project Company, directly or indirectly, to the best of the undersigned's knowledge, entered into or offered to enter into any combination, collusion or agreement to receive or pay, and that he/she has not received or paid, any sum of money or other consideration for the execution of this Agreement other than that which appears upon the face of this Agreement.

**19.1.21** [ ] is a [ ], duly organized and validly existing under the laws of [ ], has the requisite power and all required licenses to carry on its present and proposed activities, and has full power, right and authority to perform each and all of the obligations of an Equity Member provided for under this Agreement. **[Note to PNC: Include for each Equity Member of PPC.]**

## **19.2 City Representations and Warranties**

City represents and warrants to Principal Project Company as follows:

**19.2.1** The City and County of San Francisco is a charter city and municipal corporation duly organized and validly existing under the Constitution of the State of California. As of the Effective Date, City has full power, right and authority to execute, deliver this Agreement and City has full power, right and authority to perform its obligations under this Agreement.

**19.2.2** Each person executing this Agreement on behalf of City is duly authorized to execute and deliver this Agreement, and this Agreement has been duly executed and delivered by City.

**19.2.3** This Agreement has each been duly authorized by City, and constitutes a legal, valid and binding obligation of City enforceable against City in accordance with its terms.

**19.2.4** As of the Effective Date, there is no action, suit, proceeding, investigation or litigation pending and served on City which challenges City's authority to execute, deliver and perform this Agreement, or which challenges the validity or enforceability of, this Agreement or which challenges the authority of City officials executing this Agreement; and City has disclosed any pending action, suit, proceeding, investigation or litigation against City (including filed but unserved complaints of which City has Actual Knowledge) relating to this Agreement or the Project.

**19.2.5** Neither the execution and delivery by City of this Agreement, nor the consummation of the transactions contemplated under this Agreement, is in conflict with or has resulted or will result in a default under or a violation of any agreement, judgment or decree to which City is a party or is bound.

**19.2.6** The execution and delivery by City of this Agreement, and the performance by City of its obligations under this Agreement, will not conflict with any Laws applicable to City that are

valid and in effect on the date of execution and delivery. City is not in breach of any applicable Law that would have a material adverse effect on the performance of any of its obligations under the Contract Documents.

**19.2.7** City's execution and delivery of this Agreement is not subject to any requirement to obtain consent or approval of any other Person (including Governmental Entities), other than consents and approvals already obtained.

### **19.3 Special Remedies for Mutual Breach of Warranty**

Notwithstanding any other provision of this Agreement, if any circumstance or event occurs that constitutes or results in a concurrent breach by both Principal Project Company and City of similar warranties referenced in Section 16.1.1(f) or 16.3.1(c) but does not also constitute or result in any other breach or default by either Party, then the only remedies shall be for the Parties to take action to rectify or mitigate the effects of such circumstance or event, to pursue severance and reformation of the Contract Documents in accordance with Section 23.11 (Severability), or Termination Due to Court Ruling in accordance with Section 17.4.3 (Termination Due to Court Ruling).

---

## ARTICLE 20. ASSIGNMENT AND TRANSFER

### 20.1 Restrictions on Equity Transfers and Change of Control

20.1.1 Except as provided in Section 20.1.3, any:

- (a) Change of Control of Principal Project Company; or
- (b) Equity Transfer that results in any Equity Member ceasing to own (directly or indirectly) the same percentage of the issued share capital, partnership or membership interests, as applicable, in Principal Project Company that it owned (directly or indirectly) as of the Financial Close Date,

shall be subject to City's prior written approval in accordance with Section 20.2 (Standards and Procedures for City Approval).

20.1.2 Neither an Equity Transfer to a Prohibited Person, nor a Change of Control that would involve the provision of any amount of Committed Investment directly or indirectly from a Prohibited Person, is permitted at any time. Further, none of the events described in clauses (b) through (g) of the definition of Change of Control are permitted at any time if it would result in the direct or indirect ownership by a Prohibited Person of any interest in Principal Project Company.

20.1.3 Transfers and transactions within any of the exceptions described in clauses (a) through (g) of the definition of Change of Control are allowed at any time without necessity for City's approval, provided that:

- (a) for an exception described in clause (a) (with respect to any initial public offering), or clause (b), (c) or (d), Principal Project Company shall deliver to City, on or before 10 Business Days before the effectiveness of the transfer or transaction, written Notice describing the transfer or transaction and (if applicable) the names of the transferor and transferee, together with documentation demonstrating that the transfer or transaction is within such an exception; and
- (b) for an exception described in clause (a) (other than with respect to an initial public offering), Principal Project Company shall deliver to City, within five days after the effectiveness of the transfer or transaction, written Notice describing the transfer or transaction and (if applicable) the names of the transferor and transferee, together with documentation demonstrating that the transfer or transaction is within such an exception.

### 20.2 Standards and Procedures for City Approval

20.2.1 Where City's prior written approval is required for a proposed sale, assignment, conveyance, transfer, pledge, mortgage, encumbrance, grant of right of entry, or grant of other special use, management or control, or for any proposed Equity Transfer or Change of Control (each, a "**Transaction**"), and such Transaction is proposed at any time during the period ending two years after the Substantial Completion Date, City may withhold or condition its approval in

its sole discretion. Any such decision of City to withhold consent shall be final, binding and not subject to the Contract Dispute Procedures.

**20.2.2** After the second anniversary of the Substantial Completion Date, City shall not unreasonably withhold its approval of a Transaction.

**20.2.3** Among other factors and considerations, it shall be reasonable for City to withhold its approval if:

- (a) Principal Project Company fails to demonstrate to City's reasonable satisfaction that: (i) the proposed Transaction that would amount to a Change of Control of Principal Project Company will not have any adverse effect on Principal Project Company's ability to timely perform its obligations under the Contract Documents and the Principal Project Documents, taking into account the financial resources, qualifications and experience of the proposed assignee, grantee or transferee; and (ii) the proposed assignee, grantee or transferee is in compliance with City's rules, regulations, and adopted written policies regarding organizational conflicts of interest; or
- (b) at the time of the proposed Transaction, there exists any uncured PPC Default or any event or circumstance that with the lapse of time, the giving of Notice or both would constitute a PPC Default, unless City receives from the proposed transferee assurances of cure and performance acceptable to City in its reasonable discretion.

**20.2.4** For Transactions subject to City's prior reasonable approval, City will approve or disapprove in writing within 60 days after it receives from Principal Project Company:

- (a) a request for approval;
- (b) a reasonably detailed description of the proposed Transaction;
- (c) such information, evidence, and supporting documentation as City may request concerning the identity, financial resources, qualifications, experience, and potential conflicts of interest of the proposed transferee and its proposed contractors; and
- (d) such evidence of organization and authority, and such incumbency certificates, certificates regarding debarment or suspension, and other certificates, representations, and warranties as City may reasonably request.

**20.2.5** For Transactions subject to City's prior reasonable approval, City will evaluate the identity, financial resources, qualifications, experience, and potential conflicts of interest using the same standards and criteria that it is then currently applying, or if there is no current application, then the same standards and criteria it most recently applied, to the evaluation of Persons responding to City's requests for qualifications for similar agreements for comparable projects and facilities.

**20.2.6** If for any reason City does not act within such 60 day period, or any extension thereof by mutual agreement of the Parties, then the proposed Transaction shall not be permitted,

subject to Principal Project Company's right, in the case of a proposed Transaction governed by Section 20.2.2, to submit a Contract Dispute for resolution according to the Contract Dispute Procedures.

### **20.3 Restrictions on Assignment, Subletting and Other Transfers of PPC's Interest or the Project**

**20.3.1** Principal Project Company shall not voluntarily or involuntarily sell, assign, convey, transfer, pledge, mortgage or otherwise encumber PPC's Interest or any portion thereof without City's prior written approval, in its sole discretion, except:

- (a) to Lenders for security as permitted by this Agreement, provided Principal Project Company retains responsibility for the performance of Principal Project Company's obligations under the Contract Documents; or
- (b) to any Substituted Entity approved by City in accordance with the Direct Agreement, provided that such Substituted Entity assumes in writing full responsibility for performance of the obligations of Principal Project Company under this Agreement, the other Contract Documents, and the Key Contracts and Financing Documents arising from and after the date of assignment.

**20.3.2** Subject to Section 20.3.1, assignments and transfers of the PPC's Interest permitted under this Section 20.3 (Restrictions on Assignment, Subletting and Other Transfers of PPC's Interest or the Project), or otherwise approved in writing by City, shall be effective only upon City's receipt of a written instrument executed by the transferee of PPC's Interest, including any Person who acquires PPC's Interest through foreclosure, transfer in lieu of foreclosure or similar proceeding, in form and substance acceptable to City, in which the transferee, without condition or reservation, (i) assumes all of PPC's Interest then in effect, (ii) agrees to perform and observe all of PPC's Interest, and (iii) agrees to be bound by, the Project Management Plan, the Key Contracts, the Regulatory Approvals, all agreements between the transferor and Third Parties related to or arising out of the Work and/or the Project, and all agreements between the transferor and Governmental Entities with jurisdiction over the Project or the Work, except to the extent otherwise approved by City, in its sole discretion.

**20.3.3** Principal Project Company shall not grant any right of entry onto, use of, or right to manage and control the Project to any other Person except as expressly contemplated in this Agreement without City's prior written approval, in its sole discretion. Any purported voluntary or involuntary sale, assignment, subletting, conveyance, transfer, pledge, mortgage, encumbrance or grant of other special use, management or control of the Project in violation of this provision shall be null and void ab initio and City, at its option, may declare any such attempted action to be a material PPC Default.

### **20.4 Assignment by City**

City may assign all or any portion of its right, title and interest in the Contract Documents, Payment Bonds and Performance Bonds, guarantees, letters of credit and other security for payment or performance:

- (a) in its sole discretion and without Principal Project Company's consent, to any other Person that succeeds to the powers and authority of SFMTA under the

San Francisco City Charter and San Francisco Administrative Code, has the legal authority to perform its obligations and has sources of funds to perform the payment obligations of the City that are at least as adequate and secure as the City's as of the time of the assignment; and

- (b) to others with the prior written consent of Principal Project Company, which consent cannot be unreasonably withheld if City's assignee has a credit rating equal to or better than City's senior lien rating at the time of the assignment as measured by a Rating Agency.

## **20.5 Change of Organization or Name**

**20.5.1** Principal Project Company shall not change the legal form of its organization in a manner that adversely affects City's rights, protections and remedies under the Contract Documents without the prior written approval of City.

**20.5.2** If either Party changes its name, such Party agrees to promptly furnish the other Party with Notice of change of name and appropriate supporting documentation.

---

**ARTICLE 21. RECORDS AND AUDITS; INTELLECTUAL PROPERTY**

**21.1 Maintenance and Inspection of Records**

**21.1.1** Principal Project Company shall undertake the following with respect to its Books and Records:

- (a) keep and maintain Books and Records, including copies of all original documents delivered to City, in San Francisco, California, or in another location approved by City in writing, and provide Notice to City where the Books and Records are kept;
- (b) keep and maintain Books and Records in accordance with applicable provisions of the Contract Documents, including the Technical Requirements, applicable provisions of the Project Management Plan, and in accordance with Good Industry Practice;
- (c) make all Books and Records available for inspection by City and its representatives in Principal Project Company's principal offices in San Francisco, California, or in accordance with each IP Escrow, at all times during normal business hours, or at other reasonable times during the Term;
- (d) provide to City, or make available to City for review in accordance with each IP Escrow, copies of any Books and Records as and when reasonably requested by City. City may inspect upon 48 hours' prior Notice or without prior Notice where there is good faith suspicion of fraud. City's right of inspection includes the right to make extracts and take notes and shall not be construed as a waiver by Principal Project Company of the attorney-client privilege;
- (e) retain all Books and Records related to the D&C Work until five years after the Substantial Completion Date and retain all Books and Records related to the IFM Services until five years after the date of final payment under the Contract Documents, provided that all records which are being audited or which relate to Claims and Contract Disputes being processed or actions brought under the Contract Dispute Procedures shall be retained and made available until any later date that such audits, Claims, Contract Disputes and actions are finally resolved; and
- (f) permit City, upon 10 days' prior Notice to Principal Project Company (which Notice shall identify the persons City requests to be present for an interview and describe with reasonable specificity the subject matter to be raised in the interview), to discuss the obligations of Principal Project Company under this Agreement with any of the directors, chief executive officer and chief financial officer of Principal Project Company or its representatives, for the purpose of enabling City to determine whether Principal Project Company is in compliance with this Agreement and applicable Law. The interviewees and their employers may have counsel present at the interviews.

**21.1.2** Principal Project Company shall cause each Key Contract to include the provisions of Section 21.1.1, to the extent applicable, modified as appropriate to apply to the Contractor's Books and Records.

**21.1.3** Exhibit 16 (Federal, State and City Requirements) includes additional requirements regarding maintenance and inspection of Books and Records.

## **21.2 Audits**

**21.2.1** City may review and audit Principal Project Company, its Contractors and their respective Books and Records as and when City deems necessary for purposes of verifying compliance with the Contract Documents and applicable Law and verifying Claims.

**21.2.2** Without limiting Section 21.2.1:

- (a) City may audit the Project Management Plan and compliance therewith, including the right to inspect Work and/or activities and to verify the accuracy and adequacy of the Project Management Plan and its component parts, plans and other documentation;
- (b) the audits may be performed by employees or consultants of City, City or the City's Controller, or by an auditor under contract with City, City or the City's Controller;
- (c) Principal Project Company shall provide adequate and appropriate work space for City or its representative(s) to conduct audits;
- (d) Principal Project Company shall: allow auditor(s) access to such Books and Records during normal business hours; provide to City copies thereof, in any physical and/or digital medium, as and when reasonably requested by City; allow interviews of any employee who might have information related to such Books and Records; and otherwise cooperate with the auditors including furnishing a management representation letter upon request of the auditor; and
- (e) Principal Project Company shall cause each Contract to include a similar right of City to audit records and interview staff of the Contractor, and a similar covenant to cooperate with the auditors.

The foregoing shall not be deemed to waive the right of Principal Project Company or Contractor to have counsel or other appropriate representatives present at the interview.

**21.2.3** If any City audit results in a material correction to the Books and Records, as determined by City in its reasonable discretion, Principal Project Company shall pay the reasonable costs of City in conducting the audit, but if not, City will bear the costs of the audit.

**21.2.4** Failure of Principal Project Company, Contractors or their agents to maintain and retain sufficient Books and Records to allow the auditors to verify all or a portion of a Claim or to permit the auditor access to its Books and Records to verify a Claim shall be sufficient basis for City to deny recovery by Principal Project Company of the Claim to the extent of such failure.

**21.2.5** Full compliance by Principal Project Company with the provisions of Section 21.2 (Audits) is a contractual condition precedent to Principal Project Company's right to seek relief on a Claim.

**21.2.6** City's rights of audit include the right to observe the business operations of Principal Project Company and its Contractors to confirm the accuracy of Books and Records.

**21.2.7** Principal Project Company shall include in the Project Management Plan internal procedures to facilitate review and audit by City and, if applicable, City representatives and the City's Controller or their employees and consultants.

**21.2.8** Principal Project Company represents and warrants the completeness and accuracy of all information it or its agents provides in connection with City audits, and shall cause all Contractors to represent and warrant the completeness and accuracy of all information such Contractors provide in connection with City audits.

**21.2.9** Principal Project Company's internal and Third Party quality and compliance auditing responsibilities shall be identified in the Project Management Plan, in accordance with Section 1.4 of Division 1 of the Technical Requirements and other related provisions concerning QA and compliance auditing.

**21.2.10** Nothing in the Contract Documents shall in any way limit the constitutional and statutory powers, duties and rights of elected officials, including the independent rights of the City's Controller, in carrying out his or her legal authority.

### **21.3 Public Records Act and San Francisco Sunshine Ordinance**

**21.3.1** Principal Project Company acknowledges and agrees that all Submittals, records, documents, drawings, plans, specifications and other materials in City's possession, including any Books and Records submitted by Principal Project Company to City, may be considered public information subject to disclosure under the California Public Records Act (the "PRA") and San Francisco Sunshine Ordinance.

**21.3.2** If Principal Project Company believes any Books and Records submitted to City constitute trade secrets, proprietary information or other information that is not subject to or excepted from disclosure under the PRA, Principal Project Company shall be solely responsible for specifically and conspicuously designating that information by placing "CONFIDENTIAL" in the center header of each such page affected, as it determines to be appropriate. Any such designation of trade secret or other basis for exemption shall be accompanied by a concise statement of reasons supporting the claim including the specific Law that authorizes the exemption from disclosure under the PRA.

**21.3.3** If City receives a request for public disclosure of information or materials that have been designated by Principal Project Company as "CONFIDENTIAL," City will use reasonable efforts to provide Notice to Principal Project Company of the request and may request advice from City's counsel before disclosing any such documents in accordance with applicable Law. Principal Project Company shall then have the opportunity to either consent to the disclosure or assert its basis for non-disclosure and claimed exception under the PRA or other applicable Law to City within the time period specified in the Notice issued by City (if any) and before the deadlines for release in the PRA and other applicable Law. However, it is the responsibility of

Principal Project Company to monitor requests for disclosure and proceedings and make timely filings. City may make filings of its own concerning possible disclosure; however, City is under no obligation to support Principal Project Company's positions. By entering into this Agreement, Principal Project Company consents to, and expressly waives any right to contest, provision by City to City's counsel of all, or representative samples of, information or materials designated as "CONFIDENTIAL" by Principal Project Company, in accordance with the PRA. City shall have no responsibility or obligation for a failure of Principal Project Company to respond or to respond timely to any request for disclosure of information or materials designated as "CONFIDENTIAL" by Principal Project Company, in accordance with the PRA, and City shall not be required to wait for a response before making a disclosure or otherwise taking action under the PRA or other applicable Law. Under no circumstances will City be responsible or liable to Principal Project Company or any other party as a result of disclosing any such materials, including materials marked "CONFIDENTIAL", whether the disclosure is deemed required by Law or by an order of court or City's general counsel or occurs through inadvertence, mistake or negligence on the part of City or its officers, employees, contractors or consultants.

**21.3.4** Nothing contained in this Section 21.3 (Public Records Act and San Francisco Sunshine Ordinance) shall modify or amend requirements and obligations imposed on City by the PRA or other applicable Law, and the provisions of the PRA or other Laws shall control to the extent of a conflict between the procedures under this Agreement and applicable Law. City will not advise a submitting party or Principal Project Company as to the nature or content of documents entitled to protection from disclosure under the PRA or other applicable Laws, as to the interpretation of such Laws, or as to definition of trade secret. Principal Project Company is advised to contact its own legal counsel concerning the effect of applicable Laws to Principal Project Company's Books and Records and actions to be taken to preserve confidentiality.

**21.3.5** In the event of any proceeding or litigation concerning the disclosure of any Books and Records to Third Parties, City's sole involvement will be as a stakeholder retaining the material until otherwise ordered by a court or other authority having jurisdiction. Principal Project Company shall be responsible for prosecuting or defending any action, acting on its own behalf, concerning such materials at its sole expense and risk; provided, however, that City may intervene or participate in the litigation in such manner as it deems necessary or desirable. Principal Project Company shall indemnify and hold harmless Indemnitees from and against any and all claims, causes of action, suits, legal or administrative proceedings, damages, losses, liabilities, response costs, costs and expenses, including any injury to or death of persons or damage to or loss of property (including damage to utility facilities), and including attorneys' and expert witness fees and costs, arising out of, relating to or resulting from City's refusal to disclose any material that Principal Project Company has designated as a trade secret.

## **21.4 Intellectual Property**

### **21.4.1 Developed IP**

**21.4.1.1** Principal Project Company acknowledges and agrees that all Developed IP, in any medium, is either owned by City or specially ordered or commissioned by City, including works made for hire pursuant to 17 U.S.C. § 101 (the U.S. Copyright Act of 1976), and shall be owned by City upon authorship, creation, development or invention. Principal Project Company hereby assigns to City all rights, title and interest in and to the Developed IP including any and all Software, Work Product and designs. If any Developed IP is not the proper subject matter or is determined not to be a work-made-for-hire pursuant to the U.S. Copyright Act, Principal Project

Company hereby assigns, and shall cause all PPC-Related Entities to assign, to City all rights, title and interest in and to the Developed IP including any deliverable. Principal Project Company agrees to execute, and shall cause all PPC-Related Entities to execute, such further documents and to do such further acts as may be necessary to perfect, register, or enforce City's ownership of such rights, in whole or in part. If any PPC-Related Entity fails or refuses to execute any such documents, Principal Project Company, for itself and on behalf of any PPC-Related Entity, hereby appoints City as the necessary PPC-Related Entity's attorney-in-fact (this appointment is irrevocable and is coupled with an interest) to act on PPC-Related Entity's behalf and to execute such documents. Principal Project Company hereby forever waives and agrees never to assert, and shall cause any PPC-Related Entity to waive and never to assert, against City, its successors or licensees any and all "moral rights" (including claims based on 17 U.S.C. §§ 101-810 (the Copyright Act of 1976, as modified), specifically including 17 U.S.C. § 106A(a) (the Visual Artists Rights Act of 1990, "VARA")) that such PPC-Related Entity may have in any Intellectual Property or deliverable even after expiration or termination of this Agreement.

**21.4.1.2** All deliverables authored, created or developed under or for the purpose of this Agreement, the Work or the Project shall be owned by City immediately upon creation or generation, physically or digitally, and whether or not such deliverable and/or work product have been delivered to City under the terms of this Agreement.

**21.4.1.3** Principal Project Company shall deliver to City all deliverables and/or other work product authored, created or developed under or for the purpose of this Agreement (i) at time(s)/date(s) pursuant to this Agreement, or (ii) as soon as reasonably practicable after such creation or generation, but in no event later than the effective date of termination of this Agreement.

#### **21.4.2 Principal Project Company IP**

**21.4.2.1** Principal Project Company hereby grants to City an irrevocable, perpetual, non-exclusive, transferable (solely to a permitted City's assignee), fully paid-up right and license to use, execute, perform, sublicense, exploit, manufacture, distribute, reproduce, adapt, display, and prepare derivative works ("**Base License Rights**") of Principal Project Company IP in connection with the Work or the Project. The rights granted herein shall survive the termination, expiration or cancellation of this Agreement or any rights related thereto.

**21.4.2.2** Principal Project Company shall identify and disclose to City all Principal Project Company IP required by, incorporated in, or combined with the Work or the Project.

#### **21.4.3 Third Party IP**

**21.4.3.1** Principal Project Company shall use commercially reasonable efforts to secure Base License Rights in the name of City to license Third Party IP in connection with the Project or Work, and shall pay any and all royalties and license fees required to be paid for any Intellectual Property required by, incorporated in, or combined with the Project IP.

**21.4.3.2** Subject to Section 21.4.3.3, if the owner of Third Party IP refuses to grant Base License Rights pursuant to Section 21.4.3.1, Principal Project Company shall:

- (a) obtain City's prior written approval, which shall not to be unreasonably withheld, of the terms and conditions of Third Party IP licenses;

- 
- (b) identify and disclose to City all Third Party IP required by, incorporated in, or combined with the Project IP; and
  - (c) obtain from each owner of the Third Party IP prior consent to have the relevant Third Party IP deposited into an IP Escrow in accordance with Section 21.5 (Intellectual Property Escrows), or, to the extent the owner of the relevant Third Party IP has not provided such consent, obtain City's prior written approval for a waiver of this requirement, not to be unreasonably withheld.

**21.4.3.3 COTS.** Only if the owner of Third Party IP refuses to grant Base License Rights pursuant to Section 21.4.3.1 and the subject Third Party IP is COTS, Principal Project Company shall secure license(s) in the name of City, based on commercially available terms for the COTS, including any standard end user license Contract. Principal Project Company shall provide (i) an outline of license deficiencies vs. Base License Rights and (ii) the identification of at least one (1) other COTS available for the same purpose, function or design. Principal Project Company shall identify and disclose to City all COTS required by, incorporated in, or combined with the Work and/or the Project.

#### **21.4.4 City IP and City Data**

**21.4.4.1** City hereby grants to PPC-Related Entities a limited, non-exclusive license to use, exploit, manufacture, distribute, reproduce, adapt and display the Project IP, City IP, and City Data, and any deliverable and/or other work product incorporating such Intellectual Property, solely in connection with and limited to the Allowed Uses. All rights not specifically granted in this Section 21.4.4.1 are reserved to City. For the avoidance of doubt, no rights to City trademarks, whether or not the subject of a trademark state or US application or registration, ("City Marks") are granted to Principal Project Company and Principal Project Company may not incorporate, refer to, or otherwise use City Marks for any marketing, promotional or advertising purposes.

**21.4.4.2** In addition to Principal Project Company's obligations and restrictions related to City Data in this Agreement, Principal Project Company acknowledges and agrees that all City Data, including the results or creation of any anonymization, de-identification, aggregation or other analysis of such City Data, whether physical or digital, is owned by City. Except as specifically provided in this Agreement, no PPC-Related Entity shall make use of City Data, including any anonymized, de-identified, or aggregated versions thereof, even if such use is for such PPC-Related Entity's internal use or analysis, whether or not commercial value is available or received, and/or such information or data is available in other, separate or cumulative sources.

**21.4.4.3** Notwithstanding any other term or condition of this Agreement, the rights and permissions granted under this Section 21.4.4 (City IP and City Data) shall terminate (i) upon the effective date of termination of this Agreement or (ii) upon 24-hour written Notice by City to Principal Project Company, whichever is earlier.

**21.4.4.4** Except as, and to the limited extent, required by applicable Laws, Principal Project Company shall keep and maintain, and shall cause all PPC-Related Entities to keep and maintain, all City IP and City Data strictly confidential. Before any release of any City IP or CTIP Data pursuant to applicable Laws, Principal Project Company must consult with City and the

City Attorney's Office regarding such release and obtain consent to such release. Any release shall be limited to the minimum required to satisfy the applicable Law.

#### **21.4.5 Delivery of IP Materials**

Principal Project Company shall deliver to City all IP Materials related to Principal Project Company IP and Third Party IP, or deposit such IP Materials into IP Escrow(s) in accordance with Section 21.5 (Intellectual Property Escrows), as soon as reasonably practicable following incorporation of the relevant Intellectual Property into the Project or Work.

#### **21.4.6 Payments Inclusive**

Principal Project Company acknowledges and agrees that the payments provided for in Article 11 (Payments to Principal Project Company) include all royalties, fees, costs and expenses arising from or related to the Project IP, including any fees pursuant to Section 21.5 (Intellectual Property Escrows).

### **21.5 Intellectual Property Escrows**

**21.5.1** City and Principal Project Company acknowledge that Principal Project Company or other PPC-Related Entities may deliver IP Materials pursuant to Section 21.4.5 (Delivery of IP Materials) that include Software, Source Code and Documentation or other Intellectual Property and may not wish to deliver the applicable IP Materials directly to City as public disclosure could deprive such Person of commercial value. Principal Project Company further acknowledges that City nevertheless must be ensured access to such IP Materials at any time, and must be assured that the IP Materials are delivered to City pursuant to Section 21.4.5 (Delivery of IP Materials).

**21.5.2** In lieu of delivering the IP Materials directly to City, Principal Project Company may elect to deposit the IP Materials with a neutral depository. In such event, City and Principal Project Company shall: (a) mutually select one or more escrow companies or other neutral depositories (each an "**IP Escrow Agent**") engaged in the business of receiving and maintaining escrows of software source code and/or other Intellectual Property; (b) establish one or more escrows (each an "**IP Escrow**") with the IP Escrow Agent on terms and conditions reasonably acceptable to City and Principal Project Company for the deposit, retention, upkeep, authentication, confirmation and release of IP Materials to City pursuant to this Agreement; (c) determine the date(s) for Principal Project Company's deposit of the IP Materials into the IP Escrow; and (d) determine a process for releasing from escrow the IP Materials to be delivered to City pursuant to this Agreement. IP Escrows also may include Affiliates as parties and may include deposit of their Intellectual Property. Principal Project Company shall be responsible for the fees and costs of the IP Escrow Agent(s).

**21.5.3** The IP Escrows shall survive expiration or earlier termination of this Agreement regardless of the reason.

**21.5.4** The IP Materials shall be released and delivered to City in any of the following circumstances:

- (a) this Agreement expires or is terminated prior to expiration for any reason;

- (b) voluntary or involuntary bankruptcy of Principal Project Company, PPC-Related Entity or the owner of Third Party IP, as to Principal Project Company IP or Third Party IP respectively; or
- (c) Principal Project Company, PPC-Related Entity or the owner of Third Party IP is dissolved or liquidated or otherwise ceases to engage in the ordinary course of the business of manufacturing, supplying, maintaining, and servicing the Software, product, part, or other item containing the relevant Intellectual Property.

## **21.6 City's Use of IP Materials**

**21.6.1** City may exercise all rights, including the Base License Rights, granted to City pursuant to Section 21.4 (Intellectual Property) for the purposes of the Project, including any subsequent expansion or additions, except that City's ownership or assigned rights pursuant to Section 21.4.1 (Developed IP) shall not be limited in any way, for any purpose. For the avoidance of doubt, City's rights include the right to sublicense any City rights to a future vendor. City's rights under this clause shall survive the termination, expiration or cancellation of this Agreement.

**21.6.2** City shall maintain the confidentiality of any IP Materials released pursuant to Section 21.5 (Intellectual Property Escrows) pursuant to Section 21.4 (Intellectual Property) and shall enter into a non-disclosure agreement with any third party to whom City, in its sole discretion, grants access to such IP Materials to the extent that such IP Materials contain Confidential Information.

---

## ARTICLE 22. ADVERTISING AND OTHER BUSINESS OPPORTUNITIES

### 22.1 Rights and Interests in the Project and Project Site

Principal Project Company's rights and interests in the Project and Project Site under this Agreement are limited to such rights and interests that are required for performing the Work and Principal Project Company's timely fulfillment of its obligations under the Contract Documents. Principal Project Company's rights and interests exclude any Airspace or other real property interest.

### 22.2 Advertising and Business Opportunities

22.2.1 City reserves all rights and opportunities concerning:

- (a) advertising on the Infrastructure Facility and, as between Principal Project Company and City, within the Project Site, including use of Infrastructure Facility physical assets for advertising purposes; and
- (b) entrepreneurial, commercial and business activities that are ancillary or collateral to the use and operation of the Infrastructure Facility and Project Site, whether developed or pursued by City or through others worldwide. The rights and opportunities reserved to City under this Section 22.2.1(b) include the rights described in Section 22.2.1(a) and any sponsorships, naming rights, etc. (collectively, "**Business Opportunities**").

22.2.2 Principal Project Company shall cooperate and, during the D&C Period, grant all necessary access to the Project Site to City and any Third Party designees, including tenants and vendors, authorized by City in connection with City's exercise of its rights relating to the Project Site and any advertising and Business Opportunities. During the IFM Period, Principal Project Company shall not interfere with access to the Infrastructure Facility by City and any Third Party designees, including tenants and vendors, authorized by City in connection with City's exercise of its rights relating to its operations at the Project Site and any advertising and Business Opportunities. Unless otherwise agreed to by the Parties, City shall be entitled to all revenues generated by business opportunities arising out of, relating to or resulting from the Infrastructure Facility or in the Project Site's Airspace, except rents paid by any Housing and Commercial Component tenants. Principal Project Company shall be compensated for reasonable costs and expenses incurred directly by Principal Project Company in installing and maintaining facilities for advertising or Business Opportunities (other than routine maintenance), through a Change Order.

22.2.3 Except as authorized by City, Principal Project Company shall not engage in, and shall not permit:

- (a) any advertising within the Project Site or within or on the exterior of the Infrastructure Facility;
- (b) use or occupation of the Project for any Business Opportunities; and

- (c) operation of any business at the Project Site or the Infrastructure Facility, including (i) the sale of products or services (including any newsstand or concession stand for the sale of food, beverages or gifts or other retail or rental services); or (ii) the sale or rental of any wire, cable, transmission or receiving device or any other utility on, or transmission or receipt of any electronic communication to or from, any part of the Project.

**22.2.4** Principal Project Company may request City to consider Business Opportunities. If City, in its sole discretion, consents, the Parties shall execute an amendment to the Contract Documents memorializing the agreement reached, including any agreement as to any revenue and cost attribution. Notwithstanding the foregoing, Principal Project Company shall be compensated pursuant to a City Change for Principal Project Company's reasonable costs and expenses that are directly attributable to implementation of such Business Opportunities (other than routine maintenance) as well as any support efforts the City Change requires Principal Project Company to provide.

**22.2.5** Unless expressly approved by City, Principal Project Company may not permit any Person to use or occupy the Project for any ancillary or collateral purpose.

### **22.3 Remedies**

If a PPC Default concerns a breach of the provisions of Section 22.2 (Advertising and Business Opportunities), then, in addition to any other remedies available to City under this Agreement or applicable Law, City shall be entitled to receive from Principal Project Company an amount equal to all profits from the prohibited activity, together with interest thereon at the Late Payment Rate from the date of collection until the date payment is made. In addition, City may require Principal Project Company to restore the Project Site and the Infrastructure Facility to its original condition or to transfer to City all of Principal Project Company's interest in the prohibited assets and improvements and revenues derived therefrom, or any combination of the foregoing.

## ARTICLE 23. MISCELLANEOUS

### 23.1 Standard for Approvals

In all cases where approvals, acceptances or consents are required to be provided by City or Principal Project Company hereunder, such approvals, acceptances or consents shall not be withheld unreasonably except in cases where a different standard (such as sole discretion) is specified. Any authorization by City shall be in writing. Any approval required by the SFMTA Board or Board of Supervisors will be at their respective sole discretion. In cases where sole discretion is specified, the decision shall not be subject to Contract Dispute Procedures hereunder.

### 23.2 Amendments

The Contract Documents may be amended only by a written instrument duly executed by or on behalf of the Parties, except to the extent expressly provided otherwise in this Agreement.

### 23.3 Waiver

**23.3.1** The failure of a Party to exercise or delay in exercising any right under this Agreement shall not:

- (a) constitute a waiver of such right or any other right under the Contract Documents; or
- (b) relieve the other Party from performance of its obligations under the Contract Documents except as otherwise provided in the Contract Documents.

**23.3.2** No waiver of any right under this Agreement shall be effective unless made in a writing duly executed by a duly authorized representative of the Party charged with the waiver.

**23.3.3** Any waiver under Section 23.3.2 shall be limited to the specific instance and shall not constitute a waiver of such right in the future or of any other right under this Agreement.

**23.3.4** If the Parties make and implement any interpretation of the Contract Documents without documenting such interpretation by an instrument in writing signed by both Parties, such interpretation and implementation thereof will not be binding in the event of any future Contract Disputes.

**23.3.5** No waiver of any right under this Agreement shall be deemed to have occurred as the result of any acceptance by City, any payment for or acceptance of the whole or any part of the Work, any extension of time, or any possession taken by City.

### 23.4 Independent Contractor; No Joint Venture or Partnership

**23.4.1** Principal Project Company is an independent contractor. Neither Principal Project Company nor any of its employees or agents is or shall be deemed to be an employee or agent of City, and in no event shall the relationship between City and Principal Project Company be construed as creating any relationship whatsoever between City and Principal Project Company's employees or agents. Except as otherwise provided in the Contract Documents,

Principal Project Company has sole authority and responsibility to employ, discharge and otherwise control its employees and has complete and sole responsibility as a principal for its agents, for all Contractors and for all other Persons that Principal Project Company or any Contractor hires to perform or assist in performing the Work.

**23.4.2** Nothing in the Contract Documents is intended or shall be construed to create any partnership, joint venture or similar relationship between City and Principal Project Company; and in no event shall either Party take a position in any tax return or other writing of any kind that a partnership, joint venture or similar relationship exists.

**23.4.3** Principal Project Company shall not have, or be deemed to have, power or authority to make any commitments on City's behalf or to execute agreements in the name of or on behalf of City. Principal Project Company shall not enter into any agreement with any Governmental Entity, Utility Owner, property owner or other Third Party having regulatory jurisdiction over any aspect of the Project or Work or having any property interest affected by the Project or the Work that in any way purports to obligate City, or states or implies that City has an obligation to the Third Party, to undertake any activity, unless City otherwise approves.

### **23.5 Successors and Assigns**

The Contract Documents shall be binding upon and inure to the benefit of City and Principal Project Company and each of their permitted successors, assigns and legal representatives.

### **23.6 Designation of Representatives; Cooperation with Representatives**

**23.6.1** City and Principal Project Company shall each designate an individual or individuals who shall be authorized to make decisions and bind the Parties on matters relating to the Contract Documents. Exhibit 10 (Initial Designation of Authorized Representatives) provides the initial Authorized Representative designations. A Party may change such designations by written Notice in accordance with Section 23.10 (Notices and Communications).

**23.6.2** Principal Project Company shall cooperate with City and all representatives of City designated as described above in performance of their obligations under the Contract Documents.

### **23.7 Survival**

The following provisions shall survive the expiration or earlier termination of this Agreement and/or the completion of the Work:

- (a) Principal Project Company's and City's representations and warranties;
- (b) the Contract Dispute Procedures;
- (c) the indemnifications, limitations and releases contained in Section 10.6 (Indemnities);
- (d) the limitations on remedies contained in Section 16.6 (Limitation on Consequential Damages);

- (e) the express obligations of the Parties following termination (including those in Articles 17 (Termination) and 20 (Assignment and Transfer);
- (f) the Direct Agreement); and
- (g) all other provisions which by their inherent character should survive expiration or earlier termination of this Agreement and/or completion of the Work.

### **23.8 Limitation on Third Party Beneficiaries**

Except to the extent that specific provisions (such as the warranty and indemnity provisions, and the provisions for the protection of certain Lenders under any Direct Agreement) identify Third Parties and state that they are entitled to benefits, (a) it is not intended by any of the provisions of the Contract Documents to create any third party beneficiary to this Agreement or to authorize anyone not a Party to maintain a suit for personal injury or property damage under this Agreement, and (b) the duties, obligations and responsibilities of the Parties with respect to third parties shall remain as imposed by Law. The Contract Documents shall not be construed to create a contractual relationship of any kind between City and a Contractor or any Person other than Principal Project Company.

### **23.9 Governing Law; Venue**

The Contract Documents shall be governed by and construed in accordance with the laws of the State, any applicable federal law, the San Francisco City Charter and Municipal Code, and the ordinances, regulations, codes, and Executive Orders enacted and/or promulgated pursuant thereto. The venue for any litigation arising from a Contract Dispute shall be in San Francisco, California to the extent that a court located in San Francisco has subject matter jurisdiction.

### **23.10 Notices and Communications**

**23.10.1** All notices, requests, demands, instructions, certificates, consents, explanations, agreements, approvals and other communications (each being a “**Notice**”) required or permitted under this Agreement must be in writing (whether or not “written notice” or “notice in writing” is specifically required by the applicable provision of this Agreement) and (a) delivered in person, (b) sent by commercial courier, next business day delivery requested, or (c) by registered, certified mail or express mail, return receipt requested, with postage prepaid, to the mailing addresses below. All Notices under this Agreement will be deemed given, received, made or communicated on the date personal receipt actually occurs or, if mailed, on the delivery date or attempted delivery date shown on the return receipt. For the convenience of the Parties, copies of Notices may also be given by email to the email address given below but the emailed copy will not be binding on either Party.

**23.10.2** The effective time of a Notice will not be affected by the receipt of the email copy of the Notice.

**23.10.3** Any mailing address, or email address, may be changed at any time by giving written Notice of the change in the manner provided above at least ten (10) days before the effective date of the change.

- 
- (a) All Notices to Principal Project Company shall be delivered to the following address or as otherwise directed by Principal Project Company's Authorized Representative:
- 

\_\_\_\_\_  
c/o \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Attention: \_\_\_\_\_  
Telephone: \_\_\_\_\_  
E-mail: \_\_\_\_\_

- (b) All Notices to City shall be marked as regarding the Project and shall be delivered to the following address or as otherwise directed by City's Authorized Representative:

San Francisco Municipal Transportation Agency  
1 South Van Ness, 8th Floor  
San Francisco, CA 94103  
Attn: Chris Lazaro  
Email: [Chris.Lazaro@sfmta.com](mailto:Chris.Lazaro@sfmta.com)

With a copy to: Office of the City Attorney  
City Hall, Room 234  
1 Dr. Carlton B. Goodlett Place  
San Francisco, California 94102-4682  
Attn: Real Estate & Finance Group  
Re: Potrero Yard Modernization Project  
[Email: isidro.jimenez@sfcityatty.org](mailto:isidro.jimenez@sfcityatty.org)

**23.10.4** Any technical or other communications pertaining to the Work shall be conducted by Principal Project Company's Authorized Representative and City's Authorized Representative.

**23.10.5** Principal Project Company shall promptly provide to City a copy of each communication received from any Lender relating to any default or event of default under any Financing Agreement or Security Document.

### **23.11 Severability**

**23.11.1** If any provision or part of the Contract Documents is ruled invalid (including invalidity due to any statutory change or other change in Law) by a court having proper jurisdiction, then the Parties shall: (a) promptly meet and negotiate a substitute for such provision or part, which shall, to the greatest extent legally permissible, effect the original intent of the Parties, including an equitable adjustment to the Financial Model Update (or, if there has been no Update, the original Financial Model) and Principal Project Company's compensation to account for any change in the Work resulting from such invalidated portion; and (b) if necessary or desirable, apply to the court or other decision maker (as applicable) which declared such invalidity for an interpretation of the invalidated portion to guide the negotiations. The invalidity or

unenforceability of any such provision or part shall not affect the validity or enforceability of the balance of the Contract Documents, which shall be construed and enforced as if the Contract Documents did not contain such invalid or unenforceable provision or part.

**23.11.2** If after the efforts required by Section 23.11.1, no interpretation or reformation of the Contract Documents can reasonably be adopted that will return the Parties to the benefits of their original bargain, then the court order shall be treated as a Termination Due to Court Ruling under Section 17.4.3 (Termination Due to Court Ruling).

## **23.12 Construction and Interpretation of Agreement**

**23.12.1** The Contract Documents shall be construed simply, as a whole and in accordance with the fair meaning of the language used and not strictly for or against any Party.

**23.12.2** The Parties acknowledge and agree that: (a) the Contract Documents are the product of an extensive and thorough, arm's-length exchange of ideas, questions, answers, information and drafts during the Implementation Proposal preparation process; (b) each Party has been given the opportunity to independently review the Contract Documents with legal counsel; and (c) each Party has the requisite experience and sophistication to negotiate, understand, interpret and agree to the particular language of the provisions of the Contract Documents. Accordingly, in the event of a conflict, ambiguity or inconsistency in or Contract Dispute regarding the interpretation of the Contract Documents, the Contract Documents shall not be interpreted or construed against the Party preparing it, and instead the Contract Dispute resolver shall consult other customary rules of interpretation and construction.

**23.12.3** City's final answers to the questions posed during the Implementation Proposal preparation process for the Contract Documents shall in no event be deemed part of the Contract Documents and shall not be relevant in interpreting the Contract Documents except as they may clarify provisions otherwise considered ambiguous.

**23.12.4** The captions of the articles, sections and subsections in the Contract Documents are for convenience only and are not to be treated or construed as part of this Agreement.

**23.12.5** Unless otherwise expressly stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meaning.

**23.12.6** Wherever the word "including", "includes" or "include" is used in the Contract Documents, it is deemed to be followed by the words "without limitation." Wherever reference is made in the Contract Documents to a particular Governmental Entity, it includes any public agency succeeding to the powers and authority of such Governmental Entity.

**23.12.7** References to "days" contained in the Contract Documents shall mean calendar days unless otherwise stated.

**23.12.8** Subject to Section 23.12.9, if the day on or by which any thing is to be done in accordance with this Agreement is not a Business Day, that thing must be done on the next Business Day.

**23.12.9** If the Contract Documents require action to be taken in the event of an emergency and otherwise where it is clear that performance is intended to occur on a non-Business Day, Principal Project Company shall be required to perform such obligations, even though the date in question may fall on a non-Business Day.

**23.12.10** As used in this Agreement and as the context may require, the singular includes the plural and vice versa, and the masculine gender includes the feminine and vice versa.

**23.12.11** All monetary amounts and obligations in the Contract Documents are expressed and payable in U.S. dollars.

**23.12.12** Each party must perform its obligations in accordance with this Agreement at its own cost, unless expressly provided otherwise.

**23.12.13** If this Agreement requires calculation of an amount payable to a party there must be no double counting in calculating that amount.

### **23.13 Further Assurances**

Each Party shall promptly execute and deliver to the other Party all such instruments and other documents and assurances as are reasonably requested by the second Party to further evidence its obligations hereunder, including, specifically with respect to Principal Project Company, assurances regarding the validity of (a) the assignments of Contracts contained herein, and (b) any instruments securing performance hereof.

### **23.14 Entire Agreement**

City and Principal Project Company agree and expressly intend for the Contract Documents to constitute a single, non-severable, integrated agreement whose terms are interdependent and non-divisible. The Contract Documents contain the entire understanding of the Parties with respect to the subject matter of this Agreement and supersede all prior agreements, understandings, statements, representations and negotiations, in each case oral or written, between the Parties with respect to the subject matter of this Agreement.

### **23.15 Counterparts**

This instrument may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the date first written above.

**APPROVED AS TO FORM**

David Chiu, City Attorney

**CITY AND COUNTY OF SAN FRANCISCO,  
a municipal corporation, operating by and  
through the San Francisco Municipal  
Transportation Agency**

By: \_\_\_\_\_

[●]  
Deputy City Attorney

By: \_\_\_\_\_

Jeffrey Tumlin  
Director of Transportation

Date: \_\_\_\_\_

Date: \_\_\_\_\_

APPROVED BY:

San Francisco Municipal Transportation Agency  
Board of Directors

Resolution No: \_\_\_\_\_

Adopted: \_\_\_\_\_

Attest:

\_\_\_\_\_  
Secretary, SFMTA Board of Directors

**[PRINCIPAL PROJECT COMPANY]**

By: \_\_\_\_\_

Signature

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Title

By: \_\_\_\_\_

Signature

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Title

**EXHIBIT 1**  
**ABBREVIATIONS AND DEFINITIONS**

**EXHIBIT 1**

**ABBREVIATIONS AND DEFINITIONS**

Unless otherwise specified, whenever the following abbreviations or terms are used in this Agreement and the other Contract Documents, they have the meanings given below. References in this Exhibit 1 (Abbreviations and Definitions) to Sections and Exhibits shall mean sections of and exhibits to this Agreement.

ACI	American Concrete Institute
ACM	Asbestos Containing Material
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
AED	Automatic Electronic Defibrillator
AHA	Activity Hazard Analysis
AHJ	Authority(ies) Having Jurisdiction
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
APTA	American Public Transportation Association
AQMD	Air Quality Management District
ARI	Air Conditioning and Refrigerator Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	ASTM International (formerly known as the American Society for Testing and Materials)
AW	Assigned Weight
AWS	American Welding Society
BCI	Buildings Cost Index
BEB	Battery Electric Bus
BAS	Building Automation System
BIL	Basic Insulation Level
BIM	Building Information Modeling
BOCC	Building Operations Control Center
BODR	Basis of Design Report
BTU	British Thermal Unit
CADD	Computer Aided Design and Drafting
CALM	Coordination and Logistics Management Program
CAFM	Computer Aided Facility Management
CAP	Compliance Action Plan
CARPP	Capital Asset Replacement Program Plan
CBC	California Building Code
CCTV	Closed-Circuit Television
CDRL	Contract Data Requirements List
CEC	California Electrical Code
CEI	Construction Engineering and Inspection
CEL	Certifiable Elements List
CEQA	California Environmental Quality Act, California Public Resources Code § 21000 et seq., as it may be amended
CFA	Certificate of Final Acceptance
CFR	Code of Federal Regulations

CIB	Communications Infrastructure Backbone
CIDH	Cast In Drilled Hole
CIH	Central Instrument House
CIL	Certiifiable Items List
CIR	Committed Information Rate
CIS	Customer Information System
CL	Checklist
CM	Construction Management
CO	Carbon Monoxide
CPESEC	Customer Premises Equipment
CPI	Consumer Price Index
CPM	Critical Path Method
CPT	Cone Penetrometer Test
CPTED	Crime Prevention through Environmental Design
CPU	Central Processing Unit
CPUC	California Public Utilities Commission
CQCM	Construction Quality Control Manager
CS	Construction/Installation Supervisor
CSEMS	Construction Site Environmental Management Supervisor
CSP	Construction Security Plan
CWA	Clean Water Act
D&C	Design and Construction
D/CID	Design Construction Integration Documents
DC	Direct Current
DTS	Data Transmission System
DVD	Digital Video Disc
DVMS	Digital Video Management System
EA	Environmental Assessment
ECI	Environmental Compliance Inspector
ECP	Environmental Compliance Plan
EEO	Equal Employment Opportunity
EIA	Electronic Industries Association
EMP	Emergency Management Panel
EMS	Emergency Medical Services
EP	Extraction Procedure (toxicity)
EPA	Environmental Protection Agency
EPS	Electrical Power System
ER	Equipment Room
ERRS	Electricity Rate Risk Share
ESC	Erosion and Sediment Control
ESD	Environmental Site Design
ET	Environmental Team
ETEL	Emergency Telephone
EVP	Emergency Vehicle Preemption
FCI	Facility Condition Index
FA	Forced Air
FAS	Fire Alarm System
FC	Footcandle
FDC	Fire Department Connections
FEIR	Final Environmental Impact Report
FF&E	Furniture, Fixtures and Equipment
FMP	Fire Management Panel

FMS	Fire Management System
FOD	Foreign Object Debris
FONSI	Finding of No Significant Impact
FOV	Field of View
FTA	Federal Transit Administration
GDR	Geotechnical Data Report
GER	Geotechnical Engineering Reports
GIS	Geographical Information System
GPM	Gallons per Minute
GPR	Geotechnical Planning Report
GRS	Galvanized Rigid Steel
GSD	General System Display
HCF	Hundred Cubic Feet
HVAC	Heating, Ventilation, and Air Conditioning
ICEA	Insulated Cable Engineers Association
ID	Identifier
IDF	Intermediate Distribution Frame
IDO	Interdepartmental Order
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineer Society of North America (also known as IES)
IF	Infrastructure Facility
IFM	Infrastructure Facility Maintenance
IMP	Incident Management Plan
IPMVP	International Performance Measurement and Verification Protocol
IAQ	Indoor Air Quality
ISO	International Organization for Standardization
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LEED	Leadership in Energy & Environmental Design
LEED NC	LEED New Construction
LFMC	Liquidtight Flexible Metallic Conduit
LIDAR	Light Detecting and Ranging
LOE	Level of Effort
LRFD	Load and Resistance Factor Design
LRU	Lowest Replaceable Unit
LTA	Lenders' Technical Advisor
MAC	Media Access Control
MaxAP	Maximum Availability Payment
MDE	Maximum Design Earthquake
MDF	Main Distribution Frame
MEP	Mechanical, Electrical and Plumbing
MMIS	Maintenance Management Information System
MMRP	Mitigation Monitoring and Reporting Program
MOT	Maintenance of Traffic
MOU	Memorandum of Understanding
MPH	Miles Per Hour
MSD	Major Service Degradation
MSDS	Material Safety Data Sheets
MSI	Master Systems Integrator
MTBHE	Mean Time Between Hazard Events

MUTCD	Manual on Uniform Traffic Control Devices
MW	Megawatt
NACE	National Association of Corrosion Engineers
NCE	Noncompliance Event
NCEER	National Center for Earthquake Engineering Research
NCHRP	National Cooperative Highway Research Program
NCR	Non-Conformance Report
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321 et seq., as it may be amended
NESC	National Electrical Safety Code
NETA	International Electrical Testing Association
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	Noise Reduction Coefficient
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NSC	National Safety Council
NVR	Network Video Recorder
OA	Other Adjustments
O&SHA	Operating and Support Hazards Analysis
O/S-SSPP	Operating System Safety Program Plan
OCC	Operations Control Center
OCR	Optical Character Recognition
OCS	Overhead Catenary System
ODE	Operating Design Earthquake
OEM	Original Equipment Manufacturer
OH	Overhead
OSHA	Occupational Safety and Health Administration
PA	Public Address
PAB	Private Activity Bond
PABX	Private Automatic Branch Exchange
PCB	Polychlorinated Biphenyl
PCI	Precast/Prestressed Concrete Institute
PDF	Portable Document Format
PDM	Precedence Diagram Method
PDS	Power Distribution System
PHA	Preliminary Hazards Analysis
PICO	Post-Installation Checkout
PM	Project Management
PMP	Project Management Plan
PNC	Potrero Neighborhood Collective LLC
PoE	Power over Ethernet
POH	Point of Handoff
PPC	Principal Project Company
PCQP	Principal Project Company's Construction Quality Plan
PDQP	Principal Project Company's Design Quality Plan
PQP	Principal Project Company's Quality Program
PPCECP	Principal Project Company's Environmental Compliance Plan

PPCQPP	Principal Project Company's Quality Program Plan
PPCSE	Principal Project Company's Safety Engineer
PPCSHP	Principal Project Company Safety & Health Plan
PPCSS	Principal Project Company's Safety Supervisor
PPCSSSP	Principal Project Company Site Specific Safety Plan
PQM	Program Quality Manager
PRA	California Public Records Act
P-S	P-S Suspension Loggings
PSTN	Public Switched Telephone Network
PTZ	Pan, Tilt, Zoom
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
QM	Quality Management
QMP	Quality Management Plan
QMS	Quality Management System
QoS	Quality of Service
QPM	Quality Program Manager
QSD	Qualified SWPPP Developer
QT	Qualification Test
RAMS	Reliability, Availability, Maintainability, and Safety/Security/Service
RDE	Restorable Design Earthquake
RFC	Request for Comments
RFCCD	Release for Conformed Construction Documents
RFCD	Release for Construction Documents
RFP	Request for Proposals
RGS	Rigid Galvanized Steel
RTLS	Real-Time Location System
SBE	Small Business Enterprise
SC	Safety Certification
SC Plan	Safety Certification Plan
SCADA	Supervisory Control and Data Acquisition
SCI	System Condition Index
SCS	Structured Cabling System
SCVM	System Compliance Verification Matrix
SCVR	Safety Certification Verification Report
SF	Square Feet
SF6	Sulfur Hexafluoride
SFMTA	San Francisco Municipal Transportation Agency
SHA	System Hazards Analysis
SHPO	State Historic Preservation Officer
SLP	Service Loss Percentage,
SMARTS	Stormwater Multi-Application and Report Tracking System
SNMP	Simple Network Management Protocol
SOP	Standard Operating Procedure
SOQ	Principal Project Company's Statement of Qualification
SPCCP	Spill Prevention Control and Countermeasures Plan
SPFMA	System Performance and Failure Management Analysis
SQAP	Software Quality Assurance Plan
SSEPP	System Security Emergency Preparedness Plan
SSHA	System Subsystem Hazards Analysis
SSI	Sensitive Security Information

SSO	State Safety Oversight
SSP	System Security Plan
SSPP	System Safety Program Plan
SSPWC	Standard Specifications for Public Works Construction
SSRC	Safety and Security Review Committee
SUE	Subsurface Utility Engineering
SUSMP/LID BMP	Standard Urban Stormwater Mitigation Plan/Low Impact Development Best Management Practices
SWP	Safe Work Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TIA	Time Impact Analysis
TMP	Transportation Management Plan
TR	Technical Requirements
TRB	Transportation Research Board
TRO	Temporary Restraining Order
TSC	Traffic Signal Coordination
TVC	Terminal Vertical Core
U.S.C.	United States Code
UL	Underwriters Laboratory
UPS	Uninterruptable Power Supply
USDOT	United States Department of Transportation, or its successor entity
USO	United Service Organizations Inc.
VAR	Volt-Amp Resistance
VLAN	Virtual Local Area Network
VMS	Variable Message Sign
VoIP	Voice over Internet Protocol
VRLA	Valve-Regulated, Lead Acid
VSS	Video Surveillance System
VT	Verification Test
WAN	Wide Area Network
WBS	Work Breakdown Structure

**1 Year Scheduled Maintenance Plan** means detailed schedule, which highlights IFM Services activities that may impact SFMTA O&M Services, identifies implications and provides plans on how the potential impact will be mitigated or eliminated, prepared and submitted by Principal Project Company in accordance with Section C.6.7.1 of the IFM Specifications, as updated and approved by the City in accordance with this Agreement.

**24/7/365(6)** means 24 hours per day 7 days per week, 365(6) days per year.

**5 Year Scheduled Maintenance Plan** means detailed schedule, which identifies all major IFM Services activities that may impact SFMTA O&M Services, prepared and submitted by Principal Project Company in accordance with Section C.6.7.2 of the IFM Specifications, as updated and approved by the City in accordance with this Agreement.

**Access Date** has the meaning set forth in Section 2.2 (Right of Entry).

**Accessibility Condition** means a state or condition of the relevant Functional Unit or the means of access to it which allows all persons who are entitled to enter, occupy or use the

relevant Functional Unit to enter and leave the Functional Unit safely and conveniently and using normal access routes.

**Account Balances** means all amounts standing to the credit of any bank account held by or on behalf of Principal Project Company (excluding the Handback Requirements Reserve Account), or the value of any letter of credit issued in lieu of any bank account held or required to be held by or on behalf of Principal Project Company (excluding the Handback Requirements Reserve Account), at the Early Termination Date.

**Actual Insurance Policy(ies)** has the meaning set forth in Section 10.1.3(b)(ii).

**Actual Insurance Premiums** has the meaning set forth in Section 10.1.3(e)(i).

**Actual Knowledge** means (i) as to Principal Project Company, facts and information actually known to Principal Project Company or Principal Project Company's Authorized Representative (in each case, as applicable), after reasonable consultation with other personnel of each PPC-Related Entity that are involved with the performance of the Work or this Agreement, as applicable; and (ii) as to City, City's Authorized Representative, facts and information actually known to City's Authorized Representative.

**Additional Property(ies)** has the meaning set forth in Section 7.5.1.2.

**Adhoc Services** means services which, in accordance with the IFM Specifications, City is entitled to require Principal Project Company to provide but where Principal Project Company's obligation to provide those services does not arise unless and until it is requested to do so by City.

**Adjusted Annual Energy Target** or **AAET** means the Annual Energy Target in any Contract Year after adjusting pursuant to Section 3.2.1 of Exhibit 12.

**Adverse Event** means:

- (a) an Affordability Event, with the understanding that an Affordability Event occurring before the Effective Date shall be deemed to occur the day after the Effective Date;
- (b) either or both of the CEQA Approval or the NEPA Approval is invalidated for a reason other than PPC Fault;
- (c) a temporary restraining order, injunction or other form of legal order by a court prohibiting City or Principal Project Company from performing any of their respective material obligations under this Agreement or materially delaying the critical path;
- (d) the occurrence of exceptional circumstances in the financial markets in one or more of Europe, the United States of America, Japan/Asia Pacific and Canada that, in City's opinion determined in City's reasonable discretion, (i) results in material and substantial cessation of lending activity in national or relevant international capital or interbank markets and (ii) adversely affects access by Principal Project Company to such markets preventing Financial Close by the Scheduled Financial Close Date;

- 
- (e) any action, litigation or proceeding pending against City or affecting the Project, which, in each case, has a material likelihood of success and if determined adversely would have the effect of (i) preventing Financial Close; or (ii) prohibiting or materially impairing City from performing any of its material obligations under the Principal Project Documents;
  - (f) a downgrade to City's credit rating by a Rating Agency that has a material negative impact on the credit rating of any bond financing included in the Finance Plan when compared to the indicative investment grade rating(s) of such bonds included in the Finance Plan as of the Effective Date;
  - (g) the approval of this Agreement by the SFMTA Board or the Board of Supervisors is invalidated for any reason other than PPC Fault;
  - (h) failure of City to timely provide the deliverables set forth in Section 3.2.2 (City Deliverables);
  - (i) any event set forth in clauses (b), (e)-(f), (h), (l)-(m), (o), and (s)-(t) of the definition of Compensable Delay Event; or
  - (j) any event set forth in clauses (a)-(h) of the definition of "Force Majeure Event".

**Adverse Event Notice** has the meaning set forth in Section 3.4.2.

**Adverse Weather** means heavy rain, windstorm, flood, or any severe atmospheric condition that: (i) occurs at the Project Site during the D&C Period; and (ii) prevents Principal Project Company from proceeding with at least 75 percent of the scheduled labor, material, and equipment resources for at least five hours per Day on activities shown in the Critical Path on the Project Schedule).

**Adverse Weather Event** means Adverse Weather that exceeds the anticipated number of Days of Adverse Weather specified per year in Section 14.1.8 (Relief for Adverse Weather Event).

**Affiliate** means:

- (a) any Equity Member;
- (b) any Person which directly or indirectly through one or more intermediaries controls, or is controlled by, or is under common control with, Principal Project Company or any Equity Member; and
- (c) any Person owned in whole or in part by (i) Principal Project Company, (ii) any Equity Member or (iii) any Affiliate of Principal Project Company under clause (b) of this definition, whether the ownership interest is direct or indirect, beneficial or of record, provided that ownership of less than 10% of the equity interest in a Person shall not give rise to Affiliate status.

For purposes of this definition, the term "control" means the possession, directly or indirectly, of the power to cause the direction of the management of a Person, whether through voting rights or securities, by contract, family relationship or otherwise.

**Affordability Event** means the occurrence of a fluctuation in the Base Interest Rates and/or Baseline Credit Spreads during the Bank Debt Rate Protection Period or Bond Rate Protection Period that results, or in the good faith opinion of City is likely to result, in an increase to the Base Capital MaxAP of 10% or greater.

**Aggregate Actual Consumption** means the actual consumption of all Energy at the Infrastructure Facility, as invoiced by the relevant Utility companies for each Contract Year.

**Agreement** means the Design-Build-Finance-Operate-Maintain Agreement to which this **Exhibit 1** (Abbreviations and Definitions) is attached, including all exhibits, appendices and attachments, as such agreement may be modified from time to time.

**Airspace** means any and all real property, including the surface of the ground, within the vertical column extending above and below the surface boundaries of the Project Site and not necessary or required for the Infrastructure Facility (including Upgrades) or developing, permitting, designing, financing, constructing, installing, equipping, operating, maintaining, repairing, reconstructing, restoring, rehabilitating, renewing or replacing the Infrastructure Facility (including Upgrades) or Principal Project Company's timely fulfillment of its obligations under the Contract Documents. If the Project Site is a separate legal parcel with specific vertical limits, then the Airspace shall only mean the area within those vertical limits.

**Allowance** means the Office/Admin and Training Spaces FF&E Allowance, the City-Furnished IT/Comms Allowance and the Partnering Allowance, and **Allowances** means all of them as the context requires.

**Annual Energy Target** or **AET** means the targeted consumption of Energy in any Contract Year in respect of the Regulated Load, and, for clarity, does not include Non-Regulated Load consumption. Metered, Non-Regulated Load consumption shall be included for reference only.

**Annual Energy Review Meeting** has the meaning set forth in **Section 4.3** of **Exhibit 12**.

**Annual Service Plan** means the plan prepared and submitted by Principal Project Company that provides, at a minimum, the required items listed in **Section B.5.1** of the IFM Specifications, as updated and approved by the City in accordance with this Agreement.

**Annual Vandalism Deductible** has the meaning set forth in **Section 8.3.4**.

**Applicable Law and Standards** means applicable Law, all applicable Standards and Specifications, manufacturers' recommended maintenance and operations activities and maintenance and operations activities that would normally be undertaken in accordance with Good Industry Practices.

**As-Built Documents** means, collectively, the documents referred to in **Section 1.6.3** of **Division 1** of the Technical Requirements, as well as the following items referred to in **Division 1** of the Technical Requirements: As-Built Schedule, As-Built Drawings, and LOD 500 As-Built Model (**Section 1.10.1.2**).

**As-Built Drawings** means, revised sets of drawings submitted to reflect any changes made during the construction process, depicting the actual conditions, dimensions, and locations of installed elements as opposed to the originally planned design.

---

**As-Built Schedule** means has the meaning set forth in Section 1.2.5 of Division 1 of the technical Requirements.

**As-Built Schedule Analysis** has the meaning set forth in Section 18.3.5 (Additional Requirements for Contract Disputes Relating to Delay Events Impacting the Critical Path).

**Authority(ies) Having Jurisdiction** means an organization, including City acting in its regulatory capacity, office or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure. The term “Authorities Having Jurisdiction” refers to more than one such organization, office or individual.

**Authorized Representative** means the authorized representative for either Party identified in Exhibit 10 (Initial Designation of Authorized Representatives) or otherwise designated in accordance with this Agreement.

**Availability Condition** means any of (i) the Accessibility Condition, (ii) the Safety Condition or (iii) the Use Condition.

**Availability Deduction** means a Deduction from an Availability Payment as a result of Functional Unit or Functional Component being deemed Unavailable.

**Availability Failure** means an IFM Failure Event which has not been Rectified within the relevant Rectification Time and which causes a Functional Unit to be Unavailable. For the avoidance of doubt, an Availability Failure may be applied to one or more Functional Components.

**Availability Failure Deduction** means a deduction from the Availability Payment as a result of an Availability Failure.

**Availability Payment** means the payments to be made by City to Principal Project Company under Section 11.2 (Availability Payments), determined on an annual basis in accordance with Exhibit 4B (Availability Payment Mechanism) and payable quarterly.

**Bank Debt** means any debt financing, other than Bond Financing, provided by a bank or similar financial institution.

**Bank Debt Pricing Date** means with respect to any Bank Debt proposed in the Finance Plan, the earliest to occur of:

- (a) the date of Financial Close;
- (b) the date at which the Bank Debt is fixed or hedged by Principal Project Company; and
- (c) such other date as is mutually agreed to by Principal Project Company and City.

**Bank Debt Rate Protection Period** means the period beginning at 3:00 p.m. Pacific Time on [●], 2025 and ending on, with respect to any Bank Debt, the Bank Debt Pricing Date.

**Bankruptcy Event** means any of the following events:

(a) a receiver, receiver manager or other encumbrance holder taking possession of or being appointed over, or any distress, execution or other process being levied or enforced upon, the whole or any material part of the assets of an entity;

(b) any proceedings with respect to the entity being commenced under the Bankruptcy Law and if such proceedings are commenced against and are disputed by the entity, such proceedings are not discontinued, withdrawn, dismissed or otherwise remedied within 60 days of such proceedings being instituted;

(c) the entity making an assignment for the benefit of its creditors, being declared bankrupt or committing an act of bankruptcy, becoming insolvent, making a proposal or otherwise taking advantage of provisions for relief under the Bankruptcy Law or similar legislation in any jurisdiction, or any other type of insolvency proceedings being commenced by or against the entity under the Bankruptcy Law or otherwise and, if proceedings are commenced against the entity and are disputed by the entity, such proceedings are not stayed, dismissed or otherwise remedied within 60 days of such proceedings being instituted;

(d) in any voluntary or involuntary case seeking liquidation, reorganization or other relief with respect to the entity or its debts under any bankruptcy Law or foreign bankruptcy, insolvency or other similar law now or hereafter in effect, this Agreement or any of the other Contract Documents is rejected, including a rejection under 11 U.S.C. § 365 or any successor statute; or

(e) the entity ceasing to carry on business.

**Bankruptcy Law** means the United States Bankruptcy Code, 11 U.S.C. §§ 101 *et seq.* as amended from time to time and any successor statute thereto. “Bankruptcy Law” also includes any similar state law relating to bankruptcy, insolvency, the rights and remedies of creditors, the appointment of receivers or the liquidation of companies and estates that are unable to pay their debts when due.

**Base Capital MaxAP** means, initially, [●], which is the Base Capital MaxAP reflected in the Financial Model for the first Contract Year, as adjusted from time to time in accordance with this Agreement.

**Base Case Financial Model** means the Financial Model as approved by the Parties as of the Effective Date.

**Base IFM MaxAP** means, initially, [●], which is the Base IFM MaxAP reflected in the Financial Model for the first Contract Year, as adjusted from time to time in accordance with this Agreement.

**Base Interest Rate** means the publicly-documented interest rates of each maturity included in the following indices:

- (a) [●];
- (b) [●];
- (c) [●].

The Base Interest Rates do not include any additional credit spread, margin or fee components.

**Baseline Credit Spreads** means the set of credit spreads issued by City that assumes different coupons for the range of maturities, ratings and types of Bond Financings that will serve as the basis for the Credit Spread Risk Mitigation.

**Basis of Design Report (BODR)** means the report described in Section 1.8.5.2.3 of Division 1 of the Technical Requirements, concerning design methodology and approach for the D&C Work, key assumptions and operations and maintenance design methodology.

**Bedding-In Period** means the three-month period following the Substantial Completion Date.

**Benchmarking Date** has the meaning set forth in Section 10.1.3(b).

**Best Management Practices (BMP)** has the meaning set forth in Storm Water Management For Construction Activities: Developing Pollution Prevention Plans and Best Management Practices (EPA Document 832 R 92-005).

**BIM Project Execution Plan** means Principal Project Company's plan describing BIM-enabled workflows and systems to successfully deliver, design, construct, operate, and maintain the Project, prepared and submitted by Principal Project Company in accordance with Section 1.10.2 of Division 1 of the Technical Requirements, as updated and approved by the City in accordance with this Agreement.

**Board of Supervisors** means the Board of Supervisors of the City and County of San Francisco.

**Bond Financing** means any debt financing comprising of bonds, which includes tax-exempt bonds issued by a Conduit Issuer or taxable capital market instruments.

**Bond Pricing Date** means with respect to any Bond Financing proposed in the Finance Plan, the earliest to occur of (a) the date of Financial Close, (b) the date at which any Bond Financing is priced, and (c) the date at which any Bond Financing is fixed or hedged.

**Bond Rate Protection Period** means the period beginning at 3:00 p.m. Pacific Time on [●], 2025 and ending on, with respect to any Bond Financing, the Bond Pricing Date.

**Books and Records** means any and all documents, books, records, papers, or other information of any PPC-Related Entity or Affiliate relating to the Project, the Work, the PPC-Furnished FF&E and the Project Site, including (a) all design and construction documents, and all operations and maintenance documents (including drawings, specifications, Submittals, Contracts, invoices, schedules, meeting minutes, budgets, forecasts, requests for change proposals, change responses, change requests, plans (including the Project Management Plan), reports and manuals), (b) daily time sheets and supervisor's daily reports, union agreements, insurance, welfare and benefits records, payroll registers, earning records, payroll tax forms, invoices and requisitions, equipment records, payment certificates, cancelled checks, job cost reports, job payroll ledges, general ledger, cash disbursement journal; (c) income statements, balance sheets, statements of cash flow and changes in financial position, details regarding operating income, expenses, capital expenditures and budgeted operating results; (d) all budgets, certificates, claims, correspondence, data (including test data), documents, expert

---

analyses, facts, files, information, investigations, materials, notices, plans, projections, proposals, records, reports, requests, samples, schedules, settlements, statements, studies, surveys, tests, test results, vehicular traffic information, operational information analyzed, categorized, characterized, created, collected, generated, maintained, processed, produced, prepared, provided, recorded, stored or used by Principal Project Company or its Contractors or any of their representatives in connection with the Project, (e) the Base Case Financial Model, Financial Model, subsequent Financial Model Updates and Financial Modeling Data, (f) records of the expenditure and investment of the Milestone Payment including records identifying expenditures for D&C Work and debt service payments, and (g) with respect to all of the above, any information that is stored electronically or on computer-related media (in its original source and not converted to PDF or other format). For purposes of the requirements of the Contract Documents to maintain Books and Records, the term “Books and Records” includes documents or information that are subject to the attorney-client privilege, but for purposes of requirements of the Contract Documents to provide access to Books and Records, the term specifically excludes the disclosure by any Party of Books and Records that are protected by the attorney-client or other legal privilege based upon an opinion of counsel reasonably satisfactory to the other Party.

**Breakage Costs** means any commercially reasonable prepayment premiums or penalties (including documented SOFR breakage fees, customary and reasonable trustee, Collateral Agent and Lender fees but excluding any fees related to legal or other consulting costs), make-whole payments or other prepayment amounts, including costs of early termination of interest rate and inflation rate hedging, swap, collar or cap arrangements, payable by or on behalf of, or credited against payments owing to, Principal Project Company, under any Financing Agreement or Security Document or otherwise as a result of the payment (including prepayment), redemption or acceleration of all or any portion of the principal amount of Project Debt prior to its scheduled payment date (less any breakage benefits), excluding, however, any such amounts included in the principal amount of any Refinancing. The term “Breakage Costs” excludes any such premiums, penalties, payments or other amounts relating to Equity Member Debt.

**Building Automation System** or **BAS** means the computer-based control system installed in buildings that controls, monitors and integrates the buildings’ systems, including HVAC, lighting, security, fire alarm and elevator control. The BAS controls building environmental conditions including temperature, humidity, CO2, illumination, heating and cooling and air flow distribution.

**Building Occupant(s)** means City Personnel, City Parties, Visitors, PPC-Related Entities and third party members of the public lawfully present on or using the Infrastructure Facility including, or each of them as the context requires.

**Buildings Cost Index (BCI)** means the “Buildings Cost Index” in San Francisco, as published by Engineering News-Record. If the BCI is discontinued or substantially altered, a suitable replacement will be determined by the Parties in accordance with general market practice at the time.

**Bus Yard Component** means the Facility’s transit component, which (a) will include the spaces needed for City’s operation and maintenance activities at the Facility after Substantial Completion of the Infrastructure Facility, (b) must meet the Bus Yard Component criteria in the Technical Requirements except as otherwise approved by City in writing, which approval shall be at its sole discretion, and (c) is not Common Infrastructure. The Bus Yard Component is

---

generally described in the “Project Description” included in Division 1 of the Technical Requirements.

**Business Day** means any weekday (i.e., Monday through Friday) except for those weekdays on which (a) City is officially closed for business or (b) banks are not required or authorized by Law to be open in the State.

**Business Opportunity(ies)** has the meaning set forth in Section 22.2.1(b).

**CAFM (Computerized Aided Facility Management) System** means, the computerized system used to track, record, manage and communicate day-to-day Infrastructure Facility operations and to support long-term planning. Modules may include asset, location, inventory, work order/request, Scheduled Maintenance, personnel and reports.

**Capacity Improvement** means any Project expansion, improvement, measure or procedure that both (a) maintains or increases the throughput capacity of the Project or any portion thereof and (b) improves the level of service of the Project.

**CEQA Approval** means the Final Environmental Impact Report for the Potrero Yard Modernization Project at 2500 Mariposa Street (Planning Department Case No. 2019-021884ENV), certified by the Planning Commission on January 11, 2024 and available at <https://sfplanning.org/environmental-review-documents?title=Potrero+Yard+Modernization+Project>.

**CEQA Event** means:

- (a) any new or modified CEQA Approval necessitated solely by a City Change, a Delay Event or Relief Event;
- (b) legal action being taken in respect of the CEQA Approval that results in a temporary restraining order, preliminary injunction or other form of interlocutory relief by a court of competent jurisdiction that prohibits prosecution of, or by complying with such temporary restraining order, preliminary injunction or other form of interlocutory relief by a court of competent jurisdiction results in prohibiting the prosecution of, a material portion of the Work;
- (c) review or revocation or material change to, the CEQA Approval; or
- (d) any review or revocation of, or change to, a CEQA Approval directly resulting from the circumstances specified in clauses (b) and (c),

except, in each case, to the extent resulting, in whole or in part, from Principal Project Company’s design, Work or from any PPC Fault.

**Certificate of Final Acceptance** means the certificate issued by City as contemplated in Section 7.9 (Final Acceptance).

**Certificate of Substantial Completion** means the certificate issued by City as contemplated in Section 7.8 (Substantial Completion).

---

**Change** means any acceleration, addition, decrease, omission, deletion, removal or modification from or to the Work.

**Change in Law** means:

- (a) any repeal (in whole or in part) of, or amendment or modification to, any applicable Law by, any Governmental Entity or any written change in interpretation or application of, any applicable Law, in each case, after the Setting Date; and
- (b) the adoption or enactment of any new applicable Law by any Governmental Entity after the Setting Date,

which, in either case, is materially inconsistent with any existing applicable Law or any existing interpretation or application of, any such applicable Law in effect prior to the Setting Date; but excluding, (i) any repeal of, or amendment or modification to, a written change in interpretation or application of, and applicable Law, or any new applicable Law, in each case, that is pending, passed or adopted but not yet effective as of the Setting Date, (ii) any repeal of, or amendment or modification to, or written change in interpretation or application of, or the adoption or enactment of, state or federal tax laws of general application, and (iii) any repeal of, or amendment or modification to, or written change in interpretation or application of, or adoption or enactment of, state labor laws.

**Change of Control** means any Equity Transfer, transfer of an interest, direct or indirect, in an Equity Member, or other assignment, sale, financing, grant of security interest, hypothecation, conveyance, transfer of interest or transaction of any type or description, including by or through voting securities, asset transfer, contract, merger, acquisition, succession, dissolution, liquidation, bankruptcy or otherwise, that results, directly or indirectly, in a change in possession of the power to direct or control or cause the direction or control of the management of Principal Project Company or a material aspect of its business. A change in possession of the power to direct or control or cause the direction or control of the management of an Equity Member may constitute a Change of Control of Principal Project Company if such Equity Member possesses, immediately prior to such Change of Control, the power to direct or control or cause the direction or control of the management of Principal Project Company. Notwithstanding the foregoing, the following shall not constitute a Change of Control:

- (a) a change in possession of the power to direct or control the management of Principal Project Company or a material aspect of its business due solely to bona fide open market transactions in securities effected on a recognized public stock exchange, including such transactions involving an initial public offering;
- (b) an upstream reorganization or transfer of indirect interests in Principal Project Company (including, for greater certainty, in connection with the issuance or redemption of interests pursuant to any employee ownership program) so long as no change occurs in the entity with ultimate power to direct or control or cause the direction or control of the management of Principal Project Company;
- (c) a change in possession of the power to direct or control the management of Principal Project Company or a material aspect of its business due solely to a bona fide transaction involving a beneficial interest in the ultimate parent

---

organization of an Equity Member (but not if the Equity Member is the ultimate parent organization), provided, however, that this exception shall not apply if at the time of the transaction the transferee is suspended or debarred from bidding, proposing or contracting with the City or any federal or State department or agency, or is subject to a suspension or debarment proceeding;

- (d) an Equity Transfer, where the transferring Equity Member and the transferee are under the same ultimate parent organization ownership, management and control before and after the transfer;
- (e) a transfer of interests (i) between managed funds that are under common ownership, management or control or (ii) by an Equity Member to a fund, investment vehicle or other entity managed by or under common control of such Equity Member, except, in each case, a change in the management or control of a fund, investment vehicle or other entity, as applicable, that manages or controls;
- (f) the exercise of minority veto or voting rights (whether pursuant to applicable Law, by Principal Project Company's organizational documents or by related member or shareholder agreements or similar agreements) over major business decisions of Principal Project Company, provided that if such minority veto or voting rights are exercised pursuant to shareholder or similar agreements, City received copies of such agreements on or before the date of this Agreement; and
- (g) the grant of Security Documents, including the Initial Security Documents, in compliance with the Direct Agreement or the exercise of lender remedies under such Security Documents, including foreclosure.

**Change Order** has the meaning set forth in Section 1.4.3 of Exhibit 9 (Change Procedures).

**Change Proposal** has the meaning set forth in Section 1.3.1 of Exhibit 9 (Change Procedures).

**City** has the meaning set forth in the Preamble.

**City Access Period** has the meaning set forth in Section 7.13.5.1.

**City Additional Insured(s)** means any (and all) of the City and County of San Francisco, and its respective successors, assigns, officeholders, officers, directors, agents, representatives, consultants and employees.

**City-Caused Delay Event** means any event falling under clauses (a)-(e), (k), (n), (q), (r) and (u)-(v) of the definition of Compensable Delay Event.

**City-Caused Relief Event** means any event falling under clauses (a)-(c), (q), (i), (l) and (r) of the definition of Compensable Relief Event.

**City Change** has the meaning set forth in Section 12.2.1.

**City Data** means any information, data, or document, whether or not protectable Intellectual Property, which is created, developed, or collected by, or on behalf of, City related to

transportation operations, national infrastructure planning and personal information of the City employees, vendors and consumers. For the avoidance of doubt, City Data shall include, but not be limited to, (a) all “nonpublic information,” as defined by the Gramm-Leach-Bliley Act (15 USC § 6801 et seq.), (b) personal information as defined by California Civil Code §§ 1798.29, 1798.82, and 1798.140 (California Consumer Privacy Act of 2018, effective January 1, 2020), as amended and supplemented by the California Privacy Rights Act of 2020 (effective December 16, 2020; operative January 1, 2023), (c) protected health information or individually identifiable health information as defined by the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and the Health Information Technology for Economic and Clinical Health (HITECH) Act or as defined by the Code of Federal Regulations (45 CFR § 160.103), and/or (d) personal data as defined by the EU General Data Protection Regulation (Regulation (EU) 2016/679). For the further avoidance of doubt, City Data is not limited to proprietary or confidential information, and need not constitute trade secret information.

**City Default** has the meaning set forth in Section 16.3.1 (City Default).

**City Fault** means:

- (a) a breach by City of any of its obligations or any representation or warranty under this Agreement;
- (b) City’s violation of any applicable Law; or
- (c) fraud, criminal conduct, intentional misconduct, recklessness, bad faith or gross negligence of the City.

**City-Furnished Equipment** means all FF&E classified as City-Furnished Equipment (or City-furnished) in the Technical Requirements (including items marked OP in the Equipment List, Table 5 and Table 6 of Division 1 of the Technical Requirements) or otherwise required to be included as such under Section 7.13.2 (Selection of City-Furnished Equipment).

**City-Furnished Equipment List** means the list of equipment identified as being City-Furnished Equipment in the Equipment List and Tables 5 and 6 of Division 1 of the Technical Requirements, as updated or amended in accordance with Section 7.13.2 (Selection of City-Furnished Equipment).

**City-Furnished IT/Comms Allowance** means the Allowance to be used pursuant to Section 11.11.3 (City-Furnished IT/Comms Allowance) by City for City-Furnished IT/Comms Equipment. The initial City-Furnished IT/Comms Allowance amount is identified in Section 11.11.3.

**City-Furnished IT/Comms FF&E** means all FF&E classified as City-Furnished IT/Comms FF&E in the Technical Requirements, all additional FF&E identified as City-furnished “IT/Comms FF&E” in Table 5 and Table 6 of Division 1 of the Technical Requirements and all additional IT/Comms Equipment selected by City under Section 7.13.1 (Selection and Procurement of PPC-Furnished FF&E).

**City IP** means all Intellectual Property owned by, or sufficiently licensed to, City including, without limitation, all rights, grants and interests pursuant to the Predevelopment Agreement.

**City Personnel** means every person employed, engaged, or hired by City or every person

---

employed, engaged, or hired by City Contractors to carry out any of the responsibilities or any of the services provided by City with respect to the Infrastructure Facility.

**City Ready for Move Condition** means the following state of condition of the Project Site:

- (a) With respect to Utilities, all Utility infrastructure will remain in place and will not be sealed, capped, disconnected, turned off and or controlled prior to vacation of the Project Site by City;
- (b) The buildings, grounds and existing structures will remain in their current state as of the Access Date, including all furniture, equipment, materials and supplies; and
- (c) All furniture, equipment, materials and supplies that are to be moved by Principal Project Company shall be boxed or otherwise prepared so they may be moved.

**City Relocation Plan** means the plan developed by Principal Project Company pursuant to the Predevelopment Agreement, and approved by City, that describes the scope of Work to be undertaken by Principal Project Company to fully relocate the applicable City equipment, supplies and materials from the Project Site.

**City Relocation Scope** means the scope of Work undertaken by Principal Project Company to fully relocate the applicable City equipment, furniture, supplies and materials from the Project Site, as more particularly described in the approved City Relocation Plan.

**City Policies** means policies developed, administered and maintained by City on a specific topic that are directly applicable to the IFM Services and are required to be complied with by the Principal Project Company.

**Claim** means any claim, proceeding, action, cause of action, investigation, demand or suit (including by way of contribution or indemnity) made:

- (a) in connection with this Agreement or the Infrastructure Facility; and
- (b) at law or for specific performance, in equity, restitution, payment of money (including damages), increase in the Milestone Payment or Availability Payments and extension of time or other form of relief.

**Cleaning Services** has the meaning given in Section C.5.2 of the IFM Specifications.

**Climate Baseline** means, for each year, the CAEC will be adjusted based on the Weather Data from the Energy Performance Commencement Date to the Current Contract Year.

**Collateral Agent** means (a) the Institutional Lender listed or otherwise designated in the Security Documents as trustee or agent and authorized to act on behalf of or at the direction of the other Lenders, or (b) the Institutional Lender designated to act as trustee or agent on behalf of or at the direction of the other Lenders in an intercreditor agreement or other document executed by all Lenders to whom Security Documents are outstanding at the time of execution of such document, a copy of which shall be delivered by Principal Project Company to City. For

---

any Project Debt issued and held by a single Lender, Collateral Agent means such Lender. The bond trustee, if an Institutional Lender, may also be the Collateral Agent.

**Commercial Close** means the execution and delivery of this Agreement by Principal Project Company and City on the Effective Date.

**Commercially Reasonable Insurance Rates** means insurance premiums that are less than or equal to the greater of (a) rates that a reasonable and prudent risk manager for a Person seeking to insure comparable risks would conclude are justified by the risk protection afforded, and (b) 200% of the rates indicated for the period in question in the Base Case Financial Model and related Financial Modeling Data.

**Committed Investment** means the sum of the Equity Investments and Deferred Equity Amounts.

**Common Infrastructure** means the physical infrastructure component of the Facility that is shared by the Bus Yard Component and the Joint Development Alternative, as further described in the Technical Requirements, including Division 1 of the Technical Requirements.

**Communication Protocol** means the protocol prepared and submitted by Principal Project Company and approved by the City in accordance with Section B.9.1.1 of the IFM Specifications, as updated in accordance with this Agreement.

**Compensable Delay Event** means any of the following events or circumstances to the extent, in each case, that it directly and adversely impacts (i) the D&C Work during the D&C Period or (ii) Principal Project Company's completion of Punch List items between the Substantial Completion Date and the Final Acceptance Date:

- (a) the implementation of a City Change, excluding any Change following a Change Request;
- (b) City Fault;
- (c) failure by City to (i) provide Principal Project Company with access to the Project Site on the Access Date; or (ii) leave the Project Site in the City Ready for Move Condition as of 90 days after the Access Date;
- (d) failure by City to issue NTP 1 or NTP 2, as applicable, within 10 Business Days after full and complete satisfaction of the conditions precedent to the relevant NTP under this Agreement;
- (e) a Hazardous Materials Event caused by City;
- (f) a Relevant Change in Law;
- (g) discovery of an Unidentified Utility within the Project Site;
- (h) a CEQA Event or a NEPA Event;
- (i) compliance by Principal Project Company with an order or direction of an

Emergency service provider in an Emergency (except for Emergencies that are or arise out of Force Majeure Termination Events);

- (j) any condemnation or other taking by eminent domain of any material portion of the Project Site or the D&C Work;
- (k) except with respect to Regulatory Approvals under the jurisdiction of the City acting in its regulatory capacity, failure of City to provide responses to proposed schedules, plans, design documents, and other Submittals and matters submitted to City after the Commercial Close for which response is required under this Agreement as an express prerequisite to Principal Project Company's right to proceed or act, within the time periods indicated in this Agreement, or if no time period is indicated, within a reasonable time, taking into consideration the nature, importance and complexity of the Submittal or matter; provided, however, that the foregoing shall apply only following delivery of Notice after the expiration of the applicable time period from Principal Project Company requesting such action in accordance with the terms and requirements of this Agreement;
- (l) discovery at, near or on the Project Site of any archeological, paleontological or cultural resources (including historic properties), excluding any such substance or resources known or disclosed to Principal Project Company as of the Setting Date (or which should have been known to Principal Project Company pursuant to a Reasonable Investigation);
- (m) discovery at, near or on the Project Site of any threatened or endangered species, excluding any such presence of species known or disclosed to Principal Project Company as of the Setting Date (or which should have been known to Principal Project Company pursuant to a Reasonable Investigation);
- (n) loss or damage to the Work directly caused by City Fault;
- (o) issuance of a temporary restraining order, preliminary injunction or other form of interlocutory relief by a court of competent jurisdiction that prohibits prosecution of, or by complying with such temporary restraining order, preliminary injunction or other form of interlocutory relief by a court of competent jurisdiction results in prohibiting the prosecution of, any material portion of the D&C Work;
- (p) discovery of:
  - (i) actual subsurface or latent physical conditions that differ materially from the baseline subsurface conditions indicated in the Geotechnical Baseline Report, excluding any such conditions (w) that are not defined in the Geotechnical Baseline Report; (x) known or disclosed to Principal Project Company prior to the Setting Date; or (y) that could have been reasonably anticipated as potentially present by an experienced global civil works contractor based on the information contained in such Geotechnical Baseline Report; or
  - (ii) discovery of actual subsurface physical conditions within the Project Site of an unusual nature, differing materially from those ordinarily

encountered in the area and generally recognized as inherent in the type of work provided for in this Agreement, excluding any such conditions known or disclosed to Principal Project Company prior to the Setting Date;

- (q) any order of City to suspend for convenience under Section 16.2.8.3 exceeding 24 hours in total for a single suspension or 144 cumulative hours in total across multiple suspensions;
- (r) subject to Principal Project Company complying with its obligations for coordination set forth in this Agreement, actions of the City (including its employees) or Other Contractors (other than any PPC-Related Entities, JDA-Related Entities and any entity that is not a JDA-Related-Entity but that executes an interface agreement substantially in the form of Exhibit 8 (Form of Interface Agreement)), that materially and directly disrupts, damages or interferes with the D&C Work;
- (s) a change in Standards and Specifications materially impacting the D&C Work or the Project with which City directs Principal Project Company to comply under this Agreement;
- (t) a Hazardous Materials Event caused by Third Parties or which exists prior to the Access Date; and
- (u) issuance by City of a Safety Compliance Order for a reason other than to comply with Safety Standards, perform valid previously issued Safety Compliance Orders or correct a violation of Law or Regulatory Approval respecting health, safety or right of use and access.

**Compensable Relief Event** means any of the following events or circumstances to the extent, in each case, that it interferes directly and adversely with, or causes a failure of, the performance of the IFM after the Substantial Completion Date:

- (a) the implementation of a City Change, excluding any Change following a Change Request;
- (b) City Fault;
- (c) a Hazardous Materials Event caused by the City;
- (d) compliance by Principal Project Company with an order or direction of an Emergency service provider in an Emergency (except for Emergencies that are or arise out of Force Majeure Termination Events);
- (e) a change in Standards and Specifications during the IFM Period materially impacting the IFM or the Project with which City directs Principal Project Company to comply under this Agreement;
- (f) a Relevant Change in Law;

- 
- (g) failure of City to provide responses to proposed schedules, plans, design documents, and other Submittals and matters submitted to City after the Effective Date for which response is required under this Agreement as an express prerequisite to Principal Project Company's right to proceed or act, within the time periods (if any) indicated in this Agreement, or if no time period is indicated, within a reasonable time, taking into consideration the nature, importance and complexity of the Submittal or matter; provided, however, that the foregoing shall apply only following delivery of Notice after the expiration of the applicable time period from the Principal Project Company requesting such action in accordance with the terms and requirements of this Agreement;
  - (h) discovery at, near or on the Project Site of any archeological, paleontological or cultural resources (including historic properties), excluding any such substance or resources known or disclosed to the Principal Project Company as of the Setting Date (or which should have been known to Principal Project Company pursuant to a Reasonable Investigation);
  - (i) discovery at, near or on the Project Site of any Threatened or Endangered Species (regardless of when the species was listed as threatened or endangered), excluding any such presence of species known to the Principal Project Company as of the Setting Date (or which should have been known or disclosed to Principal Project Company pursuant to a Reasonable Investigation);
  - (j) loss or damage to the Infrastructure Facility directly caused by City Fault;
  - (k) issuance of a temporary restraining order, preliminary injunction or other form of interlocutory relief by a court of competent jurisdiction that prohibits prosecution of a material portion of the IFM;
  - (l) subject to Principal Project Company complying with its coordination obligations under this Agreement, actions of the City (including its employees) or Other Contractors (other than any PPC-Related Entities)), except JDA-Related Entities and any entity that is not a JDA-Related-Entity but that executes an interface agreement substantially in the form of Exhibit 8 (Form of Interface Agreement), that materially and directly disrupts, damages or interferes with the IFM Services;
  - (m) Vandalism, excluding any Vandalism affecting the Infrastructure Facility building envelope or exterior grounds;
  - (n) any condemnation or other taking by eminent domain of any material portion of the Project Site or the Project;
  - (o) a Hazardous Materials Event caused by Third Parties or which exists prior to the Access Date;
  - (p) issuance by City of a Safety Compliance Order for a reason other than to comply with Safety Standards, perform valid previously issued Safety Compliance Orders or correct a violation of Law or Regulatory Approval respecting health, safety or right of use and access;

- 
- (q) a permanent change in voltage by a Utility Owner supplying electricity to the Project that is greater than 10%, has a material adverse effect on the IFM Services and requires the purchase and installation of one or more new transformers by Principal Project Company; and
  - (r) any order of City to suspend IFM Services for convenience under Section 16.2.8.3.

**Computerized Aided Facility Management System** or **CAFM** means the computerized system used to track, record, manage and communicate day-to-day Infrastructure Facility operations and to support long-term planning. Modules may include: asset, location, inventory, work order/request, scheduled maintenance, personnel and reports.

**Condition Report** has the meaning set forth in Section 8.5.4.2.

**Conditions to Assistance** has the meaning set forth in Section 7.6.12.2.

**Conduit Issuer** means an existing agency that will issue Private Activity Bonds in connection with the Project.

**Confidential Information means**, subject to Section 21 and without limiting applicable Law, all confidential and proprietary information that a party has designated as confidential and which is supplied, or to which access is granted, to or on behalf of the other party (whether before or after the date of this Agreement), either in writing, or in any other form, directly or indirectly pursuant to discussions with the other party and includes all analyses, compilations, studies and other documents whether prepared by or on behalf of a party which contain or otherwise reflect or are derived from such designated information.

**Construction Documents** means all shop drawings, working drawings, fabrication plans, material and hardware descriptions, specifications, construction quality control reports, construction quality assurance reports and samples necessary or desirable for construction of the Project included in the Construction Work, in accordance with the Contract Documents.

**Construction Equity Ratio** means, at any time, the ratio between:

- (a) the Committed Investments at the time; and
- (b) the sum of (i) Committed Investments at the time and (ii) the amount of Project Debt scheduled to be outstanding at the time as set forth in the Financial Model.

**Construction Management Plan** means Principal Project Company's plan describing its approach to undertake and achieve the requirements in Section 1.11 of Division 1 of the Technical Requirements, prepared and submitted by Principal Project Company in accordance with Section 1.1.7.2 of Division 1 of the Technical Requirements, as updated and approved by the City in accordance with this Agreement.

**Construction Work** means all Work to build or construct, make, form, manufacture, furnish, install, supply, deliver, landscape, equip, test and commission or demolish any structure, building, or other improvement to real property included in the Project, but excluding:

- 
- (a) Design Work, professional environmental services and similar services;
  - (b) preparing and processing applications for Regulatory Approvals;
  - (c) coordinating with adjacent property owners and Utility Owners; and
  - (d) IFM Services.

**Consumer Price Index (CPI)** means the Consumer Price Index for the City of San Francisco, as published by US Bureau of Labor Statistics from time to time, or failing such publication, such other index as the Parties (acting reasonably) may agree, or as may be determined in accordance with **Error! Reference source not found.** (Contract Dispute Procedures), which most closely resembles such index.

**Contract** means any agreement, and any modification of such agreement, by Principal Project Company with any Person to perform any part of the Work or provide any materials, equipment or supplies for any part of the Work, or any such agreement, supplement or amendment at a lower tier, between a Contractor and its lower tier Contractor or a Supplier and its lower tier Supplier, at all tiers. The term “Contract” does not include agreements with Utility Owners.

**Contract Deadline** means the Substantial Completion Deadline, the Final Acceptance Deadline or the Long Stop Date, as the context may require, and “Contract Deadlines” means the Substantial Completion Deadline, the Final Acceptance Deadline and the Long Stop Date, collectively.

**Contract Dispute(s)** means any dispute, disagreement or controversy between City and Principal Project Company concerning their respective rights and obligations under the Contract Documents, including concerning any Claim, alleged breach or failure to perform and remedies.

**Contract Dispute Procedures** means the procedures for resolving Contract Disputes set forth in **Error! Reference source not found.** (Contract Dispute Procedures).

**Contract Documents** means this Agreement and all its exhibits including the Technical Requirements and other documents identified in Section 1.2 (Contract Documents; Rules to Reconcile Conflicting Provisions).

**Contract Month** means a calendar month, except with respect to the first Contract Month, which runs from the Payment Commencement Date until the end of the calendar month in which the Payment Commencement Date falls, and the last Contract Month, which runs from the first day of the calendar month in which the Termination Date falls until the Termination Date.

**Contract Quarter** means a Quarter, except with respect to the first Contract Quarter, which runs from the Payment Commencement Date until the end of the calendar quarter in which the Payment Commencement Date falls, and the last Contract Quarter, which runs from the first day of the Quarter in which the Termination Date falls until the Termination Date.

**Contract Year** means a calendar year, provided that:

- (i) the first Contract Year shall be such period that commences on the Payment Commencement Date and ends on the next ensuing December 31<sup>st</sup>; and

- 
- (ii) the final Contract Year shall be such period that commences on the January 1st that precedes the date on which this Agreement expires or is terminated, for whatever reason, and ends on the expiry or termination of this Agreement.

Any computation made on the basis of a Contract Year shall be adjusted on a pro rata basis to take into account any Contract Year of less than 365 or 366 days, whichever is applicable.

**Contractor** means any Person or entity with whom Principal Project Company has entered into any Contract to perform any part of the Work or provide any materials, equipment or supplies for the Project on behalf of Principal Project Company, and any other Person or entity with whom any Contractor has further subcontracted any part of the Work, at all tiers.

**Controlling Affiliate** means any Person which directly, or indirectly through one or more intermediaries, controls a majority of the voting shares of Principal Project Company, or controls the election of a majority of the board of directors, trustees or other persons exercising similar functions for Principal Project Company. For purposes of this definition, the term “control” means the possession, directly or indirectly, of the power to cause the direction of the management of a Person, whether through voting rights or securities, by contract, family relationship or otherwise.

**Controlling Work Item** means the activity or work item on the Critical Path of the D&C Work having the least amount of total float.

**Core Hours** means the period:

- (a) for Maintenance and Transit Spaces, commencing at 4am and ending at 10pm, every day of every week.
- (b) for Office/Admin and Training Spaces, commencing at 8am and ending at 5pm, Monday to Friday of every week.

**Corrected Aggregate Energy Consumption** or **CAEC** means, for a Contract Year, the Aggregate Actual Consumption less the Non-Regulated Load consumption with appropriate adjustments for the Climate Baseline.

**Cost and Pricing Data** means the data (including calculations, formulas, unit and material prices, and other cost and fee information) acknowledged and accepted by Principal Project Company and delivered by Lead Developer as specified in the Predevelopment Agreement, which data supports and explains the basis of Principal Project Company’s cost estimates for development, design, construction, operations, and maintenance of the Project and provides all cost assumptions for human resources, including salary and benefits for non-management personnel performing the Work.

**Cost to Complete** means (without double-counting):

- (a) those costs (internal and external) that City reasonably and properly projects that it will incur in carrying out any process to request tenders from any parties interested in entering into a contract with City to achieve Final Acceptance, including all costs related to the preparation of tender documentation, evaluation of tenders and negotiation and execution of relevant contracts; plus

- 
- (b) costs that City reasonably and properly projects that it will incur in achieving Final Acceptance; plus
  - (c) any other Losses that, but for the termination of this Agreement, City would not have incurred prior to Final Acceptance; minus
  - (d) any insurance proceeds available to City for the purposes of achieving Final Acceptance.

**COTS** (or, **Commercially Available Off-the-Shelf Software**) means Software (i) sold in substantial quantities, (ii) readily available to City without Principal Project Company or third party participation, (iii) provided without modification in the same form in which it is sold in the commercial marketplace, and (iv) for which there are at least two (2) readily available alternative solutions or items with the same or substantially similar design, use or function as the proposed COTS. For the avoidance of doubt, COTS does not include so-called open source software or sole-source software.

**Credit Spread Risk Mitigation** has the meaning set forth in Section 3.2.3.2.

**Critical Path** means each critical path on the Project Schedule, which ends on the Substantial Completion Deadline or the Final Acceptance Deadline, as applicable (i.e., the term shall apply only following consumption of all available Float in the schedule for Substantial Completion or Final Acceptance, as applicable). The lower case term "critical path" means the activities and durations associated with the longest chain(s) of logically connected activities through the Project Schedule with the least amount of total float for all chains.

**Critical Path Method (CPM)** is a method of planning and scheduling a construction project where activities are arranged based on activity relationships.

**Current Status Documents** has the meaning set forth in Section 1.6.3(C) of Division 1 of the Technical Requirements.

**D&C Contract** means:

- (a) this Agreement, where Principal Project Company will self-perform the D&C Work; or
- (b) the contract for the D&C Work entered into between Principal Project Company and D&C Contractor dated on or about the date of this Agreement, where Principal Project Company will not self-perform the D&C Work; and
- (c) any other contract between Principal Project Company and a Subcontractor for the undertaking of the D&C Work.

**D&C Contract Amount** means [\$●].

**D&C Contractor** means the Contractor primarily responsible for the D&C Work.

**D&C Noncompliance** means and where a D&C Failure Event occurs which, where a Rectification Time applies, has not been Rectified within the relevant time. For the avoidance of

---

doubt, where no Rectification Time applies (for example, in respect of scheduled activities) there shall be a D&C Failure at the point at which the D&C Failure Event occurred (for example, non-performance of the scheduled activity by the scheduled time).

**D&C Failure Event** means each event identified in Appendix A (D&C Noncompliance Points and Deductions) of Exhibit 4 (Payment Mechanism) which occurs prior to the Final Acceptance Date.

**D&C Noncompliance Points** means points accrued in association with each D&C Noncompliance as set out in Section 2 (Escalation Factor) of Exhibit 4B (Availability Payment Mechanism).

**D&C Management Plan** means the City-approved document attached at Exhibit 2 (Project Management Plan) setting forth Principal Project Company's prescribed approaches to, and plan for, its scope of Work, as it may be modified and updated from time to time, following written approval thereof by City. The preliminary D&C Management Plan shall be replaced by the final approved D&C Management Plan, which shall be developed by Principal Project Company and approved by City pursuant to Division 1 of the Technical Requirements, as a condition precedent to issuance of NTP 2, as updated in accordance with this Agreement.

**D&C Payment Bond** means the payment bond(s) to secure payment for labor and materials for the D&C Work, as required under this Agreement.

**D&C Percentage** means the value of Design Work, Construction Work, and Work relating to the manufacturing and supply of equipment, completed at a given point in time divided by the value of the total Design Work, Construction Work, and Work relating to the manufacturing and supply of equipment required to be completed to achieve Final Acceptance.

**D&C Performance Bond** means the performance bond(s) securing performance of the D&C Work required under this Agreement.

**D&C Performance Security** has the meaning set forth in Section Error! Reference source not found.

**D&C Period** means that portion of the Term that commences on the Effective Date and ends at 11:59 p.m. on the day immediately preceding the Substantial Completion Date.

**D&C Period Deduction** means a deduction from the Milestone Payment made in accordance with Section 2 (D&C Period Deductions) of Exhibit 4A (Milestone Payment Mechanism).

**D&C Site** means the real property owned by City, under the jurisdiction of SFMTA, commonly known as 2500 Mariposa Street in San Francisco, California, which is a 4.4-acre site comprised of Assessor's Block No. 3971-001, bounded by Bryant Streets, 17th Street, Hampshire Street, and Mariposa Street, any Additional Properties acquired by City in accordance with Section 7.5.1 (Additional Acquisitions), and such additional areas as may, from time to time, be designated in writing by City for Principal Project Company's use in performance of the Work. If the parcel is later subdivided to accommodate a Joint Development Alternative, this definition may be amended upon mutual agreement. For purposes of insurance (subject to any notification and other requirements imposed by the insurer(s) for approval), indemnification, safety and security requirements, the prevailing wage requirements, and payment for use of

equipment, the term “Project Site” shall also include (a) the field office sites, (b) any property used for bonded storage of material for the Project approved by City, (c) staging areas dedicated to the Project, and (d) areas where activities incidental to the Project are being performed by Principal Project Company and Contractors covered by the worker’s compensation policy but excluding any permanent locations of Principal Project Company or such covered Contractors.

**D&C Quality Management Plan** means Principal Project Company’s plan to ensure that the Project deliverables and completed Work meet the minimum required standards of quality, prepared and submitted by Principal Project Company in accordance with Section 1.4 of Division 1 of the Technical Requirements, as updated and approved by the City in accordance with this Agreement.

**D&C Work** means all Work to be performed to achieve Final Acceptance, including Design Work and Construction Work.

**D&C Work Value** means an amount equal to the D&C Contract Amount minus the aggregate of (i) the Cost to Complete, (ii) the amount of the Milestone Payment if paid to Principal Project Company prior to the Early Termination Date, (and (iii) any Deduction or other reduction to the Milestone Payment or any Availability Payments under Exhibit 4 (Payment Mechanism) accrued prior to the Early Termination Date that has, in each case, not been deducted from the Milestone Payment or any Availability Payment (as applicable).

**Day** means calendar day, unless otherwise expressly specified.

**DBE Compliance Manual** means **[Note: City to provide definition]**

**DBE Contractor** means **[Note: City to provide definition]**

**Deduction** means a D&C Period Deduction or an IFM Period Deduction, or both as the context requires.

**Deduction Amounts** means the amount in dollars of each Deduction associated with a D&C Period Deduction, and/or an IFM Period Deduction in accordance with the applicable Functional Component Rank category in Appendix B (Response and Rectification Times) to Exhibit 4B (Availability Payment Mechanism).

**Default Notice** has the meaning set forth in Section 16.1.2.2.

**Default Termination Event** has the meaning set forth in Section 17.3.1.1.

**Defect** means a defect, whether due to design, construction, installation, damage or wear, affecting the condition, use, functionality or operation of any element of the Project, which would cause or have the potential to cause one or more of the following:

- (a) a hazard, nuisance or other risk to public or worker health or safety, including the health and safety of Building Occupants;
- (b) a structural deterioration of the affected element or any other part of the Project;

- 
- (c) damage to a Third Party's property or equipment;
  - (d) damage to the Environment; and
  - (e) failure of the affected element to meet the requirements of the Contract Documents.

**Deferred Equity Amounts** means, on any date, any amount of unfunded cash equity that has been committed to Principal Project Company (including commitments to provide an Equity Investment or Equity Member Debt) and is shown to be available for use in the Financial Model prior to the Final Acceptance Date, but only to the extent that the commitment to provide such amount is supported by an Equity Letter of Credit.

**Delay Costs** means direct costs incurred by Principal Project Company relating to Controlling Work Items that result solely and directly from a Delay Event, which are limited to those costs identified in and calculated in accordance with Exhibit 13 (Costs Schedule). The term "Delay Costs" does not include any Extra Work Costs, including those incurred by Principal Project Company that relate to non-Controlling Work Items incident or collateral to a Delay Event or Controlling Work Items that do not result solely and directly from a Delay Event. In any event, Principal Project Company shall not be entitled to Delay Costs to the extent Principal Project Company is responsible for the delay or could have reasonably mitigated.

**Delay Event** means any of the following events or circumstances that occurs prior to the Final Acceptance Date and directly impacts the D&C Work:

- (a) an Unavoidable Delay Event; or
- (b) a Compensable Delay Event.

**Delayed Financial Close Date** has the meaning set forth in Section 3.4.2(a).

**Demand Maintenance** means all unscheduled, corrective, or first response maintenance (other than Scheduled Maintenance) to the Maintained Elements, which includes the response to malfunctions and provision of minor repairs, adjustments and general maintenance as follows:

- (a) first response to equipment malfunctions and assessment of the problem (e.g., operator error, Utility problem, minor or major failure), and required response; and
- (b) performance of minor repairs and general maintenance, including topping-up fluids, adjustments, resets, clearing blockages, minor carpentry and replacing minor parts such as rollers, wheels, pulley and hoses.

**Demand Requisition** means a requisition for Demand Maintenance.

**Design Deliverables** has the meaning set forth in Section 1.8.5 of Division 1 of the Technical Requirements.

**Design Documents** means all studies, quantitative assessments, evaluations, reports, documents, calculations, plans, drawings, diagrams, specifications, and other documentation

that manifest the design for the Project, at all stages, as developed by Principal Project Company or any portion, component or element thereof, including design required in connection with the operation and maintenance of the Project and Renewal Work, in each case regardless of whether such documents are required by the Contract Documents or are prepared or used by Principal Project Company in the Design Work. Design Documents include the Final Design Documents.

**Design Management Plan** means Principal Project Company's plan describing its approach to undertake and achieve the requirements in Section 1.8 of Division 1 of the Technical Requirements, prepared and submitted by Principal Project Company in accordance with Section 1.1.7.1 of Division 1 of the Technical Requirements, as updated and approved by the City in accordance with this Agreement.

**Design Work** means all Work related to the design, engineering, architecture and other professional services for the Project, including all such Work relating to the Infrastructure Facility. Design Work includes any Early Works related to the design, engineering, architecture and other professional services for the Project.

**Developed IP** means Intellectual Property that is authored, created, invented or reduced to practice under or for the purposes of this Agreement, the Work or the Project, whether or not such Intellectual Property is incorporated into the Project IP but excluding any adaptation, continuation or derivative work that constitutes PPC Intellectual Property.

**Deviation(s)** means any change, deviation, modification or alteration from the Technical Requirements (other than Change Orders and amendments to this Agreement). Deviations are not intended to amend or modify portions of this Agreement other than the Technical Requirements.

**Direct Agreement** means the agreement substantially in the form of Exhibit 5B (Form of Direct Agreement), by and among City, Principal Project Company and the Lender (or if there is more than one Lender, the Collateral Agent on behalf of the Lenders) in connection with Lenders' rights in relation to the Contract Documents.

**Dispatch Function** means the Functional Components corresponding to Functional Unit references L2-011 as specified in Table B6 (Functional Components and Functional Units for Infrastructure Facility) of Appendix B (Functional Areas, Functional Units, Functional Unit Rankings and Deduction Amounts for Availability Failures and Service Failures) of Exhibit 4B (Availability Payment Mechanism).

**Distributions** means the proceeds of any Refinancing to the extent such proceeds are distributed to any Equity Member or to any Affiliate of Principal Project Company, and any of the following, whether in cash or in kind, and whether made or projected to be made to any Equity Member, an Affiliate of Principal Project Company. Any:

- (a) Dividend or other distribution in respect of any equity interest of any class;
- (b) Payments or other distributions in reduction of capital, redemption or purchase of shares or any other reorganization or variation to share capital;
- (c) Payments in respect of Equity Member Debt (whether of fees, principal, interest

---

including capitalized interest and interest on overdue interest, breakage costs, or otherwise and whether or not such items are included or excluded from the definition of Equity Member Debt);

- (d) Payment, loan, contractual arrangement, including any management agreement or payment in respect thereof, or transfer of assets or rights, in each case to the extent made or entered into after the date of this Agreement and not in the ordinary course of business nor on reasonable commercial terms including to any Equity Member, or any Affiliate of any Equity Member; and
- (e) Conferral of any other benefit which is not received in the ordinary course of business and not on commercially reasonable terms, including to any Equity Member, any Affiliate of any Equity Member or to Principal Project Company;
- (f) Other payment to any Equity Member, any current or former Affiliate of any Equity Member or Principal Project Company howsoever arising and whether made under the terms of an agreement or otherwise or in respect of any equity interest of any class in the capital of Principal Project Company if, in any such case, such payment would not have been made were it not for the occurrence of any Refinancing or Change in Control; or
- (g) Early release of any contingent funding liabilities, the amount of such release being deemed to be a gain for the purposes of any calculation of Refinancing Gain.

**Early Termination Date** means the effective date of termination of this Agreement prior to the stated expiration of the Term set forth in Section 2.3 (Term).

**Early Works** has the meaning set forth in the Early Works Agreement.

**Early Works Agreement** means the agreement entered into by City and Principal Project Company or an Affiliate with respect to the performance of certain Work by Principal Project Company or such Affiliate during the PDA Term and prior to Financial Close.

**Earthquake** means all land movement due to seismic activity, including shocks, tremors, volcanic action, tsunami and earth rising or shifting, including any aftershocks or other Earthquakes for a period of 168 hours after the initial event, which proximately causes damage to the physical improvements of the Project or interrupts the Work.

**Earthquake Inspection Plan** means the plan detailing an approach to minimize delay in re-occupying the Infrastructure Facility following a significant seismic event as part of the City of San Francisco's Building Occupancy Resumption Program (BORP), prepared and submitted by Principal Project Company in accordance with Section B.23.1(5) of the IFM Specifications, as updated and approved by the City in accordance with this Agreement.

**Effective Date** means the date of Commercial Close.

**Eligible Investments** has the meaning set forth in Section 8.6.2.3.

---

**Eligible LC Issuer** means a financial institution with long term unsecured debt ratings of at least the following, from at least two of the listed major rating agencies: (a) A- by Standard & Poor's Ratings Services; (b) A3 by Moody's Investor Service, Inc.; or (c) A- by Fitch Ratings.

**Eligible Surety(ies)** means a surety or insurance company, as applicable, meeting the requirements of applicable Law, licensed or authorized to do business in the State and rated at least "A" (excellent or above) according to A.M. Best's Financial Strength Rating and "VIII" or better according to A.M. Best's Financial Size Rating.

**Emergency** means any unplanned event within or adjacent to the Project Site that (a) causes or has the potential to cause disruption to operation of the Infrastructure Facility, (b) presents an immediate or imminent threat to the long term integrity of any part of the Facility, to the Environment, to property immediately adjacent to the Facility or to the safety of Building Occupants or the traveling public, or (c) is recognized or declared to be an emergency by the Mayor, Board of Supervisors, any other City official authorized under law, the Governor of the State, the Federal Emergency Management Administration (FEMA), the U.S. Department of Homeland Security or other Governmental Entity with authority to declare an emergency.

**Energy** means energy/power including electricity and natural gas.

**Energy Analysis Report** has the meaning set forth in Section 4.7 of Exhibit 12.

**Energy Pain Share/Gain Share Mechanism** means the energy risk share amount calculated pursuant to Appendix B (Functional Areas, Functional Units, Functional Unit Rankings and Deduction Amounts for Availability Failures) to Exhibit 4B (Availability Payment Mechanism).

**Energy Performance Commencement Date** means the date on which the Independent Energy Auditor issues the AET that is agreed to by Principal Project Company and City.

**Energy Service** means any calculated or metered provision of Energy in respect of the Regulated Load and Non-Regulated Load at the Utility connection.

**Engineer of Record (EOR)** has the meaning set forth in Section 1.1.4.2 of Division 10 of the Technical Requirements.

**Environment** means air, soils, submerged lands, surface waters, groundwaters, land, stream sediments, surface or subsurface strata, biological resources, including endangered, threatened and sensitive species, natural systems, including ecosystems, cultural (including historic and archaeological) resources and paleontological resources.

**Environmental Approvals** means all Regulatory Approvals arising from or required by any Environmental Law in connection with the Project.

**Environmental Compliance Plan** means the procedures and plans described in Sections 01 35 49, 01 35 50 and 01 35 51 of Division 10 of the Technical Requirements.

**Environmental Law(s)** means (a) any Law applicable to the Project or the Work regulating or imposing liability or standards of conduct that pertains to the Environment, Hazardous Materials, contamination of any type whatsoever, or health and safety matters, and (b) any requirements and standards that pertain to the protection of the Environment, or to the management or

---

Release of Hazardous Materials, contamination of any type whatsoever, or health and safety matters with respect to Hazardous Materials, set forth in any agreements, permits, licenses, approvals, plans, rules, regulations or ordinances adopted, or other criteria and guidelines promulgated, pursuant to Laws applicable to the Project or the Work, as each of the foregoing have been or are amended, modified, or supplemented from time to time (including any present and future amendments thereto and reauthorizations thereof), including those relating to:

- (a) the manufacture, processing, use, distribution, existence, treatment, storage, disposal, generation and transportation of Hazardous Materials;
- (b) air, soil, surface and subsurface strata, stream sediments, surface water, and groundwater;
- (c) releases of Hazardous Materials;
- (d) protection of wildlife, endangered, threatened, and sensitive species, wetlands, water courses and water bodies, paleontological, cultural, archaeological and historical resources and natural resources;
- (e) the operation and closure of underground or aboveground storage tanks;
- (f) health and safety of employees and other persons with respect to Hazardous Materials; and
- (g) notification, documentation and record keeping requirements relating to the foregoing.

Without limiting the above, the term “Environmental Laws” shall also include the following (each as may be amended from time to time):

- (i) the National Environmental Policy Act (42 U.S.C. § 4321 et seq.);
- (ii) the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. § 9601 et seq.) and associated Superfund Amendments and Reauthorization Act (42 U.S.C. § 9601 et seq.);
- (iii) the Solid Waste Disposal Act (42 U.S.C. § 6901 et seq.);
- (iv) the Emergency Planning and Community Right to Know Act of 1986 (42 U.S.C. § 11001 et seq.);
- (v) the Clean Air Act (42 U.S.C. § 7401 et seq.);
- (vi) the Federal Water Pollution Control Act, as amended by the Clean Water Act (33 U.S.C. § 1251 et seq.);
- (vii) the Resource Conservation and Recovery Act (42 U.S.C. § 6901 et seq.);
- (viii) the Hazardous and Solid Waste Amendments of 1984 (42 U.S.C. § 6924 et seq.);

- 
- (ix) the Toxic Substances Control Act (15 U.S.C. § 2601 et seq.);
  - (x) the Hazardous Materials Transportation Act (49 U.S.C. § 5101 et seq.);
  - (xi) section 404 of the Clean Water Act (33 U.S.C. § 1344);
  - (xii) the Oil Pollution Act (33 U.S.C. § 2701 et. seq.);
  - (xiii) the Federal Insecticide, Fungicide and Rodenticide Act (7 U.S.C. § 136 et seq.);
  - (xiv) the Federal Safe Drinking Water Act (42 U.S.C. § 300 et seq.);
  - (xv) the Federal Radon and Indoor Air Quality Research Act (42 U.S.C. § 7401 et seq.);
  - (xvi) the Occupational Safety and Health Act (29 U.S.C. § 651 et seq.);
  - (xvii) the Endangered Species Act (16 U.S.C. § 1531 et seq.);
  - (xviii) the Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.);
  - (xix) the California Environmental Quality Act (§ 21000 et seq. of the California Public Resources Code);
  - (xx) the California Clean Air Act of 1988 (§ 39000 et seq. of the California Health and Safety Code);
  - (xxi) the California Occupational Safety and Health Act of 1973 (§ 6300 et seq. of the California Labor Code);
  - (xxii) the Porter-Cologne Water Quality Act (§ 13000 et seq. of the California Water Code);
  - (xxiii) the Integrated Waste Management Act of 1989 (§ 40000 et seq. of the California Public Resources Code);
  - (xxiv) the Safe Drinking Water and Toxic Enforcement Act of 1986 (§ 25249.5 et seq. of the California Health and Safety Code);
  - (xxv) Hazardous Waste Control (§ 25100 et seq. of the California Health and Safety Code); and
  - (xxvi) Fish and Wildlife Protection and Conservation (§ 1600 et seq. of the California Fish and Game Code).

**Environmental Management System** or **EMS** means the system prepared and submitted by Principal Project Company and approved by the City in accordance with Section B.22.2 of the IFM Specifications, as updated in accordance with this Agreement.

---

**Environmental Protection Program** means the overarching system by which Principal Project Company shall ensure that commitments made during the environmental approval and permitting processes, and other environmental requirements, be carried forward and reflected, as appropriate, in the design and implemented throughout the Work, as provided in Sections 01 35 49, 01 35 50 and 01 35 51 of Division 10 of the Technical Requirements.

**Equipment List** means the list of all FF&E for the Infrastructure Facility prepared and maintained in accordance with this Agreement which identifies PPC-Furnished FF&E, City-Furnished Equipment and Existing FF&E. The initial form of the Equipment List is included in Appendix 1 of Division 3 of the Technical Requirements.

**Equity Investment(s)** means (a) any form of direct cash investment by Equity Members, including the purchase of newly issued equity shares in Principal Project Company and/or subordinated loans to Principal Project Company, and (b) any cash draws by or on behalf of Principal Project Company under the letter(s) of credit described in the definition of Deferred Equity Amount.

**Equity IRR** means the nominal post-tax internal rate of return to the Committed Investment over the full Term calculated, using the Financial Model, at the discount rate that, when applied to Committed Investment cash flows, gives a zero net present value. Equity IRR is initially equal to the Original Equity IRR and can change when and if the Financial Model is updated pursuant to Section 4.7.2 (Updates to the Financial Model). For purposes of this definition the phrase “post-tax” refers only to U.S. federal income tax, state income tax, and San Francisco gross receipts, homelessness gross receipts, and overpaid executive gross receipts taxes liability of Principal Project Company or its Equity Members (or, if an Equity Member is a single-member limited liability company disregarded for federal and state income tax purposes, the owner of such Equity Member) and specifically excludes (a) any foreign income tax and other tax of any kind, and (b) any withholding tax, including any tax that Principal Project Company or an Equity Member is obligated to withhold on Distributions (whether actual or constructive) or other payments or allocations to Equity Members or holders of debt of or equity interests in an Equity Member under 26 U.S.C. §§ 1441 – 1446, notwithstanding 26 U.S.C. § 1461.

**Equity Letter of Credit** means an irrevocable and unconditional on-demand letter of credit (which may be annually renewable) issued by an Eligible LC Issuer for the account of an Equity Member naming Principal Project Company and/or the Collateral Agent as beneficiary and securing the provision of any Deferred Equity Amounts by a date that is not later than the Final Acceptance Date.

**Equity Member(s)** means (a) [\_\_\_\_\_] and any Person that holds a direct ownership interest (legal and beneficial) in [\_\_\_\_\_] either based on Committed Investments or as a result of an Equity Transfer; or (b) each Person that will hold a 10% or greater indirect interest in Principal Project Company.

**Equity Member(s) Debt** means bona fide indebtedness for funds borrowed that: (a) is held by any Equity Member or Affiliate of any Equity Member; and (b) is subordinated in priority of payment and security to all Project Debt held by Persons who are not Equity Members or Affiliates of any Equity Member.

---

**Equity Members Funding Agreement** means any loan agreement, credit agreement or other similar financing agreement or subordination agreement providing for or evidencing Equity Member Debt.

**Equity Transfer** means any assignment, mortgage, encumbrance, hypothecation, conveyance, sale, or other transfer of equity interest in Principal Project Company.

**Escalated Benchmark Insurance Premiums** has the meaning set forth in Section 10.1.3(d)(ii).

**Escalation Factor** means the escalation factor calculated in accordance with Section 2 (Escalation Factor) of Exhibit 4B (Availability Payment Mechanism).

**Exempt Refinancing** means:

- (a) any Refinancing that was fully and specifically identified and taken into account in the Base Case Financial Model;
- (b) any of the following, provided that Principal Project Company does not receive a direct or indirect financial benefit therefrom, individually or in the aggregate:
  - (i) amendments, modifications, supplements or consents to Financing Agreements and Security Documents; or
  - (ii) the exercise by a Lender of rights, waivers, consents and similar actions, in the ordinary course of day-to-day loan administration and supervision;
- (c) movement of monies between the Project accounts in accordance with the terms of Financing Agreements and Security Documents;
- (d) any of the following acts by a Lender of senior lien priority Project Debt: (i) the syndication of any of such Lender's rights and interests in the senior Financing Agreements; (ii) the grant by such Lender of any rights of participation, or the disposition by such Lender of any of its rights or interests, with respect to the senior Financing Agreements in favor of any other Lender of senior lien Project Debt or any other investor; or (iii) the grant by such Lender of any other form of benefit or interest in either the senior Financing Agreements or the revenues or assets of Principal Project Company, whether by way of security or otherwise, in favor of any other Lender of senior lien Project Debt or any investor; and
- (e) periodic resetting and remarketing of tax-exempt or taxable bonds that bear interest at a variable or floating rate and are money market eligible under SEC Rule 2a-7.

**Existing FF&E** means all FF&E identified by City in the updated Equipment List under Section 7.13.2 (Selection of City-Furnished Equipment and Existing FF&E).

**External Energy Auditor** means a company licensed in California, specializing in assessing the energy efficiency of commercial and industrial buildings ('audit'), including the review of specifications, analysis of consumption data, energy modeling, and provision of recommendations.

---

**Extra Work** means any Work in the nature of additional work, altered work or deleted work that is directly attributable to the occurrence of a Compensable Delay Event, a Compensable Relief Event or uninsured Force Majeure Event (to the extent permitted under Section 14.6 (Loss or Damage Due to Force Majeure Termination Event)) and, absent the Compensable Delay Event, Compensable Relief Event or uninsured Force Majeure Event (to the extent permitted under Section 14.6 (Loss or Damage Due to Force Majeure Termination Event)), would not be required by the Contract Documents. The term “Extra Work” does not include “Delay”.

**Extra Work Costs** means the incremental increase in Principal Project Company’s cost of labor, material, equipment and other direct and indirect costs directly attributable to Extra Work, calculated in accordance with Section 1 of Exhibit 13 (Costs Schedule).

**Facility** means the Bus Yard Component, Joint Development Alternative (if built), and Common Infrastructure, collectively.

**Facility Condition Index** or **FCI** means the total maintenance, repair and replacement deficiencies of the Infrastructure Facility divided by the current replacement value of the Infrastructure Facility.

**Failure Event** means a D&C Failure Event or an IFM Failure Event, or both as the context requires.

**Failure Type** means the designation of either “SF” (Service Failure), in the Performance Measurements Table or “AF” (Availability Failure) in the case of an IFM Failure Event which has not been rectified within the relevant Rectification Time and which causes a Functional Part to be Unavailable.

**Final Acceptance** means that all D&C Work is complete and all other prerequisites for Final Acceptance have been met. Final Acceptance is deemed to have occurred upon satisfaction of all the conditions in Section 7.9 (Final Acceptance), as confirmed by City’s issuance of a certificate in accordance with the procedures and within the time frame established in Section 7.9 (Final Acceptance).

**Final Acceptance Date** means the date that Final Acceptance is achieved.

**Final Acceptance Deadline** means 180 days after the Substantial Completion Date, as such date may be extended from time to time pursuant to Section 14.1.2 (Extension of Deadlines for General Delay Events).

**Final Design** means the general design stage, consistent of all elements, collections of elements or areas of the Project at 100% design completion, as more fully set forth in the Technical Requirements, and depending on the context: the term “Final Design” may refer to (a) the Final Design Documents, (b) the design concepts set forth in the Final Design Documents or (c) the process of development of the Final Design Documents.

**Final Design Documents** means the complete final construction plans (including plan sheets, specifications, technical memoranda, reports, studies, calculations, drawings, elevations, sections, details and diagrams) and specifications needed for performance of Construction Work, which includes all Submittals specified as required to be part of the Final Design or Final Design Documents under the Technical Requirements.

---

**Final Environmental Impact Report (FEIR)** means the Final Environmental Impact Report for the Potrero Yard Modernization Project at 2500 Mariposa Street (Planning Department Case No. [\_\_\_\_]), dated [\_\_\_\_] and available at <https://sfplanning.org/environmental-review-documents?title=Potrero+Yard+Modernization+Project>.

**Final Schedule Report** means has the meaning set forth in Section 1.2.5 of Division 1 of the Technical Requirements.

**Finance Plan** means Principal Project Company's plan for financing the Project submitted to City at Performance Milestone 32 of the Predevelopment Agreement.

**Finance Plan Due Date** means the date on which Principal Project Company submitted its final Finance Plan to City at Performance Milestone 32 of the Predevelopment Agreement.

**Finance Plan Validity Period** means the period of 180 consecutive days commencing on the Finance Plan Due Date, as such period may be extended under the terms of the Predevelopment Agreement. If the period of 180 consecutive days commencing on the Finance Plan Due Date ends on a weekend or national holiday, then the Final Finance Plan Validity Period shall end on the next Business Day.

**Financial Close** means satisfaction by Principal Project Company of (a) all conditions precedent to the effectiveness of commitments of the Lenders under the Financing Documents; and (b) the conditions set forth in Section 3.2.4 (Conditions Precedent to Financial Close).

**Financial Close Date** means the date on which Financial Close occurs.

**Financial Close Deadline** means [\_\_\_\_\_, 2025], as such date may be extended by agreement of the Parties or as a result of an Adverse Event or other excuse set forth in this Agreement.

**Financial Close Security** means the bond or letter of credit in the amount of \$15,000,000 provided by Principal Project Company to City as a condition precedent to execution and delivery of this Agreement by both City and Principal Project Company.

**Financial Model** means the Microsoft Excel-based financial model that includes financial forecasts, projections and calculations with respect to revenues, expenses, the repayment of Project Debt and Distributions to Equity Members that result in achievement of the Equity IRR, which shall be in macro-enabled excel format, on electronic storage media, or in such other format and medium as the Parties may agree in writing.

**Financial Model Update(s)** has the meaning set forth in Section 4.7.2.1.

**Financial Modeling Data** means all books, documents and back-up information in any media or format setting forth all assumptions, estimates, projections, calculations and methodology used in the preparation of the Implementation Proposal, the Financial Model, and in Financial Model Updates of revenues, pricing, costs, expenses, repayment of Project Debt, Distributions and internal rate of return, including:

- (a) the logical layout and structure of the Financial Model, including the names of all worksheets and a description of the color coding and/or labeling scheme(s);

- 
- (b) an assumptions book, fully describing all assumptions and their sources underlying the estimates, projections and calculations in the Financial Model, revisions to the Base Case Financial Model in accordance with Sections 3.2.4 (Conditions Precedent to Financial Close) and 3.3.1, and updates to such assumptions book related to Financial Model Updates;
  - (c) a detailed description of the function and intended use of all macros (each of which must be logically structured and well documented with comments included within the programming code);
  - (d) the step-by-step instructions on the procedure to run and to optimize the Financial Model submitted with the Finance Plan and each Financial Model Update, such that City will be able to read, use and modify the data contained therein, operate the Financial Model and conduct detailed sensitivity analyses;
  - (e) copies of all offers, and all data and information within this definition, received from all Contractors (at all tiers) identified in the Implementation Proposal;
  - (f) copies of all offers, and all data and information within this definition, received from all Contractors (at all tiers) related to any Relief Event; and
  - (g) all other supporting data, technical memoranda, calculations, formulas, unit and materials prices (if applicable) and such other cost, charge, fee, financing, equity return, and revenue information used by Principal Project Company in the creation and derivation of the Implementation Proposal, Finance Plan, the Financial Model, or of any Financial Model Update, or related to any Delay Event, Relief Event or Change Order.

**Financial Proposal** means the Financial Proposal provided at Exhibit 3A (Financial Proposal). ***[Note to PNC: This will include the Finance Plan, including the Base Case Financial Model, with its audited report, and respective commitment letters for Bank Debt, Equity Investments, Security Documents and Insurance Policies, among other documents, and including the Final Price as determined under the PDA, PPC's financing costs, along with a schedule including the proposed Milestone Payment amount and the proposed Availability Payments payable from Substantial Completion to the end of the PDA Term.]***

**Financing Agreement** means:

- (a) any loan agreement, funding agreement, account maintenance or control agreement, insurance or reimbursement agreement, intercreditor agreement, subordination agreement, trust indenture, agreement from any Equity Member in favor of any Lender, hedging agreement, interest rate swap agreement, guaranty, indemnity agreement, agreement between any Contractor and any Lender, or other agreement by, with or in favor of any Lender pertaining to Project Debt (including any Refinancing), other than Security Documents;
- (b) any note, bond or other negotiable or non-negotiable instrument evidencing the indebtedness of Principal Project Company for Project Debt (including any Refinancing); and

- 
- (c) any amendment, supplement, variation or waiver of any of the foregoing agreements or instruments.

**Financing Delay Costs** means:

- (a) in the case of Delay Events, an amount equal to principal payments, interest payments, hedging costs and other financing costs accrued and/or paid, or which became payable, by Principal Project Company to the Senior Lenders in accordance with the Financing Agreements that accrued during the period of the schedule extension granted pursuant to Section 14.1.2 (Extension of Deadlines for General Delay Events); and
- (b) in the case of City-Caused Delay Event only, such other amounts so as to result in Principal Project Company achieving the same Equity IRR (with reference to the Base Case Equity IRR) as if such Compensable Delay Event had not occurred.

**Financing Documents** means Financing Agreements and Security Documents.

**Financing Document Terms** means Exhibit 5G (Financing Document Terms).

**Fiscal Year** means the consecutive 12 calendar month period starting on July 1 and ending on June 30.

**Fixed IFM Costs** means the sum of those fixed costs:

- (a) incurred by the IFM Provider with respect to insurance premiums, office rental and office expenses, equipment hire costs, depreciation on items of equipment used by Principal Project Company in the performance of the IFM Services excluding:
- (ii) equipment incorporated into the Infrastructure Facility and not capable of being demobilized and remobilized to a different site or portion of the Work, the Project, the Infrastructure Facility, the Project Site or to another project;
  - (iii) third party accounting, audit and legal costs; and
  - (iv) any costs payable by Principal Project Company to the IFM Provider for the provision of labor,
- (a) incurred directly by the IFM Provider during the IFM Period in meeting its obligations in accordance with this Agreement and solely and directly attributable to the Project and which are not reasonably capable of being deferred or avoided by the IFM Provider; and
- (b) evidenced in writing to the reasonable satisfaction of the City's Authorized Representative.

**Float** means the amount of time that any given activity or logically connected sequence of activities shown on the Project Schedule may be delayed before it will affect the Substantial

Completion Deadline or Final Acceptance Deadline, as applicable. Float is generally identified on the Project Schedule as the difference between the early start date and late start date, or early completion date and late completion date for activities shown on the Project Schedule, and shall include any float contained within an activity as well as any period containing an artificial activity (that is, an activity that is not encompassed within the meaning of the definition of “D&C Work”).

**Force Account Work** means Change Order work that City authorizes and will pay for on the basis of direct costs plus markup on direct costs for overhead and profit as provided in Exhibit 13 (Costs Schedule).

**Force Majeure Event** means the occurrence of any of the following events or circumstances which directly causes either Party to be unable to perform all or a material part of its obligations under this Agreement:

- (a) war (including civil war or revolution), invasion, violent act of foreign enemy or armed conflict occurring within the continental United States or military or armed blockade, or military or armed takeover of the Project;
- (b) any act of terrorism, riot, insurrection, civil commotion or sabotage that causes direct physical damage to, or otherwise directly causes interruption to construction or direct losses during maintenance of, the Project;
- (c) national or state-wide strikes not specific to Principal Project Company, or embargoes, that, in each case, directly cause interruption to construction or direct losses during maintenance of the Project;
- (d) nuclear, radioactive, or biological contamination of the Project unless the source or cause of the contamination is brought to or near the Project Site by PPC-Related Entities, or is the result of any PPC Fault;
- (e) flood, fire, explosion, tidal wave, sinkhole caused by natural events, or landslide caused by natural events, in each case, occurring within the City and directly impacting the Project or performance of Work;
- (f) SFMTA staff strikes and work stoppages not caused by PPC Fault that directly cause interruption to construction or direct losses during maintenance of the Project;
- (g) any City, or governor-declared, Emergency within the limits or precluding access to the Project Site;
- (h) (i) any epidemic in the State; or (ii) Pandemic (defined as the worldwide spread of a disease due to lack of immunity in most people, excluding COVID-19);
- (i) a Change in Law (other than a Relevant Change in Law);
- (j) an electricity outage upstream from the connection to the Project Site that affects prosecution of the IFM Services, provided that Principal Project Company was not, in whole or in part, the cause of such outage and was in compliance with

---

Section 2.10.5 of Division 3 of the Technical Requirements and all other requirements in the Contract Documents regarding back-up power for the Project; and

- (k) a seismic event in excess of a magnitude 3.5 on the Richter Scale, where (i) such Earthquakes, ground shaking, liquefaction, settlement, or ground movements directly impact, and cause damage to, temporary or permanent works of the Project; and (ii) such event is not insured or required to be insured under the terms of the Contract Documents.

**Force Majeure Termination Event** has the meaning given in Section 17.2.1.

**Functional Component** means a room, space or system within a Functional Unit in the Infrastructure Facility, which is specified as such in Appendix C (Functional Areas, Functional Units, Functional Unit Rankings and Deduction Amounts for Availability Failures) of Exhibit 4 (Payment Mechanism).

**Functional Component Rank** means the rank on a scale of 1 to 5 ascribed to each Functional Component in the Infrastructure Facility for the purpose of establishing Deduction Amounts associated with each Functional Component and calculating Deductions for Availability Failures based on the Rectification Time as set out in Appendix B (Response and Rectification Times) of Exhibit 4 (Payment Mechanism).

**Functional Part** means either a Functional Unit or a Functional Component.

**Functional Unit** means an area of the Infrastructure Facility specified as such in Appendix C (Functional Areas, Functional Units, Functional Unit Rankings and Deduction Amounts for Availability Failures) of Exhibit 4 (Payment Mechanism) comprising one or more Functional Components.

**Geotechnical Baseline Report (GBR)** means the report entitled Geotechnical Baseline Report, set forth in Appendix A of Division 3 of the Technical Requirements.

**Good Faith Efforts** means (a) with respect to DBE, the efforts to meet the DBE goal required under 49 CFR Part 26, Appendix A, (B) with respect to SBE, the efforts to meet the SBE Goal required by the Project Agreement.

**Good Industry Practice** means:

- (a) in the case of Work (excluding the Design Work), the exercise of the degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced constructor, supplier, operator or maintenance provider, as applicable, operating in the United States under the same or similar circumstances and conditions, seeking in good faith to comply with its contractual obligations, the Contract Documents and all applicable Laws and Regulatory Approvals in conformance with all professional engineering principles, construction, operations and maintenance practices generally accepted as standards of the industry in the State. With respect to storm water management for construction activities, Good Industry Practice means Best Management Practices;

in the case of Design Work, the exercise of the degree of skill, diligence, prudence, and foresight which would reasonably and ordinarily be expected from a professional designer or engineer, as applicable, operating in the United States under the same or similar circumstances and conditions, seeking in good faith to comply with its contractual obligations, the Contract Documents and all applicable Laws and Regulatory Approvals and engaged in the same type of undertaking under circumstances similar to the Project and conditions similar to those within the same geographic area as the Project Site.

**Government Code Dispute** has the meaning set forth in Section 18.4 (Government Code Dispute).

**Governmental Entity(ies)** means City in its regulatory capacity, any federal, state, local or foreign government and any political subdivision or any governmental, quasi-governmental, judicial, public or statutory instrumentality, administrative agency, authority, body or entity other.

**Governmental Utility(ies)** has the meaning set forth in Section 00 73 20 of Division 10 of the Technical Requirements.

**Handback** means the stage when Principal Project Company has done everything that this Agreement requires to enable Principal Project Company to handover the Project to meet the Handback Requirements at the end of the Term or Early Termination Date.

**Handback Inspection** has the meaning set forth in Section 8.5.4.1(c).

**Handback Renewal Work** means the Renewal Work required in order for the Project to meet the Handback Requirements.

**Handback Renewal Work Plan** means the plan prepared and submitted by Principal Project Company in accordance with Section F of the IFM Specifications, as updated and approved by the City in accordance with this Agreement.

**Handback Requirements** means the terms, conditions, requirements and procedures governing the condition in which Principal Project Company is to deliver the Infrastructure Facility and the Project Site upon Handback, as stated in Section F of the IFM Specifications.

**Handback Requirements Letter(s) of Credit** has the meaning set forth in Section 8.6.5.1.

**Handback Requirements Recovery Plan** means the plan to perform additional work needed to meet the Handback Requirements at the end of the IFM Period prepared and submitted by Principal Project Company in accordance with Section F.2 of the IFM Specifications, as updated and approved by the City in accordance with this Agreement.

**Handback Requirement Recovery Work** means the additional work as identified in the Handback Requirements Recovery Plan needed to bring any element of the Infrastructure Facility to meet the Handback Requirements.

**Handback Requirements Reserve Account** means the account established pursuant to Section 8.6.1.1.

---

**Handback Requirements Reserve Balance** means: (a) if no Handback Requirements Letter of Credit is delivered pursuant to Section 8.6.5.1, all amounts standing to the credit of the Handback Requirements Reserve Account on the Termination Date; or (b) if any Handback Requirements Letter of Credit is delivered pursuant to Section 8.6.5.1, all amounts that would have been standing to the credit of the Handback Requirements Reserve Account on the Termination Date if no Handback Requirements Letter of Credit had been delivered pursuant to Section 8.6.5.1.

**Handback Reserve Amount** has the meaning set forth in Section 8.5.4.2(h).

**Handback Year** means each consecutive 12 calendar month period commencing seven full years before the expected end of the Term.

**Hazardous Material(s)** means any (a) substance, product, waste, pollutant, contaminant or other material of any nature whatsoever that exceeds maximum allowable concentrations for that material, as defined by any Environmental Law; (b) substance, product, waste, pollutant, contaminant or other material of any nature whatsoever that is or becomes listed, regulated, or addressed under any Environmental Law; (c) substance, product, waste, pollutant, contaminant or other material of any nature whatsoever which may give rise to liability under clause (a) or (b) or under any statutory or common law theory based on negligence, trespass, intentional tort, nuisance, or strict liability or under any reported decisions of a state or federal court; (d) petroleum hydrocarbons excluding de minimis amounts and excluding petroleum hydrocarbon products contained within regularly operated motor vehicles; and (e) hazardous building materials including asbestos or asbestos-containing materials, lead or PCBs in structures and/or other improvements on or in the Project Site or in subsurface artifacts. The term “Hazardous Materials” includes Hazardous Waste and contaminated materials.

**Hazardous Materials Event** means Hazardous Materials in, over, under or emanating from the Project Site or which has migrated onto the Project Site from land or premises adjoining the Project Site that (1) render use of the Project unsafe or potentially unsafe absent assessment, containment and/or remediation, or (2) are required by applicable Law to be recycled, treated or stored, excluding Hazardous Materials:

- (a) that are Known or Suspected Hazardous Materials; and
- (b) to the extent caused, contributed, or, once discovered, exacerbated, by any PPC-Related Entity.

**Hazardous Materials Management** means procedures, practices and activities to address and comply with Environmental Laws and Environmental Approvals with respect to Hazardous Materials encountered, impacted, caused by or occurring in connection with the Project, Project Site or the Work (including demolition Work), including investigation and remediation of such Hazardous Materials. Hazardous Materials Management may include sampling, characterization, stock-piling, storage, backfilling in place, asphalt batching, recycling, treatment, clean-up, remediation, transportation and/or off-site disposal of Hazardous Materials, whichever approach is effective, most cost-efficient and permitted under applicable Law.

**Hazardous Waste** means waste as defined in 40 CFR Part 261 and/or 22 California Code of Regulations 66260.10.

---

**HCC Agreement** means an agreement between City and the Housing Project Company (or between City and the Principal Project Company and assigned by Principal Project Company to a Housing Project Company), pursuant to which City will grant a long-term real property interest in certain premises for the development of the Housing and Commercial Component.

**Health and Safety Plan** means Principal Project Company's plan describing the policies and procedures to be followed by all PPC personnel at the Site under CFR Title 29, CCR Title 8 and other applicable regulations, prepared and submitted by Principal Project Company in accordance with Section 01 35 45 of Division 10, as updated and approved by the City in accordance with this Agreement.

**Help Desk** means the contact point to be established by Principal Project Company pursuant to these IFM Specification for the notification of Failure Events and other day to day matters arising in relation to the provision of IFM Services.

**Help Desk Services** means services described in Section B.17 of the IFM Specifications, including methods and systems to receive, track and dispatch work requests, and track IFM Failure Events.

**Housing and Commercial Component** or **HCC** means the Facility's housing and commercial component, which, if implemented, would include the commercial space, the housing units and their associated support spaces (e.g., lobbies, vertical and horizontal circulation, storage, open space, rooms for building systems, offices for property management and residential services, and resident amenities such as laundry and community rooms) that are not used for the Bus Yard Component or the Common Infrastructure.

**IFM Contract** means each Contract between Principal Project Company and an IFM Provider. There may be more than one IFM Contract concurrently in effect.

**IFM Failure Event** means an incident or state of affairs which does not meet or comply with the IFM Specifications and/or results in an Availability Condition not being met in a Functional Part. An IFM Failure Event will become:

- (a) an Availability Failure, if it causes a Functional Unit or Functional Component (as the case made be) to be Unavailable and the IFM Failure Event is not Rectified within the Rectification Time;
- (b) separate and distinct Service Failures, if the IFM Failure Event is not Responded to within the Response Time or Rectified within the Rectification Time (in the case of IFM Failure Events requiring Rectification which do not constitute a breach of the Availability Conditions); or
- (c) if, in accordance with Performance Measurements Table, no Rectification Time or Response Time applies, the IFM Failure Event shall be a Service Failure.

**IFM Management Plan** means the document titled "IFM Management Plan" that is included in the approved PMP, which is attached as part of Exhibit 2 (Project Management Plan). The preliminary "IFM Management Plan" will be replaced with a final approved "IFM Management Plan", which shall be developed and submitted by Principal Project Company and approved by the City pursuant to Section 1.1.8 of Division 1 of the Technical Requirements and applicable

sections of the IFM Specifications, as updated in accordance with this Agreement.

**IFM Noncompliance Point(s)** means an accrual of points in accordance with Section 6 (IFM Noncompliance Points System) of Exhibit 4B (Availability Payment Mechanism).

**IFM Operations Committee** has the meaning set forth in Section B.9.1.2 (IFM Operations Committee) of the IFM Specifications.

**IFM Period** means that portion of the Term commencing on the later of the Substantial Completion Date and the Substantial Completion Deadline and ending on the Termination Date.

**IFM Period Deduction(s)** means an Availability Deduction and/or a Service Failure Deduction from the Availability Payment in accordance with Section 3 (Deductions from Availability Payments) of Exhibit 4B (Availability Payment Mechanism).

**IFM Project Site** means the real property owned by City, under the jurisdiction of SFMTA, on which the Infrastructure Facility is located as described and shown on the [IFM Site Plan]t. For purposes of insurance (subject to any notification and other requirements imposed by the insurer(s) for approval), indemnification, safety and security requirements, the prevailing wage requirements, and payment for use of equipment, the term “Project Site” shall also include (a) the field office sites, (b) any property used for bonded storage of material for the Project approved by City, (c) staging areas dedicated to the Project, and (d) areas where activities incidental to the Project are being performed by Principal Project Company and Contractors covered by the worker’s compensation policy but excluding any permanent locations of Principal Project Company or such covered Contractors.

**IFM Provider** means the Contractor primarily responsible for the IFM Services.

**IFM Quality Management Plan** means the plan prepared and submitted by Principal Project Company and approved by the City pursuant to Section B.14 of the IFM Specifications, as updated in accordance with this Agreement.

**IFM Records** means all data in connection with maintenance, operation, renewals and expansion of the Project including (a) all inspection and inventory records, whether generated by Principal Project Company or a Third Party, (b) any communication to and/or from City or a Third Party, and (c) any information system (as may be introduced or amended by City from time to time) in connection with operation, maintenance, renewal or handback of the Project that City requires Principal Project Company to use or operate.

**IFM Services** means all management, engineering, repairs and maintenance, renewals and replacement, and other ancillary services required at all times for the Infrastructure Facility to allow for the ongoing operations and maintenance activities needed at the Infrastructure Facility and to meet the service requirements specified in the IFM Management Plan and the Technical Requirements. IFM Services includes Maintenance Services, Renewal Work, and Technology Enhancements, but excludes D&C Work and SFMTA O&M Services.

**IFM Services Procedures** means the procedures prepared and submitted by Principal Project Company and approved by the City in accordance with Section B.6(3) of the IFM Specifications, as updated in accordance with this Agreement.

---

**IFM Services Submittals** means all Submittals required to be submitted under this Agreement with respect to the IFM Services.

**IFM Specifications** means Division 7 of the Technical Requirements.

**Implementation Proposal** means the Financial Proposal, provided at Exhibit 3A (Financial Proposal); and the specific elements of the following documents included at Exhibit 3B (Technical Proposal Elements): (i) the Lead Developer's design submittals under the Predevelopment Agreement, (ii) the D&C Contractor's design-build proposal for the D&C Contract submitted to Lead Developer in accordance with the Predevelopment Agreement, and (c) the IFM Provider's proposal for the IFM Contract submitted to Lead Developer in accordance with the Predevelopment Agreement.

**Incidental Utility Work** means, for all Utilities, all of the following work necessary for construction of the Project, including any necessary coordination with Utility Owners and property owners, furnishing design, performing construction, and obtaining and complying with all required Regulatory Approvals:

- (a) Service Line relocations;
- (b) The adjustment of Utility appurtenances (e.g., manholes, valve boxes and vaults) for line and grade upon completion of roadway work;
- (c) Protection in Place of Utilities;
- (d) All work necessary to remove and dispose of any Utilities (whether or not in use as of the Effective Date) in situations for which leaving the Utilities in place is not feasible or not permitted, or is required in order to accommodate or permit construction of the Project, regardless of whether replacements for such Utilities are being or have been installed in other locations;
- (e) All work necessary to abandon in place any Utility in accordance with applicable Law and proper Utility Owner and/or industry procedures (e.g., flushing, capping, slurry backfill, etc.) regardless of whether replacements for such Utilities are being or have been installed in other locations;
- (f) Traffic control for Utility Adjustment work;
- (g) Resurfacing and re-striping of streets; reconstruction of curbs, gutters and sidewalks; reinstallation of signage; and reinstallation or replacement of traffic signals;
- (h) Supplemental investigation, potholing, electronic detection, surveying and any other methods used to determine Utility locations, preparation of Principal Project Company's Utility conflict matrix and other material information concerning Utilities;
- (i) Temporary Relocations; and
- (j) Earthwork trenching requested by a Utility Owner.

---

**Increased Oversight Cure Plan** means the plan including specific actions (including timeframes) to be taken by Principal Project Company, to improve its performance, prepared and submitted by Principal Project Company in accordance with Section 15.6.4(a) of the Agreement, as updated and approved by the City in accordance with this Agreement.

**Increased Oversight Threshold** means:

During the D&C Phase;

- (a) Principal Project Company receives a total of 200 or more Noncompliance Points over the course of 12 consecutive calendar months (determined on a rolling basis); or
- (b) Principal Project Company receives a total of 350 or more Noncompliance Points over the course of 36 consecutive calendar months (determined on a rolling basis);

During the IFM Period;

- (c) Principal Project Company receives a total of 1406 or more Noncompliance Points over the course of 12 consecutive calendar months (determined on a rolling basis); or
- (d) Principal Project Company receives a total of 3687 or more Noncompliance Points over the course of 36 consecutive calendar months (determined on a rolling basis); or
- (e) Principal Project Company receives a second Performance Notice, either on a successive basis or for matters related to a prior Performance Notice.

**Indemnitees** means City, including its boards and commissions, other persons and entities designated as “Indemnitees” in the Contract Documents, and all of their respective officeholders, officers, directors, agents, members, consultants, employees, authorized representatives, successors, and assigns.

**Independent Energy Auditor** or **IEA** means a company specializing in energy modelling and reporting that is a licensed, professional engineer in the state of California.

**Independent Engineer** means the independent engineering consultant retained by the Parties in accordance with Section 8.6.2 (Independent Engineer).

**Information Management Plan** means Principal Project Company’s plan describing procedures to produce and control all documentation and relevant information, prepared and submitted by Principal Project Company in accordance with Section 1.6 of Division 1 of the Technical Requirements, as updated and approved by the City in accordance with this Agreement.

**Infrastructure Facility** means the Bus Yard Component and the Common Infrastructure.

---

**Initial Financing Agreements** means the documents identified in Part A (Initial Financing Agreements) of Exhibit 5A (List of Initial Financing Documents).

**Initial Financing Documents** means Initial Financing Agreements and Initial Security Documents.

**Initial Project Debt** means the Project Debt originally incurred to finance the Project and Work, in the total face amount at each lien priority, and with the particular Lenders, set forth in the Contract Documents, which Project Debt is evidenced by the Initial Financing Agreements and secured by the Initial Security Documents.

**Initial Schedule** means the schedule attached as Exhibit 19 (Initial Schedule), setting out all the relevant D&C Work activities from Commercial Close through Final Acceptance, with key interim milestones during that period of work, and at a minimum at Level 3 defined in AACE 91R-16 “Schedule Development”.

**Initial Security Documents** means the documents identified in Part B (Initial Security Documents) of Exhibit 5A (List of Initial Financing Documents).

**Institutional Lender** means:

- (a) The United States of America, any state thereof or any agency or instrumentality of either of them, any municipal agency, public benefit corporation or public authority, advancing or insuring mortgage loans or making payments which, in any manner, assist in the financing, development, operation and maintenance of projects;
- (b) Any (i) bank, trust company (whether acting individually or in a fiduciary capacity), savings and loan organization or insurance company organized and existing under the laws of the United States of America or any state thereof, (ii) foreign insurance company or bank qualified to do business as such, as applicable under the laws of the United States of America or any state thereof, or (iii) pension fund, foundation or university or college endowment fund; provided that an entity described in this clause (b) only qualifies as an Institutional Lender if it is subject to the jurisdiction of state and federal courts in the State in any actions;
- (c) Any “qualified institutional buyer” under Rule 144(a) under the Securities Act of 1933, 15 U.S.C. § 77a et seq., or any other similar Law hereinafter enacted that defines a similar category of investors by substantially similar terms;
- (d) Any purchaser of debt securities the proceeds of which are used to finance the Project that are not publicly offered pursuant to the exception to registration provided in Section 4(2) of the U.S. Securities Act of 1933; or
- (e) Any other financial institution or entity designated by Principal Project Company and approved in writing by City; provided that such institution or entity, in its activity under this Agreement, is acceptable under then current guidelines and practices of City;

---

provided, however, that each such entity (other than entities described in clause (c) and (d) of this definition), or combination of such entities if the Institutional Lender is a combination of such entities, shall have individual or combined assets, as applicable, of not less than \$1 billion. The foregoing dollar minimums shall automatically increase at the beginning of each calendar year by the percentage increase, if any, in the CPI during the immediately preceding calendar year, determined by comparing the CPI most recently published for the immediately preceding year with the CPI most recently published for the second preceding year.

**Insurance Policy(ies)** means all of the insurance policies Principal Project Company is required to carry under Exhibit 7 (Insurance Requirements).

**Insurance Proceeds** means all proceeds from insurance payable to Principal Project Company (or that would have been payable to Principal Project Company but for Principal Project Company's breach of any obligation under this Agreement to procure or maintain said insurance) on or after the Early Termination Date.

**Insurance Review Report** means the report furnished in accordance with Section 10.1.3(b).

**Insurance Unavailability** means either:

- (a) Any Insurance Policy coverage required under Section 10.1 (Insurance) or Exhibit 7 (Insurance Requirements) is deemed unavailable under Section 10.1.4 (Insurance Unavailability); or
- (b) Provision of all such Insurance Policy coverages has become unavailable at Commercially Reasonable Insurance Rates from insurers meeting the requirements in Section 10.1.2.1 (Insurers).

For the purpose of clause (b), the only increases in premiums that may be considered are those caused by changes in general market conditions in the insurance industry affecting insurance for project-financed transit facilities, and Principal Project Company shall bear the burden of proving that premium increases are the result of such changes in general market conditions. No increase in insurance premiums attributable to particular conditions of the Project or Project Site, or to claims or loss experience of any PPC-Related Entity or Affiliate, whether under an Insurance Policy required to be placed under this Agreement or in connection with any unrelated work or activity of PPC-Related Entities or Affiliates, shall be considered in determining whether Insurance Unavailability exists or has occurred.

**Intellectual Property** means all current and future legal and/or equitable rights and interests, anywhere in the world, in know-how, patents (including applications), copyrights (including moral rights), trademarks (registered and unregistered), service marks, trade secrets (as defined by the Defend Trade Secrets Act § 2(b)(1) (18 USC § 1839(3)), and pursuant to US state and federal laws), designs (registered and unregistered), utility models, circuit layouts, mask works, business and domain names, inventions, solutions embodied in technology, and other intellectual activity, and applications of or for any of the foregoing, subsisting in or relating to the Work or IP Materials. Without limiting the foregoing, Intellectual Property includes Software and City Data. For the avoidance of doubt, Intellectual Property is distinguished from the physical, electronic, and/or mechanical embodiments of such Intellectual Property (see IP Materials).

---

**IP Escrow(s)** has the meaning set forth in Section 21.5.2 of this Agreement.

**IP Escrow Agent** has the meaning set forth in Section 21.5.2 of this Agreement.

**IP Materials** means all physical, electronic and/or mechanical embodiments of, and documents disclosing, Intellectual Property. Without limiting the generality of the foregoing, IP Materials include embodiments, documents, deliverables and/or Work incorporating concepts, inventions (whether or not protected under patent laws), works of authorship, information, new or useful art, combinations, discoveries, formulae, algorithms, specifications, manufacturing techniques, technical developments, systems, computer architecture, artwork, Software, Source Code, decompilation instructions, programming, applets, scripts, designs, procedures, processes, and methods of doing business, and any other media, materials, plans, reports, project plans, work plans, documentation, training materials, and other tangible objects produced under the Contract or required by, incorporated into or combined with the Work or the Project.

**IT / Comms Site** means those areas related to City-Furnished IT/Comms FF&E, including locations of each MDF, IDF, wireless access point, RTLS point, a 15-foot radius immediately around each of these locations, and other areas the City, acting reasonably, deems necessary and identifies for PPC at least 14 days prior to the beginning of the City Access Period.

**JDA Project Company(ies)** means an entity, including a special-purpose entity(ies), that will undertake a Joint Development Alternative pursuant to an amendment to this Agreement or a separate agreement, including an HCC Agreement (with respect to the HCC).

**JDA-Related Entity(ies)** means:

- (a) each JDA Project Company;
- (b) any other persons or entities performing any work relating to a JDA;
- (c) any Affiliate of the Principal Project Company and any affiliate of any other PPC-Related Entity, any JDA Project Company and any other JDA-Related Entity participating in or responsible for any aspect of a JDA;
- (d) any other persons or entities for which a JDA Project Company may be legally or contractually responsible;
- (e) any non-City party to any separate agreement relating to a JDA, including an HCC Agreement, including all subcontractors, subconsultants and suppliers of any tier; and
- (f) the employees, personnel, officers, directors, agents, representatives, successors and assigns of any of the foregoing.

**Joint Development Alternative or JDA** means the design, construction, operation and/or maintenance of (i) an HCC; (ii) the Paratransit Facility or (iii) any other project or portion of the Facility for an SFMTA use, if and to the extent implemented.

**Joint Technical Review** has the meaning set forth in Section 8.5.4.1.

---

**Joint Technical Review Plan** has the meaning set forth in Section Error! Reference source not found.

**Joint Technical Review Report** has the meaning set forth in Section Error! Reference source not found.

**Key Contract** means any one of the following:

- (a) all Prime Contracts for Construction Work and Design Work;
- (b) all Prime Contracts for IFM Services;
- (c) all Prime Contracts for project or program management services; and
- (d) all other Prime Contracts with a single Contractor (or a single Contractor and its affiliates) that individually or in the aggregate total in excess of \$25 million on a term (not annual) basis.

The term “Key Contracts” means all such Contracts in the aggregate or more than one of such Contracts.

**Key Contractor** means each Contractor under any Key Contract.

**Key Personnel** means, collectively, those individuals: (a) in Exhibit 20 (List of Key Personnel); and (b) appointed by Principal Project Company and approved by City from time to time to fill the “Key Personnel” positions identified in Section 1.1.4 of Division 1 of the Technical Requirements (each is a “Key Person”).

**Key Ratios** means ratios contained in the Financing Documents that have financial covenants attached to them or ratios that are condition precedents to Financial Close under the Financing Agreements.

**Known or Suspected Hazardous Materials** means Hazardous Materials (i) that are known or reasonably suspected to exist as of the Setting Date based on information, data or analysis contained or referenced in the Reference Documents as of the Setting Date; (ii) excluding Hazardous Materials that are entirely subsurface, which should have been known or reasonably suspected pursuant to a Reasonable Investigation prior to the Setting Date, including those listed in the Technical Requirements; (iii) are identified or referenced in any of the information, data, analyses or reports undertaken by Principal Project Company pursuant to the Predevelopment Agreement; (iv) constituting asbestos, lead, PCBs, any byproducts of the foregoing and/or any other material or substance indicated as present or potentially present at, in, on or under the Project Site in that \_\_\_\_\_ ***[PNC to list/identify the haz mat report(s) it has prepared during PDA Term]***; (v) anticipated or likely to be present in a building or structure that was constructed in 1915 and in continuous operation as a bus maintenance facility and heavy industrial use since that time; and/or (vi) excluding Hazardous Materials that are entirely subsurface, which should have been identified or referenced pursuant to a Reasonable Investigation undertaken pursuant to the Predevelopment Agreement. Known or Suspected Hazardous Materials include Hazardous Materials arising in or from any of the Hazardous Materials sites listed in the CEQA documents, the NEPA documents or in the Technical Requirements.

---

**Late Payment Rate** means the legal rate, as set forth in Section 685.010(a) of the California Code of Civil Procedure, as may be amended from time to time, up to a maximum amount equal to 10% per annum.

**Law(s)** means (a) any statute, law, code, regulation, ordinance, rule or common law, (b) any binding judgment (other than regarding a Claim), (c) any binding judicial or administrative writ, order, judgment, injunction, award or decree (other than regarding a Claim), (d) any written directive, guideline, policy requirement or other governmental restriction (including those resulting from the initiative or referendum process, but excluding those by City within the scope of its administration of the Contract Documents) or (e) any similar form of decision of or determination by, or any written interpretation or administration of any of the foregoing by, any Governmental Entity, in each case which is applicable to or has an impact on the Project or the Work, whether taking effect before or after the Effective Date. The term “Laws”, however, excludes Regulatory Approvals.

**Lead Developer** means and Potrero Neighborhood Collective LLC, a limited liability company organized under the laws of the State of Delaware.

**Lender(s)** means each of the holders and beneficiaries of Security Documents, including any financial guarantor providing Project Debt or any guaranty or credit enhancement in respect thereof, and their respective successors, assigns, participating parties, trustees and agents, including the Collateral Agent.

**Lenders’ Liabilities** means, at the relevant time, the aggregate of (without double counting) all principal, interest (including capitalized and default interest under the Financing Documents, but with respect to default interest, only to the extent that it arises as a result of City making any payment later than the date that it is due under this Agreement or any other default by City under this Agreement), Breakage Costs, banking fees, premiums or reimbursement obligations with respect to financial insurance policies, agent and trustee fees, costs and expenses properly incurred owing or outstanding to the Lenders by Principal Project Company under or pursuant to the Financing Documents on the Early Termination Date, including any prepayment premiums or penalties, make-whole payments or other prepayment amounts, including costs of early termination of interest rate and inflation rate hedging, swap, collar or cap arrangements, that Principal Project Company must pay, or that may be payable or credited to Principal Project Company, under any Financing Agreement or Security Document or otherwise as a result of the payment, redemption or acceleration of all or any portion of the principal amount of Project Debt prior to its scheduled payment date that were determined to be reasonable by City at the time City reviewed and approved the Financing Agreements in connection with Financial Close, as evidenced by City’s approval of such Financing Agreements.

**Lenders’ Technical Advisor (LTA)** means the Lenders’ technical advisor, [\_\_\_\_\_], and any replacement technical advisor engaged by Principal Project Company and the Lenders with respect to the Project.

**Long Stop Date** means 12 calendar months after the Substantial Completion Deadline, as such date may be extended from time to time pursuant to Section 14.1.2 (Extension of Deadlines for General Delay Events).

**Loss(es)** means, whether asserted, suffered or incurred by a Party or a Third Party, any debt, assessment, claim, action, loss, proceeding, damage, injury, liability, obligation, cost, response

---

cost, expense (including attorneys', accountants' and expert witnesses' fees and expenses (including those incurred in connection with the enforcement of any indemnity or other provision of this Agreement), loss (whether direct or indirect), proceedings, demands and charges whether arising under statute, contract or at common law), compensation, charge or liability of any kind (including fees, judgments, or penalties), and whether or not arising under or for breach of contract, in tort (including negligence), restitution, under statute or otherwise at law. Losses include injury to or death of persons, damage or loss of property, and harm or damage to natural resources, utility facilities or Intellectual Property.

**LTA Agreement** means the technical advisory agreement dated as of the Financial Close Date between Principal Project Company, the Lenders (or the Collateral Agent) and Lenders' Technical Advisor.

**Maintenance and Transit Spaces** means the areas described as Maintenance and Transit Spaces and FF&E, as set forth in in Section A.2.1.2 of the IFM Specifications, and identified as Parking, Bays and Shops, Fare Box & Clipper Card Reader Repair Shop, Service & Clean, Parts, Maintenance, Operations, Transit Services (MRO) and enclosed circulation between in the Division 3 of the Technical Requirements.

**Major Approval** means the site permit issued by the City and County of San Francisco Department of Building Inspection, acting in its regulatory capacity.

**Major Approval Conditions to Assistance** has the meaning set forth in Section 6.3.8.2.

**Major Approval Deadline** means the following time period and deadline for Principal Project Company to secure each Major Approval:

***[Note: PNC to propose time period applicable to the Major Approval for City review and approval, in its sole discretion]***

Each such time period:

- (a) begins on the date the first Major Approval request is submitted to the applicable Governmental Entity after the last to occur of (x) Principal Project Company has submitted a fully compliant and complete request and application to the applicable Governmental Entity in accordance with applicable Law and the policies and procedures of such Governmental Entity; (y) Principal Project Company has paid in full all fees and charges required for the review, consultation and issuance of the Major Approval by the applicable Governmental Entity; and (z) Principal Project Company has satisfied all other conditions to the commencement of review by the applicable Governmental Entity in accordance with applicable Law and the policies and procedures of such Governmental Entity; and ends on the date that Governmental Entity's approval is received; and
- (b) includes any Governmental Entity comment requirements and Principal Project Company resubmissions.

**Major Approval Delay** means a delay to the Work resulting from the failure to obtain a Major Approval by the applicable Major Approval Deadline where that delay is not due, in whole or in part, to a change to the Principal Project Company's design between the Effective Date and Final Design Documents (unless such design change is as a direct and sole result of a City

---

Change, Compensable Delay Event or Unavoidable Delay Event (excluding Major Approval Delay)) or due to any act or omission of any PPC-Related Entity or any PPC Fault (including any failure to provide City with an updated Project Schedule or to perform the Work in accordance with the Project Schedule).

**Major Utility Adjustment** means the following Utility Adjustments:

***[Note: PNC to propose limited list of Utility Adjustments that City would provide time / Financing Delay Costs for City review and approval, in its sole discretion.]***

**Major Utility Adjustment Deadline** means the deadline to complete each Major Utility Adjustments specified below:

***[Note: PNC to propose time period for the above limited list of Utility Adjustments for City review and approval, in its sole discretion. Time period is to commence after submittal of complete, compliant Utility Adjustment package, design, etc. to Utility. With respect to any Utility Adjustment proposed, if included, this needs to be based on schedule that PNC has worked out with the affected Utility plus a reasonable contingency/buffer]***

**Major Utility Adjustment Delay** means a delay to the Utility Adjustment Work resulting from a failure by a Utility Owner to complete a Major Utility Adjustment by the applicable Major Utility Adjustment Deadline where that delay is not due, in whole or in part, to a change to the Principal Project Company's design between the Effective Date and Final Design Documents (unless such design change is as a direct and sole result of a City Change, Compensable Delay Event or Unavoidable Delay Event (excluding Major Utility Adjustment Delay)) or due to any act or omission by any PPC-Related Entity or any PPC Fault or failure of the Principle Project Company to act diligently in accordance with the requirements of the Contract Documents and Good Industry Practice (including any failure to provide City with an updated Project Schedule or to perform the Work in accordance with the Project Schedule).

**Main or Trunkline Utility** means an underground Utility, which is not a Service Line, and which relative to the particular system of which it is a part, (a) is a larger line serving as a main line to connecting tributary lines and (b) serves a larger area, all as determined by City, in its sole discretion. In determining whether a facility should be considered a Main or Trunkline Utility, City may refer to definitions in the relevant manual or code, if any, of the Utility Owner.

**Maintained Elements** means the Infrastructure Facility and the Project Site, including all equipment, component, finishes and any other elements required to satisfy the requirements of the Agreement, including all constructed maintained elements, building systems, cabling material, equipment, finishes, furniture and fixtures, excluding the SFMTA O&M Facilities.

**Maintenance and Transit Spaces** means the areas described as Maintenance and Transit Spaces and FF&E, as set forth in in Section A.2 of the IFM Specifications, and identified as Parking, Bays and Shops, Fare Box & Clipper Card Reader Repair Shop, Service & Clean, Parts, Maintenance, Operations, and Transit Services (MRO) in Division 3 of the Technical Requirements.

**Maintenance of Traffic (MOT)** means the comprehensive effort to maintain traffic.

---

**Maintenance Plan** means the plan to properly monitor and maintain the landscaped areas, prepared and submitted by Principal Project Company and approved by the City in accordance with Section C.4.3 of the IFM Specifications, as updated in accordance with this Agreement.

**Maintenance Rectification Costs** means, in respect of any termination of this Agreement that occurs after Substantial Completion, all Losses that City determines it is reasonably likely to incur as a direct result of the termination of this Agreement, including (without double counting):

- (a) those costs (internal and external) that City is reasonably likely to incur as a direct result of carrying out any process to request tenders from any parties interested in entering into a contract with City to carry out the IFM Services, including all costs related to the preparation of tender documentation, evaluation of tenders and negotiation, and execution of relevant contracts; and
- (b) those costs reasonably projected to be incurred by City in relation to:
  - (i) remediation or, if remediation is not possible or would cost more than renewal, renewal of any defective D&C Work or IFM Services;
  - (ii) rectification or cure of any breach of this Agreement by Principal Project Company; and
  - (iii) carrying out of all other matters necessary in order to ensure that within a reasonable period of the Early Termination Date, the Project complies with the requirements of the Contract Documents, and has a reasonable prospect of continuing to perform to the same standard and cost that it would have continued to perform at had this Agreement not been terminated and the Project been in compliance with all of the requirements of the Contract Documents,

including, for the avoidance of doubt, any amount which, but for the termination of this Agreement, either should have been deposited with or paid to City in accordance with the terms of this Agreement.

**Maintenance Services** means all Work during the IFM Period to maintain, repair, preserve, replace, refurbish, test, commission and modify the Project, including the supply of machinery, equipment, materials, hardware, software, systems or any other items related to such Work, and including Demand Maintenance, Scheduled Maintenance and Renewal Work, but excluding (a) D&C Work remaining to be performed following Substantial Completion, and (b) SFMTA O&M Services.

**Major Service Failure** means a Service Failure which has been designated in the Technical Requirements or Exhibit 4 (Payment Mechanism) as a Major Service Failure.

**Manual** or **Manuals** means policies, procedures, practices, guidelines, plans, checklists, deliverables, etc. that are developed, implemented and updated by Principal Project Company.

**Maximum Availability Payment (MaxAP)** means the maximum annual Availability Payment that Principal Project Company can earn in a given Contract Year during the IFM Period, as

calculated in accordance with Exhibit 4B (Availability Payment Mechanism), and as may be further adjusted in accordance with the Contract Documents.

**Maximum Quarterly Availability Payment (MaxQAP)** means the maximum Quarterly Availability Payment that Principal Project Company can earn in a given Contract Quarter during the IFM Period, as calculated in accordance with Exhibit 4B (Availability Payment Mechanism), and as may be further adjusted in accordance with the Contract Documents.

**Medium Service Failure** means a Service Failure which has been designated in the Technical Requirements or Exhibit 4 (Payment Mechanism) as a Medium Service Failure.

**Meet and Greet** means the Functional Components corresponding to Functional Unit references GL-025 as specified in Table B5 (Functional Components and Functional Units for Infrastructure Facility) of Appendix B (Functional Areas, Functional Units, Functional Unit Rankings and Deduction Amounts for Availability Failures and Service Failures) of Exhibit 4B (Availability Payment Mechanism).

**Milestone Payment** has the meaning set forth in Section 1(a) of Exhibit 4A (Milestone Payment Mechanism).

**Minimum Agreed Availability Condition** means all of the Accessibility Conditions, the Safety Conditions and the Use Conditions, as temporarily modified as permitted in accordance with Exhibit 4B (Availability Payment Mechanism) for the purposes of a Temporary Repair.

**Minor Service Failure** means a Service Failure which has been designated in the Technical Requirements or Exhibit 4 (Payment Mechanism) as a Minor Service Failure.

**Model Update Event** has the meaning set forth in Section 4.7.1.1.

**Monthly Progress Meeting** has the meaning set forth in Section 1.1.3.7 of Division 1 of the Technical Requirements.

**Monthly Progress Status Report** has the meaning set forth in Section 1.2.4.1 of Division 1 of the Technical Requirements.

**Monthly Report** means each of the reports described in Section 1.2.4.1 of Division 1 and Section B.11 of the IFM Specifications.

**Move-In** has the meaning set forth in Section 7.14 (Move-In).

**Move-In Plan** means the plan prepared and submitted by Principal Project Company and approved by the City in accordance with Section B.25 of the IFM Specifications, as updated in accordance with this Agreement.

**Move-In Resource Candidate** has the meaning set forth in Section 7.14.3.1.

**Move-In Resource** means the advisor selected in accordance with Section **Error! Reference source not found.**

**Move-In Subcommittee** has the meaning set forth in Section 7.14.2.1.

---

**NEPA Approval** means the \_\_\_\_\_ dated [\_\_\_\_\_] and available at \_\_\_\_\_.

**NEPA Event** means:

- (a) any new or modified NEPA Approval necessitated solely by a City Change, a Delay Event or Relief Event;
- (b) legal action being taken in respect of the NEPA Approval that results in a temporary restraining order, preliminary injunction or other form of interlocutory relief by a court of competent jurisdiction that prohibits prosecution of, or by complying with such temporary restraining order, preliminary injunction or other form of interlocutory relief by a court of competent jurisdiction results in prohibiting the prosecution of, a material portion of the Work;
- (c) review or revocation or material change to, the NEPA Approval;
- (d) any review or revocation of, or change to, a NEPA Approval directly resulting from the circumstances specified in clauses (b) and (c); or
- (e) any new or modified condition, mitigation or constraint set forth in the NEPA Approval that directly and adversely affects the D&C Work and is materially different from the conditions, mitigations or constraints set forth in Exhibit \_\_\_\_\_,  
***[NOTE TO PNC: THIS CONDITION (e) WILL BE DELETED IF THE NEPA APPROVAL IS OBTAINED PRIOR TO COMMERCIAL CLOSE]***

except, in each case, to the extent resulting, in whole or in part, from Principal Project Company's design, Work or from any PPC Fault.

**Noncompliance Database** has the meaning set forth in Section 15.3.1.1.

**Noncompliance Event** means a D&C Noncompliance Event, Service Failure or Unavailability Failure.

**Non-Core Hours** means:

- (a) for Maintenance and Transit Spaces, commencing at 10:01 pm until 3:59 am every day of every week; and
- (b) for Office/Admin and Training Spaces, commencing at 5:01 pm until 7:59 am, Monday to Friday of every week.

**Non-Dig Alert Utilities** means Utilities that are not documented by or recorded with USA Dig Alert.

**Noncompliance Points** means the points that may be assessed in accordance with Section 15.4 (Assessment of Noncompliance Points).

**Nonconforming Work** means any D&C Work (including any product of the D&C Work) that does not conform to the requirements of the Contract Documents, the Regulatory Approvals,

applicable Law, the Design Documents or the Construction Documents, including any Work required to be repaired or replaced under Section 7.11 (Nonconforming Work) of this Agreement.

**Non-Digalert Utility** means a Utility owned or operated by a Utility Owner that is not a member of the California Digalert organization/notification process. “Non-Digalert Utilities” are not “Unidentified Utilities.”

**Non-Regulated Load** means the metered provision of Energy other than Regulated Load. Non-Regulated Loads are to be aggregated in a logical fashion through a submetering system.

**Non-Revenue Vehicle Parking Space** means the Functional Components corresponding to Functional Unit references GL-025 as specified in Table B5 (Functional Components and Functional Units for Infrastructure Facility) of Appendix B (Functional Areas, Functional Units, Functional Unit Rankings and Deduction Amounts for Availability Failures and Service Failures) of Exhibit 4B (Availability Payment Mechanism).

**Notice** has the meaning given in Section 23.10 (Notices and Communications).

**Notice(s) of Conditional Termination** has the meaning set forth in Section 17.2.1 (Notice of Conditional Election to Terminate – Force Majeure Termination Events).

**Notice of Determination** has the meaning set forth in Section 15.3.3.2.

**Notice of Potential Claim** means a written Notice submitted by Principal Project Company in accordance with Section 18.2 (Notice of Potential Claim).

**Notice of PPC Default** means a written Notice provided by City concerning City’s determination that a PPC Default has occurred, with respect to any default for which a cure period is allowed under Section 16.3.2 (Cure Periods).

**NTP 1** means the written Notice issued by City to Principal Project Company in accordance with Section 7.4.3 (Commencement of Non-Construction Work) authorizing Principal Project Company to proceed with non-Construction Work.

**NTP 2** means the written Notice issued by City to Principal Project Company in accordance with Section 7.4.4 (Commencement of Construction Work) authorizing Principal Project Company to proceed with Construction Work.

**Office/Admin and Training Spaces FF&E** means all FF&E to be included in Office/Admin and Training Spaces and all additional FF&E identified as "Office/Admin and Training Spaces FF&E" in the Equipment List or otherwise required to be included in the Office/ Admin and Training Spaces under Section 7.13.1 (Selection and Procurement of PPC-Furnished FF&E).

**Office/ Admin and Training Spaces** means administration and training facility spaces including Office/Admin and Training Spaces FF&E, as set forth in Section A.2 of the IFM Specifications and identified as “Office Modules”, “Training” and “Operations” and enclosed circulation between in Division 3 of the Technical Requirements.

---

**Open Book Basis** means review by City of documentation showing Principal Project Company's underlying assumptions, documents, information and data associated with the issue in question, including assumptions as to the Financial Model and each updated Financial Model, pricing or compensation or adjustments thereto, costs of the Work, costs or compensation claimed with respect to Model Update Events, schedule, composition of equipment spreads, equipment rates (including rental rates), labor rates and benefits, productivity, estimating factors, design and productivity allowance, contingency and indirect costs, Extra Work Costs, risk pricing, discount rates, interest rates, inflation and deflation rates, swap and hedge rates, insurance rates, bonding rates, letter of credit fees, overhead, profit, traffic volumes and other items reasonably required by City to satisfy itself as to validity or reasonableness.

**Ordinance** has the meaning set forth in Recital D.

**Original Equity IRR** means [●]%, which is the Equity IRR listed in the Base Case Financial Model.

**Other Adjustments (OA)** means the aggregate of any other adjustments for a Contract Quarter to reflect previous over-payments and/or under-payments, any interest payable in respect of any amounts owed, and any other amount due and payable from Principal Project Company to the City or from the City to Principal Project Company under this Agreement, as set out in Section 11.9 (Other Adjustments; Full Compensation).

**Other Amounts** has the meaning given in Section 11.4.2.

**Other Contractor** means any contractor, tradesperson or other person engaged by City to do work other than Principal Project Company and its Subcontractors.

**Oversight** means monitoring, inspecting, sampling, measuring, spot-checking, reviewing, attending, observing, testing, investigating, auditing and conducting any other ongoing oversight respecting any part or aspect of the Project or the Work, by any Person so entitled, including all the activities described in Section 5.4.2.

**Paratransit Facility** means the paratransit component which will (a) include the spaces needed for paratransit operation and maintenance activities at the Paratransit Facility, (b) reside on the roof of the bus yard component with access and egress from vehicular ramps extending from the Bus Yard Component onto the Bus Yard Component podium roof, (c) must meet the paratransit criteria in the Technical Requirements, (c) delivered pursuant to a Change Order or by Principal Project Company or another entity under a separate agreement. Paratransit Facility would be developed as Joint Development Alternative 2 Paratransit Component, as described in the "Project Description" included in Division 1 of the Technical Requirements.

**Partnering** means the partnering process as set forth in Article 18 of this Agreement.

**Party** means Principal Project Company or City, as the context may require, and "Parties" means Principal Project Company and City, collectively.

**Pass-Through Costs** means the cost of diesel incurred by PPC directly and paid to utility owners with respect to PPC's performance of the IFM Services consistent with Section A. 2.1.1 of the IFM Specifications for operations and management of back-up power systems and Section 11.3.

---

**Payment Bond** means the payment bond(s) to secure payment for labor and materials, as required under this Agreement.

**Payment Commencement Date** means the date that is one day after the Substantial Completion Date.

**PDA-Related Costs** means the following costs incurred by or accruing to City under the PDA:

- (a) The reasonably required costs of any assistance, action, activity or work undertaken by City which Principal Project Company is liable for or is obligated to reimburse City for under the terms of the PDA, including the charges of third party contractors and reasonably allocated wages, salaries, compensation and overhead of City staff and employees performing such action, activity or work; plus
- (b) Reasonably required out-of-pocket costs City incurs to publicly procure any such third party contractors; plus
- (c) Reasonable fees and costs of attorneys (including the reasonably allocable fees and costs of the Office of the City Attorney), financial advisors, engineers, architects, insurance brokers and advisors, investigators, traffic and revenue consultants, risk management consultants, other consultants, and expert witnesses, as well as court costs and other litigation costs, in connection with any such assistance, action, activity or work, including in connection with defending claims by and resolving disputes with third party contractors; plus
- (d) Interest on all the foregoing sums at the Late Payment Rate, commencing on the date due under the applicable terms of the PDA and continuing until paid; plus
- (e) An administrative fee of 10% of the actual aggregate costs incurred by City as described in clauses (a) through (d) of this definition.

**PDA Term** means the period commencing on November 2, 2022 and expiring on the Effective Date.

**Performance Action Plan** or **PAP** means the plan, at minimum, containing a summary of the issues raised by City, an analysis of the root causes of the issues, the steps and timeframes for such steps to be undertaken by Principal Project Company to address the issues, prepared and submitted by Principal Project Company in accordance with Section B.18.2 of the IFM Specifications, as updated and approved by the City in accordance with this Agreement.

**Performance Bond** means the performance bond(s) securing performance of the Work required under this Agreement.

**Performance Cure Plan** means the plan prepared and submitted by Principal Project Company and approved by the City in accordance with Section 15.5.2(a) of the Agreement, as updated in accordance with this Agreement.

**Performance Measure** has the meaning given in the Performance Measurements Table.

---

**Performance Measurements Table** means the table in Section G of the IFM Specifications.

**Performance Monitoring** means a detailed inspection and/or monitoring of the Project by Principal Project Company during the IFM Period in accordance with the Technical Requirements, including the IFM Specifications, to verify compliance with the Contract Documents.

**Performance Monitoring Report** means a report documenting all Failure Events, associated Noncompliance Points and Deductions, and showing space temperatures during period, including identification of rooms that have not met the requirements of the Technical Requirements, including the IFM Specifications.

**Performance Notice** means a written Notice provided by City, as set forth in Section 15.5.1.

**Performance Notice Threshold** means

- (a) if Principal Project Company receives a total of 375 or more Noncompliance Points over the course of 3 consecutive calendar months (determined on a rolling basis); or
- (b) A material Noncompliance Event occurs, as determined by the City

**Permanent Repair** means Rectification where a Temporary Repair has been permitted and carried out pursuant to Section 9 (Amendment of IFM Period Performance Measures Table) of Exhibit 4B (Availability Payment Mechanism).

**Permanent Repair Deadline** has the meaning given in Section 8(b) of Exhibit 4B (Availability Payment).

**Persistent PPC Default** means if:

During the D&C Phase;

- (a) Principal Project Company receives a total of 500 or more Noncompliance Points over the course of 12 consecutive calendar months (determined on a rolling basis); or
- (b) Principal Project Company receives a total of 875 or more Noncompliance Points over the course of 36 consecutive calendar months (determined on a rolling basis);

During the IFM Period;

- (a) Principal Project Company receives a total of 3867 or more Noncompliance Points over the course of 12 consecutive calendar months (determined on a rolling basis); or
- (b) Principal Project Company receives a total of 10,635 or more Noncompliance Points over the course of 36 consecutive calendar months (determined on a rolling basis); or

- 
- (c) 58,005 or more cumulative Noncompliance Points or have occurred over the course of the IFM Period.

**Persistent PPC Default Cure Plan** means the plan including specific actions (including timeframes) to be taken by Principal Project Company to improve performance, prepared and submitted by Principal Project Company in accordance with Section 15.8.1 of the Agreement, as updated and approved by the City in accordance with this Agreement.

**Person** means any individual, corporation, joint venture, limited liability company, company, voluntary association, partnership, trust, unincorporated organization or Governmental Entity.

**Planning Department** means the City's Planning Department.

**Post-Refinancing Financial Model** has the meaning set forth in Section 1.2 (Create a Post-Refinancing Financial Model) of Exhibit 5C (Calculation of Refinancing Gain).

**Potential Contract Dispute** has the meaning set forth in Section 18.2.1.

**PNC** has the meaning set forth in Recital E.

**PPC Change Request** has the meaning set forth in Section 3.1 of Exhibit 9 (Change Procedures).

**PPC Default** has the meaning set forth in Section 16.1.1 (PPC Default).

**PPC Employee(s)** means employee(s) of Principal Project Company or any other PPC-Related Entity at the Project Site.

**PPC Employee and Contractor Breakage Costs** means:

- (a) the payment of all wages earned, accrued unused vacation time, and any other payments required to be made by Principal Project Company to its employees under law, or under the terms and conditions of Principal Project Company's employment agreements with its employees as a direct result of the termination of this Agreement;
- (b) Losses that have been or will be reasonably and properly incurred by Principal Project Company under a Key Contract as a direct result of the termination of this Agreement (and which shall not include lost profit or lost opportunity), but only to the extent that:
  - (i) the Losses are incurred in connection with the Project and with respect to the Work required to be provided or carried out, including:
    - (1) any materials or goods ordered or subcontracts placed that cannot be cancelled without such Losses being incurred;
    - (2) any expenditure incurred in anticipation of the provision of services or the completion of Work in the future; and

- 
- (3) the cost of demobilization including the cost of any relocation of equipment used in connection with the Project; and
  - (ii) the Losses are reasonably and properly incurred under arrangements and/or agreements that are consistent with terms that have been entered into in the ordinary course of business and on an arm's length basis; and
  - (c) Principal Project Company and the relevant Key Contractor have each used their reasonable efforts to mitigate such Losses.

**PPC Fault** means:

- (a) the breach by any PPC-Related Entity of any of its obligations or any representation, warranty or covenant under the Contract Documents;
- (b) a breach of applicable Law or any Regulatory Approval by any PPC-Related Entity; and
- (c) fraud, criminal conduct, intentional misconduct, recklessness, bad faith, gross negligence, negligence or other culpable act or omission of any PPC-Related Entity.

**PPC Intellectual Property** means Intellectual Property developed by Principal Project Company, Contractors, or any of their respective Affiliates either (a) prior to the Effective Date, (b) independently of the Contract Documents or (c) any adaptation, continuation or derivative work which requires the incorporation, exercise or practice of Intellectual Property that is the subject of either subsection (a) or (b).

**PPC Release** means, with respect to Hazardous Materials, (a) any Release of Hazardous Material, or the exacerbation of any such Release, attributable to any PPC Fault; (b) any Release of Hazardous Materials arranged to be brought onto the Project Site by any PPC-Related Entity; regardless of cause; (c) any migration of Hazardous Materials into, onto, under or from the Project Site where the source of such Hazardous Materials is a PPC-Related Entity; or (d) any use, containment, storage, management, handling, transport or disposal of any Hazardous Materials, by any PPC-Related Entity in violation of the requirements of the Contract Documents, Good Industry Practice or any applicable Law or Regulatory Approval.

**PPC Resources** means the employees of Principal Project Company or any Principal Project Company that are not at the Project Site.

**PPC's Construction Quality Plan (PCQP)** means the Principal Project Company deliverable described in Section 1.4.3 of Division 1 of the Technical Requirements, following approval thereof by City, as updated in accordance with this Agreement.

**PPC's Design Quality Plan (PDQP)** means the Principal Project Company deliverable described in Section 1.4.2 of Division 1 of the Technical Requirements, following approval by City, as updated in accordance with this Agreement.

**PPC-Furnished FF&E** means all FF&E required by the Technical Requirements or the Equipment List (including items marked CP) or otherwise required to be included on the

---

Equipment List under Section 7.13.1 (Selection and Procurement of PPC-Furnished FF&E) including the Office/Admin and Training Spaces FF&E and the IT/Comms Equipment, but excluding City-Furnished Equipment and Existing FF&E.

**PPC's Interest** means all right, title and interest of Principal Project Company in, to, under or derived from the Contract Documents, including the Infrastructure Facility, Project Management Plan, Subcontracts, Submittals, Claims and Intellectual Property.

**PPC-Maintained FF&E** means the PPC-Furnished FF&E, excluding the Office/Admin and Training Spaces FF&E and the IT/Comms Equipment.

**PPC's Quality Program (PQP)** means the program described in Section 1.4.1 of Division 1 of the Technical Requirements, including all sub-plans.

**PPC's Quality Program Plan (PQPP)** means Principal Project Company's plan describing its approach to undertake and achieve the requirements in Section 1.4.1 of Division 1 of the Technical Requirements, prepared and submitted by Principal Project Company in accordance with Section 1.4 of Division 1 of the Technical Requirements, as updated and approved by the City in accordance with this Agreement.

**PPC-Related Entity(ies)** means:

- (a) Principal Project Company;
- (b) Principal Project Company's Equity Members, including Lead Developer;
- (c) Contractors;
- (d) any other persons or entities performing any of the Work;
- (e) any other persons or entities for whom Principal Project Company may be legally or contractually responsible;
- (f) any Affiliate of the Principal Project Company, or any other PPC-Related Entity (excluding such Affiliates to the extent that they are participating in or responsible for any aspect of a Joint Development Alternative); and
- (g) the employees, agents, officers, directors, representatives, consultants, successors and assigns of any of the foregoing.

**PPC Spaces** has the meaning given in Section 2.1.4 of the IFM Specifications.

**Predevelopment Agreement** has the meaning set forth in Recital F of this Agreement.

**Pre-Existing Hazardous Materials** means Hazardous Materials that:

- (a) are located in, on or under, or are emanating from, any parcel within the boundaries of the Project Site as of the date access to such parcel is provided to Principal Project Company; or

- 
- (b) existed in another location as of the date access to such a parcel was provided and thereafter migrated to such parcel,

excluding any Hazardous Materials that are located in, on or under, or are emanating from any Additional Property or Temporary Areas or which arise as a result of any act or omission of any PPC-Related Entity in connection with any Additional Property or Temporary Areas.

**Pre-Refinancing Financial Model** has the meaning set forth in Section 1.1 (Create a Pre-Refinancing Financial Model) of Exhibit 5C (Calculation of Refinancing Gain).

**Prevailing Rate of Wages** has the meaning given in Section 6.22(e) and 21C of the San Francisco Administrative Code.

**Prime Contract** means a direct Contract between Principal Project Company and a Contractor.

**Prime Contractor** means any Contractor that has a direct contract with Principal Project Company.

**Principal Project Company (PPC)** means [\_\_\_\_\_], a [\_\_\_\_\_] organized under the laws of the State of [\_\_\_\_\_], and its permitted successors and assigns.

**Principal Project Company IP** means Intellectual Property that is (i) owned by any PPC-Related Entity prior to the Effective Date, (ii) developed or acquired by any PPC-Related Entity independently of this Agreement or not for the purposes of performing the Work (iii) any adaptation, continuation or derivative work which requires the incorporation, exercise or practice of Intellectual Property that is the subject of either subsection (i) or (ii).

**Principal Project Document(s)** means the Contract Documents, the Key Contracts and the escrow agreements relating to the escrow of the Financial Model and Cost and Pricing Data and the IP Escrows.

**Priority 1** has the meaning given in Section B.18.1.1 of the IFM Specifications.

**Priority 2** has the meaning given in Section B.18.1.1 of the IFM Specifications.

**Priority 3** has the meaning given in Section B.18.1.1 of the IFM Specifications.

**Private Placement** means the issuance of debt securities that are exempt from registration under U.S. securities law and are sold directly in the private market.

**Proceeds Account** means a deposit account with the Collateral Agent, bearing **[Insert name of bank]** Account No. **[To be completed at Financial Close]**.

**Prohibited Person** means any Person who is:

- (a) debarred, suspended, proposed for debarment with a final determination still pending, declared ineligible or voluntarily excluded from participating in procurement or nonprocurement transaction or determined to be a non-responsible bidder or contractor (as such terms are defined or used in City's Contractor Responsibility Program);

- 
- (b) indicted or convicted of a crime, including misdemeanors, or had a civil suit or administrative judgment rendered against such Person involving the bidding, awarding, or performance of a government contract, a false claim or material misrepresentation to any private or governmental entity, or the crime of theft, fraud, embezzlement, perjury, or bribery (as such terms are defined or used in City's Contractor Responsibility Program);
  - (c) identified on the list entitled "Entities Prohibited from Contracting with Public Entities in California per the Iran Contracting Act of 2010" maintained by the Department of General Services;
  - (d) a financial institution against which, or a banking institution chartered or licensed in a jurisdiction against which, the United States Secretary of the Treasury has imposed special measures under Section 311 of the USA PATRIOT Act;
  - (e) located within or is operating from a jurisdiction that has been designated as a "high-risk and non-cooperative jurisdiction" by the Financial Action Task Force;
  - (f) a "senior foreign political figure" or a prohibited "foreign shell bank" within the meaning of 31 CFR Section 1010.605; or
  - (g) engaged in litigation with the City of San Francisco relating to performance of a contract or business practices (unless the City has first waived (in the City's sole discretion) by written Notice to the transferring equity holder, with a copy to Principal Project Company, the prohibition on a transfer to such Person during the continuance of the relevant litigation).

**Project** means the design, construction, financing, operation and maintenance of the Infrastructure Facility as described in the Contract Documents.

**Project Debt** means bona fide indebtedness (including subordinated indebtedness) for or with respect to funds borrowed or obligations incurred (including bona fide indebtedness with respect to any financial insurance issued for funds borrowed) or for the value of goods or services rendered or received, the repayment of which has specified payment dates and is secured by one or more Security Documents. Project Debt includes principal, capitalized interest, accrued interest, customary and reasonable lender, financial insurer, agent and trustee fees, costs, expenses and premiums with respect thereto, payment obligations under interest rate and inflation rate hedging agreements or other derivative facilities with respect thereto, reimbursement obligations with respect thereto and lease financing obligations. Project Debt excludes (a) any indebtedness of Principal Project Company or any Equity Member of Principal Project Company that is secured by anything less than the entire Principal Project Company's Interest, such as indebtedness secured only by an assignment of economic interest in Principal Project Company or of rights to cash flow or dividends from Principal Project Company, (b) debt that constitutes consideration paid for the sale of the economic rights in Principal Project Company or Principal Project Company's Equity Members, and (c) any increase in indebtedness to the extent resulting from an agreement or other arrangement Principal Project Company enters into after it was aware (or should have been aware, using reasonable due diligence) of the occurrence or prospective occurrence of an event of termination giving rise to an obligation of City to pay Termination Compensation, including Principal Project Company's receipt of a Notice of Termination for Convenience and occurrence of a City Default of the type

entitling Principal Project Company to terminate this Agreement. In addition, no debt shall constitute Project Debt unless and until the Collateral Agent provides City with Notice thereof and the related Financing Agreements and Security Documents in accordance with the relevant Direct Agreement.

**Project Debt Competition** has the meaning set forth in Section 3.4.2(d)(ii).

**Project Financial Performance** means the cashflows from Principal Project Company's operations, financing and investments, including: (a) cash revenues and expenses, (b) Project Debt drawdowns, fees, interest expense and repayments, (c) Committed Investment drawdowns and Distributions; and (d) funding and release of reserves.

**Project IP** means all PPC Intellectual Property, Third Party IP and City IP incorporated into the Project, Implementation Proposal or Work.

**Project Management Plan (PMP)** means the D&C Management Plan and the IFM Management Plan (or either as the context requires).

**Project Manager** means the Key Person described in Section • of Exhibit 3 (Implementation Proposal).

**Project Schedule** means (i) during the period from the Effective date until NTP2, the Initial Schedule; and (ii) from NTP2 until Final Acceptance, the fully cost loaded CPM schedule for all D&C Work meeting the requirements of the Technical Requirements, including the requirements in Section 1.2.1 of Division 1 thereof, as approved and updated in accordance with this Agreement.

**Project Site** means the D&C Site and the IFM Project Site, or either, as applicable.

**Proposed Change Order** means a Change Order proposed by City in accordance with Section 1.2 of Exhibit 9 (Change Procedures).

**Proprietary Design Review** has the meaning set forth by Section 1.8.5 of Division 1 of the Technical Requirements.

**Protection(s) in Place** means any action taken to avoid damaging a utility facility which does not involve removing or relocating that facility, including staking the location of a facility, exposing the facility, locating construction equipment so as to avoid impacts to facilities, installing steel plating or concrete slabs, encasement in concrete, temporarily de-energizing power lines, and installing physical barriers. For example, temporarily lifting power lines without cutting them would be considered a Protection in Place; whereas temporarily moving power lines to another location after cutting them would be considered a phased Utility Adjustment and not a Protection in Place. The term "Protection in Place" includes both temporary measures and permanent installations meeting the foregoing definition.

**Provision Document(s)** has the meaning set forth in Section 1.8.5.2.4 of Division 1 of the Technical Requirements.

**Public Outreach Plan** has the meaning set forth in Section 1.15.2 of Division 1 of the Technical Requirements.

---

**Public Records Act (PRA)** means California Public Records Act, Cal. Gov't Code § 6250 et seq., as amended from time to time.

**Punch List** means an itemized list of D&C Work as agreed upon by Principal Project Company and City which remains to be completed after the Substantial Completion Date with respect to the Infrastructure Facility as a condition to Final Acceptance, and which is limited to minor incidental items of Work necessary to correct imperfections which have no adverse effect on the safety, use or operability of the Project.

**Quality Assurance (QA)** means all planned and systematic actions by Principal Project Company necessary to provide confidence that QC is performed in accordance with Principal Project Company's Design Quality Plan and Principal Project Company's Construction Quality Plan, that all Work complies with the Contract Documents and that all materials incorporated in the Work, and that all equipment and all elements of the Work will perform satisfactorily for the purpose intended. QA actions include: monitoring and verification of design through auditing, spot-checking and participation in the review of the Design Documents and work plans; and monitoring and verification of construction, manufacturing/process facilities and equipment, on-site equipment and QC documentation through auditing, spot inspections and reconciliation of material acceptance and rejection based on QC testing and Verification Sampling and Testing at production sites and the Project Site. Quality Assurance also includes documentation of all QA efforts.

**Quality Audit** means the audits performed by Principal Project Company in connection with its quality audit program, as described in further detail in Section 1.4.1 of Division 1 of the Technical Requirements.

**Quality Control (QC)** means the total of all activities performed by Principal Project Company to ensure that the Work meets the requirements of the Contract Documents. For design, this includes procedures for design quality, checking, and design review including reviews for constructability, and review and approval of work plans. For construction, this includes: procedures for materials handling and construction quality; inspection, sampling, testing and acceptance/rejection of materials, plants, production and construction; material certifications; calibration and maintenance of equipment; production process control; and monitoring of environmental compliance. Quality Control also includes documentation of all QC design and construction efforts.

**Quality Management Plan** means the plan to manage and measure the quality of IFM Services, prepared and submitted by Principal Project Company and approved by the City in accordance with Section B.16.2 of the IFM Specifications, as updated and approved by City in accordance with this Agreement.

**Quality Program Manager** has the meaning set forth in Section 1.1.4.9 of Division 1 of the Technical Requirements.

**Quality Records** means the documentation required to be produced and maintained by PPC-Related Entities in accordance with Principal Project Company's Quality Program.

**Quarter** means a time period comprised of three calendar consecutive calendar months.

---

**Quarterly Availability Payment (QAP)** means the sum in dollars payable by City to Principal Project Company in each Contract Quarter of the IFM Period in accordance with this Agreement, as calculated in Exhibit 4B (Availability Payment Mechanism).

**Quarterly Deduction Cap** has the meaning given in Section 5.1.1(a) of Exhibit 4B (Availability Payment Mechanism).

**Rating Agency(ies)** means any credit rating agency registered with the Securities and Exchange Commission as a nationally recognized statistical rating organization (“**NRSRO**”).

**Reasonable Accuracy** means with respect to the description or identification of a Utility in the Utility Information:

- (a) The Utility's actual centerline location is located at or less than five feet distant from the horizontal centerline location indicated therefor in the Utility Information (without regard to vertical location);
- (b) The Utility Information shows an active and existent Utility as not abandoned;
- (c) The Utility Information shows a non-existent or inactive Utility as abandoned; or
- (d) The Utility has an actual nominal diameter (excluding casings and any other appurtenances) greater than 12 inches, and its actual nominal diameter is either greater than or less than the diameter shown in the Utility Information by 25% or less of the diameter shown in the Utility Information.

Any other inaccuracies in the Utility Information (e.g., as to type of material or encasement status) shall have no impact on "reasonable accuracy" of its identification and shall not result in a determination that the Utility was not identified with "reasonable accuracy." If there is any discrepancy between any of the components of the Utility Information, only the most accurate information shall be relevant for purposes of determination of "reasonable accuracy."

**Reasonable Investigation** means the following activities by appropriate, qualified professionals:

- (a) Visit and inspection of the Project Site and adjacent locations, including inspection to identify the presence of other facilities, such as barriers, railing, structures, manholes or identifying markers;
- (b) Undertaking the geotechnical, Utility, Hazardous Material and other intrusive site conditions investigations, sampling, testing, analyses and assessments as required to identify conditions at a specific point or to identify where conditions change between points, and otherwise contemplated by the Predevelopment Agreement;
- (c) Review and analysis of all Reference Documents and online map tools;
- (d) Review and analysis of the CEQA Approval, NEPA Approval and other Regulatory Approvals;

- 
- (e) Without limiting clause (b), reasonable inquiry with Utility Owners, including request for and review of Utility plans provided by Utility Owners;
  - (f) Review and analysis of material applicable Law applicable to the Project or the Work as of the Setting Date; and
  - (g) Other activities consistent with Good Industry Practice sufficient to familiarize Principal Project Company with surface and subsurface conditions, including the presence of Utilities, Hazardous Materials, archeological, paleontological and cultural resources, and Threatened or Endangered Species, affecting the Project Site or surrounding locations.

**Reasonable Wear and Tear** means wear and tear that is reasonable given the use and age of the Infrastructure Facility and consistent with wear and tear that could reasonably be expected to exist at a similar facility, operating in a similar environment and similar circumstances but not including any degradation in the functionality or operability of the IFM Facility that, subject to the exceptions specified in the Technical Requirements, will result in the Infrastructure Facility failing to meet the Technical Requirements or failing to comply with Applicable Law and Standards.

**Record Documents** means construction drawings, specifications and related documentation furnished by Principal Project Company to reflect the actual conditions and location in detail of Work as constructed and installed, which may be generated initially as marked-up Release for Construction Documents, revised subsequently as finished revised drawings and documents, and updated thereafter as required by the Technical Requirements.

**Recoverable Costs** means:

- (a) The reasonably required costs of any assistance, action, activity or work undertaken by City which Principal Project Company is liable for or is obligated to reimburse City for under the terms of the Contract Documents, including the charges of third party contractors and reasonably allocated wages, salaries, compensation and overhead of City staff and employees performing such action, activity or work; plus
- (b) Reasonably required out-of-pocket costs City incurs to publicly procure any such third party contractors; plus
- (c) Reasonable fees and costs of attorneys (including the reasonably allocable fees and costs of the Office of the City Attorney), financial advisors, engineers, architects, insurance brokers and advisors, investigators, traffic and revenue consultants, risk management consultants, other consultants, and expert witnesses, as well as court costs and other litigation costs, in connection with any such assistance, action, activity or work, including in connection with defending claims by and resolving disputes with third party contractors; plus
- (d) Interest on all the foregoing sums at the Late Payment Rate, commencing on the date due under the applicable terms of the Contract Documents and continuing until paid; plus

- 
- (e) An administrative fee of 10% of the actual aggregate costs incurred by City as described in clauses (a) through (d) of this definition.

**Recovery Schedule** has the meaning set forth in Section 1.2.1.4 of Division 1 of the Technical Requirements.

**Rectification** means resolving and curing the Service Failure or Availability Failure (as applicable) in a way that Principal Project Company is in full compliance with this Agreement, with respect to that Service Failure or Availability Failure.

**Rectification Time** means, with respect to each Service Failure or Availability Failure (as applicable), the relevant period within which Principal Project Company shall Rectify such failure as specified in Appendix B (Response and Rectification Time) of Exhibit 4 (Payment Mechanism).

**Reference Documents** means the documents provided with and so designated by City in the RFP or in writing during the PDA Term, which are provided for disclosure purposes only and without any warranty as to their accuracy, completeness or fitness for any particular purpose.

**Refinancing** means:

- (a) any amendment, variation, novation, extension, renewal, supplement, refunding, defeasance or replacement of any Project Debt, Financing Agreement or Security Document (other than any Equity Member Debt);
- (b) any Project Debt incurred by Principal Project Company in addition to the Initial Project Debt, secured or unsecured;
- (c) the disposition of any rights or interests in, or the creation of any rights of participation with respect to, Project Debt, Financing Agreements and Security Documents or the creation or granting by Principal Project Company or any Lender of any other form of benefit or interest in either Project Debt, Financing Agreements and Security Documents or Principal Project Company's Interest whether by way of security or otherwise; or
- (d) any other arrangement put in place by Principal Project Company or another Person which has an effect similar to any of clauses (a) through (c) above.

**Refinancing Data** means the Pre-Refinancing Financial Model, the Post-Refinancing Financial Model, any interim Financial Models, and all assumptions, calculations and other information supporting the calculation of the Refinancing Gain, including any debt term sheets or other similar documentation relating to the proposed Refinancing.

**Refinancing Gain** means an amount equal to the greater of (a) zero and (b)  $(A - B)$ , as such variables are calculated in accordance with Exhibit 5C (Calculation of Refinancing Gain).

**Regulated Load** means the metered provision of Energy for the following end-uses: (i) space heating; (ii) humidification; (iii) space cooling; (iv) dehumidification; (v) heat rejection; (vi) all fans; (vii) lighting; (viii) domestic hot water; and (ix) all pumps except for any domestic water booster pumps and any process-related pumps.

---

**Regulatory Approvals** means all permits, licenses, consents, concessions, grants, franchises, authorizations, waivers, variances or other approvals, guidance, protocol(s), mitigation agreement(s), or memoranda of agreement/understanding, and any amendment(s) or modification(s) of any of them, required or provided by Governmental Entities, including State, local, or federal regulatory agencies, agents, or employees, which authorize or pertain to the Project or the Work or take actions required to complete obligations in connection with this Agreement. Regulatory Approvals include encroachment permits and other access rights or right of entries for Work to be performed in areas under the jurisdiction of Governmental Entities, Major Approvals and Environmental Approvals.

**Regulatory Approvals Plan** means Principal Project Company's plan defining its approach to obtain all Regulatory Approvals, prepared and submitted by Principal Project Company in accordance with Section 1.1.6 of Division 1 of the Technical Requirements, as updated and approved by the City in accordance with this Agreement.

**Related Project(s)** has the meaning set forth in Section 1.14.2 of Division 1 of the Technical Requirements.

**Release** or **Release of Hazardous Materials** means, with respect to Hazardous Materials, any spill, leak, emission, release, discharge, injection, escape, leaching, dumping or disposal of Hazardous Materials into the soil, air, water, groundwater or environment, including any exacerbation of an existing release or condition of Hazardous Materials contamination.

**Release for Construction Documents (RFCD)** means Design Documents that have been authorized to be used as the basis for Construction Work or Renewal Work, in accordance with the design management portion of the approved Project Management Plan, and as set forth in Section 1.8.6 of Division 1 of the Technical Requirements.

**Relevant Event** has the meaning set forth in Section 13.3.1.

**Relevant Change in Law** means a discriminatory Change in Law which is principally borne by Principal Project Company (including PPC-Related Entities) and principally directed at, affects or relates only to the design, supply, construction (including installation), operation and maintenance of the Infrastructure Facility:

- (a) Except where such change (i) is in response, in whole or in part, to any PPC Fault, or (ii) is otherwise expressly permitted under the Contract Documents;
- (b) Where such Change in Law is a Change in Law for which compliance requires material capital expenditures by Principal Project Company; or
- (c) Where such Change in Law is a Change in Law for which compliance requires specific and material adverse changes in Principal Project Company's normal and compliant operation or maintenance procedures.

As used in this definition of "Relevant Change in Law", material capital expenditures are capital expenditures in excess of \$25,000 per event, such threshold to be index-linked and increased by the Escalation Factor calculated in accordance with Section 2 of Exhibit 4B (Availability Payment Mechanism).

---

**Relief Event** means any of the following events or circumstances to the extent, in each case, that the event interferes directly and adversely with, or causes a failure of, the performance of the IFM Services after the Substantial Completion Date:

- (a) a Force Majeure Event; and
- (b) any Compensable Relief Event.

**Renewal Work** means all work related to the capital replacement, reconstruction, overhaul, refurbishment and reinstatement of the Infrastructure Facility, including the supply of machinery, equipment, materials, hardware, software, systems or any other items related to such Work, carried by Principal Project Company during the Term to maintain compliance with the Contract Documents. Renewal Work excludes D&C Work and SFMTA O&M Services.

**Renewal Work Plan** means the plan which defines design life, specific replacement and/or refurbishment strategies, prepared and submitted by Principal Project Company in accordance with Section E of the IFM Specifications, as updated and approved by the City in accordance with this Agreement.

**Repeat Failure Ratchet** has the meaning given in Section 4.3 (Repeat Service Failures and Repeat Failure Ratchet) of Exhibit 4B (Availability Payment Mechanism).

**Request for Change Proposal** means a written Notice issued by City to Principal Project Company setting forth a proposed City Change and requesting Principal Project Company's assessment of cost and schedule impacts thereof, as described in Section 1.1 of Exhibit 9 (Change Procedures).

**Request for Proposals (RFP)** means the request for proposals to design, build, finance, and maintain the Infrastructure Facility and design, build, finance, operate and maintain the Housing and Commercial Component at the Project Site, issued by City on April 9, 2021, as amended.

**Request for Qualifications (RFQ)** means the request for qualifications to invite interested parties to submit a statement of qualifications to design, build, finance and maintain the Infrastructure Facility at the Project Site and design, build, finance, operate and maintain the Housing and Commercial Component at the Project Site, issued by City on August 21, 2020 as amended.

**Required Minimum Insurance Policy(ies)** means the Insurance Policies required in Exhibit 7 (Insurance Requirements) for performing the IFM Services, subject to Section 10.1.2.12 (Inadequacy of Required Coverage).

**Rescue Refinancing** means any Refinancing that:

- (a) occurs due to the failure or imminent failure of Principal Project Company to comply with any material financial obligation under any Financing Document;
- (b) results in the cure of such failure or imminent failure;
- (c) does not result in an increase in the Equity IRR beyond the Original Equity IRR; and

- 
- (d) does not result, singly or in the aggregate, in an actual or potential increase of the Lenders' Liabilities (determined without including any Exempt Refinancings) by more than 10%.

**Residual Life** means, for an element of the Work, the period remaining until the element will next require reconstruction, rehabilitation, restoration, renewal or replacement. The Residual Life of an element would be equal to its originally calculated Useful Life less its age if (a) the element has performed in service in the manner and with the levels of Reasonable Wear and Tear, and (b) Principal Project Company has performed the type of routine maintenance of the element which is normally included as an annually recurring cost in transit facility maintenance and repair budgets, and as a result thereof the element complies throughout its originally calculated Useful Life with all applicable requirements of the Contract Documents. The Residual Life of an element would be different from its originally calculated Useful Life minus its age if any of the foregoing conditions is not true.

**Response** means:

- (a) the surrounding area to a state or condition such that in the good faith opinion of City's Authorized Representative, the area is free of conditions which might otherwise create a condition that is hazardous or unsafe for maintenance and operating personnel; and
- (b) sufficiently reducing the risk during the remainder of the Rectification Time that further damage, nonperformance, safety hazards or adverse consequences caused by the Service Failure or Availability Failure (as applicable), might occur.

**Response Time** means with respect to each Service Failure or Availability Failure (as applicable), the relevant period within which Principal Project Company shall Respond to such failure as specified in Appendix B (Response and Rectification Time) of Exhibit 4 (Payment Mechanism).

**Retaining Wall** means a wall structure which retains fill with a minimum exposed face height of 4 feet and a minimum overall height from top of footing to top of wall of 5 feet.

**Revenue Vehicle Parking Space** means the Functional Units corresponding to Functional Unit references AL-010 and AL-011, as specified in Table C2 (Functional Components and Functional Units for Infrastructure Facility) of Appendix C (Functional Areas, Functional Units, Functional Unit Rankings and Deduction Amounts for Availability Failures and Service Failures) of Exhibit 4B (Availability Payment Mechanism).

**Review Date** has the meaning set forth in Section 8.5.4.1.

**Revised Project Schedule** has the meaning set forth in Section 1.2.1.3 of Division 1 of the Technical Requirements.

**Room Data Sheet** means a sheet or document that summarizes the requirements for each room in the Infrastructure Facility. It should include the room name, number, location, and the relevant prescriptive criteria and performance criteria from the Technical Requirements including for finishes, fixtures and fittings such as furniture and storage, mechanical and

electrical requirements, acoustic and lighting performance, and IT Comms and audio-visual requirements.

**Safety Compliance** means any and all improvements, repair, reconstruction, rehabilitation, restoration, renewal, replacement, changes in configuration, or procedures implemented to correct a specific safety condition or risk that City has reasonably determined to exist by investigation or analysis (excluding a safety condition or risk that exists by reason of Principal Project Company's failure to comply with the requirements of the Contract Documents).

**Safety Compliance Order** means a written order or directive from City to Principal Project Company to implement Safety Compliance.

**Safety Condition** means a state or condition of the relevant Functional Part which allows those persons who it can reasonably be expected may from time to time require to enter, leave, occupy, and use such Functional Part to do so safely, including compliance with applicable Law, relevant policies of the City and the City's requirements related to fire safety or health or workplace safety.

**Safety Orientation Program** means Principal Project Company's detailed plan for the safety orientation of employees and visitors, as more particularly described in Section 01 35 45 of Division 10 of the Technical Requirements.

**Safety Standards** means those provisions of the Technical Requirements that relate to Project safety, including Section B.8.1.6 and Section 01 35 45 of Division 10 of the Technical Requirements. Safety Standards are considered to be important measures to protect public safety, worker safety or the safety of property.

**Scheduled Financial Close Date** has the meaning set forth in Section 3.1.2 (Date of Financial Close).

**Scheduled Maintenance** means regular, routine and planned maintenance scheduled and performed according to a usage, time or other factors to determine frequency and timing of the maintenance.

**Scheduled Milestone Payment Date** means *[Note to PNC: Date to be inserted]*.

**Security Document** means any mortgage, deed of trust, pledge, lien, indenture, trust agreement, hypothecation, assignment, collateral assignment, account control agreement, financing statement under the enacted Uniform Commercial Code of any jurisdiction, security instrument or other charge or encumbrance of any kind, including any lease in the nature of a security instrument, given to any Lender as security for Project Debt or Principal Project Company's obligations pertaining to Project Debt and encumbering Principal Project Company's Interest.

**Senior Debt Service Amount** means the debt service payments that are senior to all other debt obligations in the cash flow waterfall.

**Service Category(ies)** means the discreet services as outlined in Section B and Section C of the IFM Specifications.

---

**Service Failure** means any failure by Principal Project Company to provide the IFM Services in accordance with Performance Measures designated Failure Type “SF” in the Performance Measurements Table and which, where a Response Time or Rectification Time applies, has not been Responded to or Rectified (as the case may be) within the relevant time. For the avoidance of doubt, where no Response Time and/or Rectification Time applies (for example, in respect of scheduled activities) there shall be a Service Failure at the point at which the IFM Failure Event occurred (for example, non-performance of the scheduled activity by the scheduled time).

**Service Failure Deduction** means a deduction from the Availability Payment as a result of a Service Failure.

**Service Failure Performance Measure** means a Performance Measure designated as SF in the Performance Measurements Table.

**Service Line(s)** means a utility line, the function of which is to connect directly the improvements on an individual property (e.g., a commercial building or an industrial warehouse) to another utility line located off such property, which other utility line connects more than one such individual line to a larger system, as well as any cable or conduit that supplies an active feed from a Utility Owner’s facilities to activate or energize a Governmental Entity’s local lighting and electrical systems, traffic control systems, street lights, communications systems and/or irrigation systems.

**Service Requests** means Demand Maintenance, Demand Requisitions, any request for service, report of a Service Failure, report of an Incident or IFM Failure Event or any other report, inquiry, complaint or comment, made by a Building Occupant or automatically generated, to the Help Desk or to Principal Project Company, whether by phone or electronically.

**Setting Date** means \_\_\_\_\_, 2025 ***[30 days prior to the proposal due date for submittal of proposals in connection with the D&C Contractor RFP].***

**SFMTA Board** means the San Francisco Municipal Transportation Agency Board of Directors.

**SFMTA O&M Facilities** means the elements of the Project generally described in Section A.2.1.2 of the IFM Specifications for which SFMTA will provide SFMTA O&M Services.

**SFMTA O&M Facilities Warranty Bond** has the meaning set forth in Section 10.9 (SFMTA O&M Facilities Warranty Bond).

**SFMTA O&M Services** means the transit operations and maintenance services specified in Section A.2.1.2 of the IFM Specifications [and Retail Space maintenance services specified in Section A.2.1.2 of the IFM Specifications] that SFMTA will perform with respect to the SFMTA O&M Facilities. ***[Note: Further consideration required with respect to retail construction and services]***

**Site Security Plan (SSP)** Principal Project Company’s plan defining its oversight management program, team organization, and operating strategy to provide and maintain work site security, prepared and submitted by Principal Project Company in accordance with Section 1.11.2.2 of Division 1 of the Technical Requirements, as updated and approved by the City in accordance with this Agreement.

**SOFR** with respect to any US banking day means a rate per annum equal to the secured overnight financing rate published for such US banking day by the Federal Reserve Bank of New York, on the Federal Reserve Bank of New York's Website. The calculation of SOFR with respect to a loan that bears interest at a rate based on SOFR shall be the rate for the one/three/six calendar months period on the date of determination published by the SOFR Administrator; provided, however, that if as of 5:00 p.m. (New York City time) on any date of determination the SOFR rate for the applicable tenor has not been published by the SOFR Administrator, then the SOFR rate will be the SOFR rate for such tenor as published by the SOFR Administrator on the first preceding day.

**SOFR Administrator** means the CME Group Benchmark Administration Limited (CBA) (or a successor administrator of the SOFR rate as determined by the City, in its reasonable discretion.

**Software** means individually each, and collectively all, of the computer programs developed or provided by Principal Project Company, and any PPC-Related Entity, under this Agreement (including Developed IP, Principal Project Company IP and/or Third-Party IP), including as to each such program, the processes, and routines used in the processing of data, the object code, interfaces to be provided hereunder by PPC-Related Entity, updates, upgrades, and any and all programs otherwise provided by PPC-Related Entity under this Agreement.

**Source Code** means the version of a Software computer program in which the programmer's original programming statements are expressed in any programming language.

**Source Code Documentation** means (a) software written in programming languages, such as C and Fortran, including all comments and procedural code, such as job control language statements, which shall be in a form intelligible to trained programmers and capable of being translated into object or machine readable code for operation on computer equipment through assembly or compiling, and (b) documentation, including flow charts, schematics, statements of principles of operations, architectural standards, and commentary, explanations and instructions for compiling, describing the data flows, data structures, and control logic of the software in sufficient detail to enable a trained programmer through study of such documentation to maintain and/or modify the software without undue experimentation. Source Code and Source Code Documentation also include all modifications, revisions, additions, substitutions, replacements, updates, upgrades and corrections made to the foregoing items.

**Source of Supply Certificate of Compliance** has the meaning set forth in Section 1.4.3.3 of Division 1 of the Technical Requirements.

**Special Tools** means (a) specialized tools necessary for maintenance or repair of Project elements or equipment (including vehicles), and (b) other tools obtained or developed by Principal Project Company or any Contractor for use in performance of the IFM Services. The term excludes tools used in performance of the Work that were not procured for the Project or developed for use on the Project and that were acquired by Principal Project Company or Contractor at its own expense for use on multiple projects. The term "tool" as used in the Contract Documents includes "special tools."

**Standards and Specifications** means the standards, specifications and other documents referenced in the Technical Requirements.

---

**Starting Insurance Benchmarking Premiums** has the meaning set forth in Section 10.1.3(a).

**State** means the State of California.

**Statement of Qualification (SOQ)** means Principal Project Company's Statement of Qualification, provided in response to the Request for Qualifications.

**Step-in Party** means (a) the Collateral Agent, a Lender or any entity that is wholly owned by a Lender or group of Lenders, or (b) any Person approved by City as a Substituted Entity; in each case where such Person is not a Prohibited Person.

**Structure** means, as the context may require, bridges, Culverts, catch basins, drop inlets, retaining walls, cribbing, manholes, end walls, buildings, sewers, service pipes, under drains, foundation drains, steps, fences and other features which may be encountered in the Work and not otherwise classified.

**Subcontract** means each Contract with a Subcontractor.

**Subcontractor** means each Contractor that is not a Prime Contractor.

**Submittal(s)** means, generally, any document, work product or other written or electronic end-product, report or item required to be delivered or submitted to City, Third Parties, or Governmental Entities in connection with this Agreement or the Project.

**Submittal Schedule** has the meaning set forth in Section 1.2.1.6 of Division 1 and Section B.6.1 of the IFM Specifications.

**Substantial Completion** means that all D&C Work is complete (except for Punch List items that do not affect normal and safe use and operation of the Infrastructure Facility and any D&C Work that, by its nature, is to be performed after the Substantial Completion Date), and all other prerequisites for Substantial Completion have been met. Substantial Completion is deemed to have occurred upon satisfaction of all the conditions for the Project in Exhibit 15C (Conditions to Substantial Completion), as confirmed by City's issuance of a Certificate of Substantial Completion in accordance with the procedures and within the time frame established in Section 7.8 (Substantial Completion).

**Substantial Completion Date** means the date City issues a Certificate of Substantial Completion for the Project.

**Substantial Completion Deadline** means **[April 30, 2029 [IF D&C CONTRACTOR PROPOSES EARLIER, THIS DAY WILL BE THE EARLIER DATE]**, as such date may be extended from time to time pursuant to Section 14.1.2 (Extension of Deadlines for General Delay Events).

**Substituted Entity** means a Third Party proposed by the Collateral Agent and approved by City under a Direct Agreement to act in Principal Project Company's stead and not merely as a Step-in Party, in each case where such Person is (a) a Suitable Substitute and (b) not a Prohibited Person.

**Suitable Substitute** means a Person, approved in writing by City in accordance with the Direct

Agreement that:

- (a) has the legal capacity, power and authority to become the party to and perform the obligations of Principal Project Company under this Agreement;
- (b) is in compliance with City's rules and regulations, and has adopted written policies regarding organizational conflicts of interest consistent with City's conflicts of interest policy;
- (c) has ensured that all of its subcontractors are in compliance with City's rules and regulations;
- (d) has adopted written policies regarding organizational conflicts of interest consistent with City's conflicts of interest policy;
- (e) employs individuals having the appropriate qualifications, experience and technical competence to timely perform Principal Project Company's obligations under the Contract Documents and the Principal Project Documents; and
- (f) otherwise has available resources (including committed financial resources and subcontracts) sufficient to enable it to perform the obligations of Principal Project Company under the Contract Documents and the Principal Project Documents.

**Superfund Site** means a site listed on either the National Priorities List or the Proposed National Priorities List at <https://www.epa.gov/superfund/superfund-national-priorities-list-npl>.

**Supplier** means any Person not performing work at or on the Project Site that supplies machinery, equipment, materials, hardware, software, systems or any other appurtenance to the Project to Principal Project Company or to any Contractor in connection with the performance of the Work. Persons that merely transport, pick up, deliver or carry materials, personnel, parts or equipment or any other items or persons to or from the Project Site shall not be deemed to be performing Work at the Project Site.

**Surety(ies)** means each properly licensed surety company, insurance company or other Person approved by City, which has issued a Payment Bond or a Performance Bond.

**Sustainability Management Plan** means Principal Project Company's plan describing its approaches to ensure achievement of the sustainability requirements of the Contract Documents, prepared and submitted by Principal Project Company in accordance with Section 1.9.1 of Division 1 of the Technical Requirements, as updated and approved by the City in accordance with this Agreement.

**System Condition Index or SCI** means the total maintenance, repair and replacement deficiencies of the Infrastructure Facility divided by the current replacement value of the Infrastructure Facility.

**Systems Manual** has the meaning set forth in Section 6.6.4.1 (Systems Manual) of Division 6 of the Technical Requirements.

**Taxes** means federal, State, local or foreign income, margin, gross receipts, sales, use, excise, transfer, consumer, license, payroll, employment, severance, stamp, business, occupation, premium, windfall profits, environmental (including taxes under Section 59A of the Internal Revenue Code of 1986, as amended), customs, permit, capital stock, franchise, profits, withholding, social security (or similar), unemployment, disability, real property, personal property, registration, value added, alternative or add-on minimum, estimated or other taxes, levies, imposts, duties, fees or charges imposed, levied, collected, withheld or assessed at any time, whether direct or indirect, relating to, or incurred in connection with, the Project, the performance of the Work, revenues or act, business, status or transaction of Principal Project Company, including any interest, penalty or addition to such amounts, and including utility rates or rents, in all cases whether disputed or undisputed.

**Technical Requirements** means Exhibit 18 (Technical Requirements).

**Technology Enhancements** means modifications, additions, refinements, substitutions, revisions, replacements and upgrades made to Intellectual Property, equipment, mechanism, operational technology, or to any related documentation, that accomplish incidental, performance, structural, or functional improvements. Technology Enhancements specifically includes modifications, updates, or revisions made to software or any related documentation that correct errors or support new models of input-output devices with which the software is designed to operate.

**Temporary Areas** means areas outside of the Project Site where activities incidental to construction of the Project are being performed by Contractors, including field office sites, storage sites, staging areas dedicated to the Project, temporary work areas and parking areas, but excluding any permanent locations of Principal Project Company or any Contractor.

**Temporary Relocation** means any (a) interim relocation of any Utility (i.e., the installation, removal and disposal of an interim facility) pending installation of a permanent facility in the same or a new location, and (b) removal and reinstallation of the Utility in the same place without an interim relocation.

**Temporary Repair** means, in respect of the occurrence of an IFM Failure Event which results in an Availability Condition not being met in Functional Unit or Functional Component, works of a temporary nature that do not constitute Rectification but satisfy the Minimum Agreed Availability Conditions and substantially make good the relevant IFM Failure Event for the period until a Permanent Repair can be undertaken.

**Temporary Work** means any temporary works and structures necessary for the construction of permanent improvements. This includes falsework, formwork, scaffolding, shoring, temporary earthworks, sheeting, cofferdams, special erection equipment and the like.

**Term** means the period commencing on the Effective Date and ending on the date specified in Section 2.3 (Term).

**Termination Compensation** means the measure of compensation owing from City to Principal Project Company upon termination of this Agreement prior to the stated expiration of the Term, as determined in accordance with this Agreement.

---

**Termination Date** means (a) the date of expiration of the Term, or (b) if applicable, the Early Termination Date.

**Termination Due to Court Ruling** has the meaning set forth in Section 17.4.3 (Termination Due to Court Ruling).

**Termination for Convenience** has the meaning set forth in Section 17.1.1 (Termination for Convenience).

**Test Procedures** means a description of a test to be performed. Test Procedures shall describe the test configuration, the test equipment required, the personnel required to perform the test, all construction and testing pre-requisites that must be completed before the test can be performed, lists each individual step to be followed in the test, expected result of each step, and the pass/fail criteria for each step, and shall include a Test Report form on which the results of the test shall be recorded.

**Test Report** means a form that lists each step to be performed in a test. Each Test Report shall identify the expected results of each step, a location to enter the actual results of each step, a place for the person responsible for performing the test to sign and date the form, and a place for any witnesses of the test to sign and date the form.

**Three-week Look-ahead Activity Reports** has the meaning set forth in Section 1.2.1.7 of Division 1 of the Technical Requirements.

**Third Party(ies)** means any person or entity unrelated to City or Principal Project Company. Third Parties expressly excludes any PPC-Related Entities.

**Third Party IP** means Intellectual Property owned by any Person unrelated to the Principal Project Company, any Contractor, or any of their respective Affiliates.

**Third Party and Utility Owner Coordination Work Plans** has the meaning set forth in Section 1.13 of Division 1 of the Technical Requirements.

**Threatened or Endangered Species** means any species listed by the United States Fish and Wildlife Service as threatened or endangered under the Endangered Species Act, as amended, 16 U.S.C. § 1531 et seq., or any species listed as threatened or endangered under the California Endangered Species Act, Fish and Game Code § 2050 et seq.

**Total Unavailability** has the meaning set forth in Section 5.4 (Total Unavailability) of Exhibit 4B (Availability Payment Mechanism).

**Traffic Control Plan(s) (TCP)** means the site-specific design plan that provides necessary details to control traffic through and around the work area.

**Trainee Plan** means the plan prepared and submitted by Principal Project Company and approved by the City to implement the SFMTA Trainee Program.

**Transaction** has the meaning set forth in Section 20.2.1.

---

**Transaction Survey(s)** means surveys covering IFM Services and people making enquiries or Service Requests by telephone, in writing, electronically or otherwise to Principal Project Company.

**Transportation Management Plan** means Principal Project Company's plan describing how safe traffic operations will be managed and maintained during each phase of construction and in every work zone of the Project, prepared and submitted by Principal Project Company in accordance with Section 1.11.3.1 of Division 1 of the Technical Requirements, as updated and approved by the City in accordance with this Agreement.

**Utility Easement** means a permanent replacement easement and/or other interest in real property (excluding a franchise) located outside of the Project Site that is necessary for a Utility Adjustment.

**Unavailable** means, in relation to a Functional Unit or Functional Component, that such Functional Unit or Functional Component is in a state or condition which does not comply with any one or more of the Availability Conditions and "Unavailability" shall be construed accordingly.

**Unavailable Component Threshold** means, the number of Functional Components in a Functional Unit that if exceeded by Unavailable Components at any point triggers deemed Unavailability of all Functional Components in the relevant Functional Unit. Table 2 (Unavailable Component Thresholds) in Section 5.6 (Unavailable Component Thresholds) of Exhibit 4B (Availability Payment Mechanism) lists the threshold value for each affected Functional Unit.

**Unavoidable Delay Event** means any of the following events or circumstances that occurs prior to the Final Acceptance Date and directly impacts the D&C Work:

- (a) a Force Majeure Event;
- (b) a Major Approval Delay;
- (c) a Utility Delay; or
- (d) an Adverse Weather Event.

**Unidentified Utility** means a subsurface Main or Trunkline Utility, (i) where the Utility Information incorrectly indicates that the subject Main or Trunkline Utility does not exist anywhere within the boundary lines of the Project Site and which Main or Trunkline Utility could not have been reasonably inferred as of the Setting Date based on a Reasonable Investigation; (ii) where the Utility Information does not identify the subject Main or Trunkline Utility within the boundary lines of the Project Site with Reasonable Accuracy and such information could not have been reasonably inferred as of the Setting Date based on a Reasonable Investigation; (iii) where such Main or Trunkline Utility is not identified or referenced in any of the information, data, analyses or reports undertaken by Principal Project Company pursuant to the Predevelopment Agreement; and (iv) where such Main or Trunkline Utility should have been identified or referenced pursuant to a Reasonable Investigation undertaken pursuant to the Predevelopment Agreement. Unidentified Utilities specifically exclude any Utility that serves the Project Site as of the Setting Date and which is to be de-energized or de-activated and removed as part of the Project.

---

**Unilateral Change Order** has the meaning set forth in Section 2 (Unilateral Change Orders) of Exhibit 9 (Change Procedures).

**Uninterruptible Power Supply (UPS)** has the meaning set forth in Section 3.12.14 and Appendix G, Section 2.10.8 of Division 3 of the Technical Requirements.

**Unsafe Condition** means a condition that (a) gives rise to the imminent possibility of serious injury to workers or the public or of serious damage to property or the environment, or (b) affects safe movement.

**Upgrades** means alterations, improvements, modifications or changes, including Capacity Improvements, that Principal Project Company makes to any portion of the Project, as originally designed and constructed, at any time after the Substantial Completion Date, except as part of ordinary maintenance or Renewal Work. Upgrades may include alterations, improvements, modifications or changes that require an amendment or supplement to the final environmental impact documents for the Project or that are to be located outside the boundaries of the original Project Site. Upgrades exclude Technology Enhancements and any alterations, improvements, modifications or changes undertaken in the use or development of a Business Opportunity.

**Use Condition** means a state or condition of the relevant Functional Unit or Functional Component which satisfies the Use Parameters for that Functional Part.

**Use Parameters** means the range of functional requirements for the proper use and enjoyment of a Functional Unit or Functional Component, including the use of, in the case of the Infrastructure Facility, the ancillary equipment for its particular purpose as set out in the Technical Requirements.

**Useful Life** means, for an element, the period following its first installation, or following its last reconstruction, rehabilitation, restoration, renewal or replacement, until the element will next require reconstruction, rehabilitation, restoration, renewal or replacement.

**Utility(ies) or utility(ies)** means a privately, publicly or cooperatively owned facility (which term includes lines, systems and other facilities, and includes municipal and/or government facilities) for transmitting or distributing communications, cable television, power, electricity, gas, oil, crude products, water, steam, waste, or any other similar commodity, including any fire or police signal system as well as streetlights associated with roadways owned by local agencies. However, when used in the context of Utility Adjustments of facilities to accommodate the Project, the term "Utility" or "utility" excludes traffic signals, ramp metering systems, flashing beacon systems, and lighting systems for roads adjacent to the Project. Necessary appurtenances to each utility facility (including the utility source, guide poles, Service Lines, supports, etc.) shall be considered part of the facility. Without limitation, any service lateral connecting directly to a utility shall be considered an appurtenance to that utility, regardless of the ownership of such service lateral.

**Utility Adjustment** means each relocation (temporary or permanent), abandonment, Protection in Place, removal (of previously abandoned utility facilities as well as newly-abandoned facilities), replacement, reinstallation, and/or modification of existing Utilities necessary to accommodate the Project or the Work. For any utility crossing the Project Site or public right of way, the Utility Work for each crossing of the Project Site or public right of way, as applicable, by that utility shall be considered a separate Utility Adjustment. For any utility installed

longitudinally within the Project Site or the public right of way, the Utility Work for each continuous segment of that utility located within the Project Site or public right of way, as applicable, shall be considered a separate Utility Adjustment.

**Utility Betterment** means any upgrading of a Utility that is not attributable to the construction of the Project and is made during the course of a Utility Adjustment solely for the benefit of and at the election of the Utility Owner, including an increase in the capacity, capability, efficiency or function of the facility over that which was provided by the existing Utility. The following are not considered Utility Betterments:

- (a) any upgrading required for accommodation of the Project;
- (b) any upgrading required under the Contract Documents;
- (c) replacement devices or materials that are of equivalent standards although not identical;
- (d) replacement of devices or materials no longer regularly manufactured with an equivalent or next higher grade or size;
- (e) any upgrading required by applicable Law;
- (f) replacement devices or materials that are used for reasons of economy (e.g., non-stocked items may be uneconomical to purchase); and
- (g) any upgrading required by the Utility Owner's applicable Utility Standards.

**Utility Delay** has the meaning set forth in Section 7.6.13.1

**Utility Information** means as-built drawings, existing facility drawings, or other documentation of existing underground Utilities within the Project Site available to Principal Project Company or generated by any PPC-Related Entity. Utility Information includes the Utility conflict matrix and subsurface utility engineering investigations undertaken by or on behalf of Principal Project Company during the PDA Term.

**Utility Owner** means the owner or operator of any Utility (including both privately held and publicly held entities, cooperative utilities, and municipalities and other governmental agencies), including City acting by and through the San Francisco Public Utilities Commission (it being understood that the San Francisco Public Utilities Commission is not the "City" for other purposes under this Agreement)).

**Utility Standards** means the standard specifications, standards of practice, and construction methods that a Utility Owner customarily applies to facilities (comparable to those being adjusted on account of the Project) constructed by the Utility Owner (or for the Utility Owner by its contractors), at its own expense. Except as may be specifically identified in the Technical Requirements, "Utility Standards" are not "Standards and Specifications."

**Utility Work** means the design and construction necessary for a Utility Adjustment. Any Utility Work furnished or performed by Principal Project Company is part of the D&C Work; and any

Utility Work furnished or performed by a Utility Owner is not part of the D&C Work. Utility Work expressly includes Utility Adjustments of PG&E's power lines and poles that impact the Project.

**Vandalism** means willful or malicious damage or defacement (including graffiti) that:

- (a) was not the result of Principal Project Company's failure to comply with its obligations under the Contract Documents and its IFM Management Plan with respect to Vandalism; and
- (b) does not arise from, or was not contributed to, directly or indirectly, by any act or omission of Principal Project Company or any PPC-Related Entity.

**Verification Sampling and Testing** means sampling and testing performed to validate the quality of the product. City, or its designee, will perform Verification Sampling and Testing as part of its QA Oversight efforts.

**Warning Notice** has the meaning set forth in Section 16.1.3.1.

**Weather Data** means a record of annual hourly data for dry and wet bulb temperature, dew point, relative humidity, total horizontal solar radiation, wind speed and direction and atmospheric pressure at the Weather Monitoring Station.

**Weather Monitoring Station** means the closest National Weather Service weather monitoring station to the Infrastructure Facility.

**Work** means all of the work, services and obligations required to be furnished, performed and provided by Principal Project Company under the Contract Documents, including activities to obtain financing as well as all administrative, design, engineering, construction, demolition, Utility Adjustments, payment to Third Parties, support services, financing services, operations, maintenance and other work of renewal, reconstruction, repair or reinstatement of Project improvements and equipment, and management services. The term does not include any efforts which the Contract Documents expressly specify will be performed by Persons other than PPC-Related Entities.

**EXHIBIT 2**

**PROJECT MANAGEMENT PLAN**

**[NOTE TO PNC: FULL PRELIMINARY DRAFT TO BE INCLUDED AT COMMERCIAL CLOSE. FINAL APPROVED DRAFT TO BE INSERTED AND REPLACE PRELIMINARY AS A CONDITION TO NTP 2]**

**EXHIBIT 3**

**IMPLEMENTATION PROPOSAL**

**Exhibit 3A Financial Proposal**

***[NOTE TO PNC: This will include the Finance Plan, including the Base Case Financial Model, with its audited report, and respective commitment letters for Bank Debt, Equity Investments, Security Documents and Insurance Policies, among other documents, and including the Final Price as determined under the PDA, PPC's financing costs, along with a schedule including the proposed Milestone Payment amount and the proposed Availability Payments payable from Substantial Completion to the end of the PDA Term. To be included at Commercial Close.]***

**Exhibit 3B Technical Proposal Elements**

***[NOTE TO PNC: This will include the following elements developed pursuant to the PDA, as selected by City in its discretion:***

- ***aspects PNC/PPC's design and other submittals***
- ***aspects of D&C Contractor's design-build proposal***
- ***aspects of IFM Contractor's proposal***

***This may include listed subs, identified Key Personnel, designs, enhancements to the Technical Requirements, etc. that City chooses to include as contractual requirements. To be included at Commercial Close.]***

**EXHIBIT 4**

**PAYMENT MECHANISM**<sup>1</sup>

**PART A: DEFINITIONS**

**1 DEFINITIONS**

Unless otherwise specified, capitalized terms used in this Exhibit 4 (Payment Mechanism) have the meanings given in Exhibit 1 (Abbreviations and Definitions) to the Agreement.

---

<sup>1</sup> This Exhibit remains subject to continued review in light of ongoing refinements to the IFM Specifications and Technical Requirements

**EXHIBIT 4A**

**MILESTONE PAYMENT MECHANISM**

**1. MILESTONE PAYMENT**

- (a) Subject to the terms and conditions of this Section 1 (Milestone Payment) and the Contract Documents, Principal Project Company shall be entitled to receive a single milestone payment from the City as partial compensation for Principal Project Company's performance of the D&C Work and reaching Substantial Completion (the "Milestone Payment").
- (b) The Milestone Payment shall be calculated using the following formula:
- $$MP = MMP - D$$
- Where:
- MP = Milestone Payment;
- MMP = the amount [\$●];
- D = D&C Deductions incurred for the period commencing on the Effective Date and ending on the Substantial Completion Date as set out in Section 2 (D&C Period Deductions) of Exhibit 4A (Milestone Payment Mechanism).
- (c) For the Milestone Payment, Principal Project Company shall submit an invoice no later than the 10th day of the month immediately following issuance of a Certificate of Substantial Completion in accordance with the process in Section 11.3 (Invoice, Other Amounts and Payments) of the Agreement.
- (d) The City will pay Principal Project Company the Milestone Payment accordance with the process in Section 11.3 (Invoice, Other Amounts and Payments) of the Agreement.
- (e) The Milestone Payment shall not be used to pay the principal of any outstanding obligations, the interest on which is excludable from gross income for federal income tax purposes as set forth under the Internal Revenue Code of 1986, as amended.

## 2. D&C PERIOD DEDUCTIONS

- 2.1 Subject to the provisions of this Agreement, if at any time prior to the Substantial Completion Date, a D&C Failure Event occurs, the City may make a Deduction from the relevant Milestone Payment in respect of that D&C Failure Event.
- 2.2 Principal Project Company shall submit to City, 30 days before the anticipated date of Substantial Completion and Final Acceptance, a report providing a preliminary summary of all D&C Noncompliance Points and D&C Period Deductions calculated as of 30 days prior to the anticipated Substantial Completion Date and Final Acceptance Date (as applicable). Within 30 days following the Substantial Completion Date, Principal Project Company shall submit to City a final summary of all D&C Period Noncompliance Points and D&C Period Deductions calculated as of the Substantial Completion Date or Final Acceptance Date (as applicable).
- 2.3 Principal Project Company will accrue D&C Period Noncompliance Points for every D&C Failure Event in accordance with this Section 2, Section 15.4 of the Agreement and as set forth in Appendix A (D&C Noncompliance Points and Deductions) in this Exhibit 4A (Milestone Payment Mechanism) up until the Substantial Completion Date for the D&C Period.
- 2.4 Principal Project Company will include in its Performance Monitoring Report a summary of all D&C Period Noncompliance Points accrued in the month and cumulative number of points accrued up to the month being reported from the Effective Date.

***[Note: D&C Thresholds under development/review]***

**APPENDIX A**  
**D&C PERIOD NONCOMPLIANCE POINTS AND DEDUCTIONS**

**Table A1 – D&C Failure Event Table**

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
<b>1</b>	<b>Division 01 - General</b>							
1.1	Project Management	Project Management Plan	Prepare, submit and update Project Management Plan in accordance with the Contract Documents	5 days	5 per D&C Failure Event	-	2 days	Technical Requirements, Division 01, Section 1.1.1
1.2	Project Management	Initiation Meetings	Conduct Initiation Meetings and submit meeting agendas and minutes in accordance with the Contract Documents	1 day	3 per D&C Failure Event	\$150	1 day	Technical Requirements, Division 01, Section 1.1.3.1-5
1.3	Project Management	Weekly Project Coordination Meetings	Conduct Weekly Project Coordination Meetings in accordance with the Contract Documents	1 day	3 per D&C Failure Event	\$150	1 day	Technical Requirements, Division 01, Section 1.1.3.6
1.4	Project Management	Monthly Progress Meetings	Conduct Monthly Progress Meetings and submission of meeting agenda and minutes in accordance with the Contract Documents	1 day	3 per D&C Failure Event	\$150	1 day	Technical Requirements, Division 01, Section 1.1.3.7
1.5	Project Management	Ongoing Coordination Meeting	Conduct Ongoing Coordination Meetings and submission of meeting agenda and minutes in	3 days	1 per D&C Failure Event	\$50	1 day	Technical Requirements, Division 01, Section 1.1.3.8

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
			accordance with the Contract Documents					
1. 6	Project Management	Special Meetings	Conduct Special Meetings and submission of meeting agenda and minutes in accordance with the Contract Documents	3 days	1 per D&C Failure Event	\$50	1 day	Technical Requirements, Division 01, Section 1.1.3.9
1. 7	Intentionally Omitted							
1. 8	Project Management	Regulatory Approvals Plan	Prepare, submit and update a Regulatory Approvals Plan in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.1.7
1. 9	Project Management	Design and Construction Management Plans	Prepare, submit and update a complete Design Management Plan to achieve the requirements of Design Management in accordance with the Contract Documents	5 days	5 per D&C Failure Event	-	2 days	Technical Requirements, Division 01, Section 1.1.7.1
1. 10	Project Management	Design and Construction Management Plans	Prepare, submit and update a complete Construction Management Plan to achieve the requirements of Construction Management in	5 days	5 per D&C Failure Event	-	2 days	Technical Requirements, Division 01, Section 1.1.7.2

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
			accordance with the Contract Documents					
1. 11	Project Management	IFM Management Plan	Prepare, submit and update a complete preliminary IFM Management Plan in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.1.8
1. 12	Project Controls and Performance Management	Project Schedules	Prepare, submit and update Initial Schedule in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$1,000	2 days	Technical Requirements, Division 01, Section 1.2.1.2
1. 13	Project Controls and Performance Management	Project Schedules	Prepare, submit and update Project Schedule (excluding the Initial Schedule) in accordance with the Contract Documents	3 days	5 per D&C Failure Event	\$300	1 day	Technical Requirements, Division 01, Section 1.2.1.3 and Section 1.2.2
1. 14	Project Controls and Performance Management	Project Schedules	Prepare, submit and update Recovery Schedule in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	2 days	Technical Requirements, Division 01, Section 1.2.1.4 and Section 1.2.2
1. 15	Project Controls and Performance Management	Project Schedules	Prepare, submit and update complete Project Schedule Monthly Updates in accordance with the Contract Documents	2 days	3 per D&C Failure Event	\$150	1 day	Technical Requirements, Division 01, Section 1.2.1.5 and Section 1.2.2

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
1.16	Project Controls and Performance Management	Project Schedules	Prepare, submit and update complete preliminary and final Submittal Schedule for D&C Submittals in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$150	2 days	Technical Requirements, Division 01, Section 1.2.1.6 and Section 1.2.2
1.17	Project Controls and Performance Management	Project Schedules	Prepare, submit and update complete Look-Ahead Activity Reports in accordance with the Contract Documents	1 day	1 per D&C Failure Event	\$50	1 day	Technical Requirements, Division 01, Section 1.2.1.7 and Section 1.2.2
1.18	Project Controls and Performance Management	Schedule System	Comply with requirements of the Scheduling System	5 days	1 per D&C Failure Event	\$50	1 day	Technical Requirements, Division 01, Section 1.2.3
1.19	Project Controls and Performance Management	Performance Reporting	Prepare, submit and update Monthly Progress Status Report in accordance with the Contract Documents, including City acceptance of format	5 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.2.4.1
1.20	Project Controls and Performance Management	As-Built Schedules	Prepare, submit and update complete As-Built Schedule and Final Schedule Report in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.2.5

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
1. 21	Project Controls and Performance Management	Time Impact Analysis for Proposed Extensions of Time	Prepare, submit and update Time Impact Analysis for proposed extensions of time in accordance with the Contract Documents	2 days	3 per D&C Failure Event	\$150	1 day	Technical Requirements, Division 01, Section 1.2.6
1. 22	Submittal Management	Submittal Management	Prepare, submit and update Initial List of Submittals in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.3
1. 23	Submittal Management	Submittal Management	Meet requirements and standards of each Submittal provided to the City and other entities in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.3
1. 24	Quality Management	Principal Project Company Quality Program	Prepare, submit and update complete Initial PPC Quality Program Plan in accordance with the Contract Documents	5 days	5 per D&C Failure Event	-	3 days	Technical Requirements, Division 01, Section 1.4.1
1. 25	Quality Management	Principal Project Company Quality Program	Prepare, submit and update complete subsequent updates to PPC Quality Program Plan in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.4.1
1. 26	Quality Management	Principal Project Company Quality Program	Establish Quality Management System and submit necessary documentation to the City	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.4.1.2

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
1. 27	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Design Control Procedures in accordance with the Contract Documents	10 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.4.1.3
1. 28	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Product Identification and Traceability Procedures in accordance with the Contract Documents	10 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.4.1.4
1. 29	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Process Control Procedures in accordance with the Contract Documents	10 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.4.1.5
1. 30	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Schedule of Testing Equipment in accordance with the Contract Documents	10 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.4.1.7
1. 31	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Control of Nonconforming Work Procedures in accordance with the Contract Documents	10 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.4.1.9
1. 32	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Nonconforming Work Report in accordance with the Contract Documents	24 hours	1 per D&C Failure Event	\$50	24 hours	Technical Requirements, Division 01, Section 1.4.1.9

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
1.33	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Corrective and Preventive Action Procedures in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.4.1.10
1.34	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Control of Quality Records Procedures in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.4.1.11
1.35	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Quality Audit Procedures in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.4.1.12
1.36	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Quality Audit Reports in accordance with the Contract Documents	3 days	1 per D&C Failure Event	\$50	1 day	Technical Requirements, Division 01, Section 1.4.1.12
1.37	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Training Procedures in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.4.1.13
1.38	Quality Management	Principal Project Company Quality Program	Prepare, submit and update Training Records and Certifications in accordance with the Contract Documents	3 days	1 per D&C Failure Event	\$50	1 day	Technical Requirements, Division 01, Section 1.4.1.13
1.39	Quality Management	Principal Project Company Design Quality	Prepare, submit and update complete Initial Principal Project Company Design Quality Plan	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.4.2

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
			in accordance with the Contract Documents					
1. 40	Quality Management	Principal Project Company Design Quality	Prepare, submit and update updates to Principal Project Company Design Quality Plan in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.4.2
1. 41	Quality Management	Principal Project Company Design Quality	Prepare, submit and update Design Progress Tracking Report in accordance with the Contract Documents	1 day	1 per D&C Failure Event	\$50	1 day	Technical Requirements, Division 01, Section 1.4.2.1.A
1. 42	Quality Management	Principal Project Company Design Quality	Prepare, submit and update Monthly PDQP Report in accordance with the Contract Documents	1 day	1 per D&C Failure Event	\$50	1 day	Technical Requirements, Division 01, Section 1.4.2.1.B
1. 43	Quality Management	Principal Project Company Design Quality	Prepare, submit and update Final Design Report in accordance with the Contract Documents	3 days	1 per D&C Failure Event	\$50	2 days	Technical Requirements, Division 01, Section 1.4.2.1.C
1. 44	Quality Management	Principal Project Company Design Quality	Prepare, submit and update Quantity Estimates in accordance with the Contract Documents	3 days	1 per D&C Failure Event	\$50	2 days	Technical Requirements, Division 01, Section 1.4.2.1.D
1. 45	Quality Management	Principal Project Company Design Quality	Prepare, submit and update Quality Surveillance and Mitigation Monitoring Reports in accordance with the Contract Documents	3 days	1 per D&C Failure Event	\$50	2 days	Technical Requirements, Division 01, Section 1.4.2.2.A

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
1.46	Quality Management	Principal Project Company Design Quality	Prepare, submit and update Log of Nonconforming Design Work Reports in accordance with the Contract Documents	1 day	1 per D&C Failure Event	\$50	1 day	Technical Requirements, Division 01, Section 1.4.2.2.C
1.47	Quality Management	Principal Project Company Design Quality	Assign a Design Quality Assurance Manager (DQAM) to assess and evaluate the efficacy and effectiveness of Principal Project Company's quality in design activities.	5 days	5 per D&C Failure Event	\$500	3 days	Technical Requirements, Division 01, Section 1.4.2.3
1.48	Quality Management	Principal Project Company Construction Quality	Prepare, submit and update Principal Project Company Construction Quality Plan (PCQP) in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.4.3
1.49	Quality Management	Principal Project Company Construction Quality	Prepare, submit and update Candidate Independent Testing Laboratory Credentials in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.4.3.1
1.50	Quality Management	Principal Project Company Construction Quality	Prepare, submit and update ITL Portable and Satellite Policies and Procedures in accordance with the Contract Documents	2 days	3 per D&C Failure Event	\$150	0.5 day	Technical Requirements, Division 01, Section 1.4.3.1

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
1.51	Quality Management	Principal Project Company Construction Quality	Prepare, submit and update Material and Equipment Conformance Certifications in accordance with the Contract Documents	2 days	1 per D&C Failure Event	\$50	0.5 day	Technical Requirements, Division 01, Section 1.4.3.3
1.52	Quality Management	Principal Project Company Construction Quality	Prepare, submit and update Source of Supply Compliance Certifications in accordance with the Contract Documents	2 days	1 per D&C Failure Event	\$50	0.5 day	Technical Requirements, Division 01, Section 1.4.3.3
1.53	Quality Management	Principal Project Company Construction Quality	Prepare, submit and update Construction Quality Work Plans in accordance with the Contract Documents	3 days	1 per D&C Failure Event	\$50	1 day	Technical Requirements, Division 01, Section 1.4.3.4
1.54	Quality Management	The City Quality Oversight	Prepare, submit and update Software Quality Assurance Plan in accordance with the Contract Documents	10 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.4.5
1.55	Existing Conditions	Pre-Construction Information, Pre- and Post-Construction Surveys	Prepare, submit and update Pre-construction Survey Reports in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.5.1
1.56	Existing Conditions	Pre-Construction Information, Pre- and Post-Construction Surveys	Prepare, submit and update Post-construction Survey Reports in accordance with the Contract Documents	10 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.5.1

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
1. 57	Information Management	Information Management	Prepare, submit and update Information Management Plan (IMP) in accordance with the Contract Documents	10 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.6
1. 58	Information Management	Information Management	Prepare, submit and update Document Control Procedures in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	2 days	Technical Requirements, Division 01, Section 1.6.1.A
1. 59	Information Management	As-Built Documents	Prepare, submit and update complete As-Built Documents for individual items in accordance with the Contract Documents	10 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.6.3.A
1. 60	Information Management	As-Built Documents	Prepare, submit and update complete aggregated As-Built Documentation prior to Final Acceptance in accordance with the Contract Documents	10 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.6.3.A
1. 61	Training	Training	Prepare, submit and update Training Procedures, Materials and Records in accordance with the Contract Documents	10 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.7
1. 62	Design Management	Proprietary Design Reviews	Prepare, submit and update Proprietary Design Reviews in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.8.5

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
1.63	Design Management	Proprietary Design Reviews	Prepare, submit and update to the City, and maintain a comprehensive Basis of Design Report (BODR) for the Project in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.8.5.2.3
1.64	Design Management	Release for Construction Documents	Prepare, submit and update RFCDs for approval by City in accordance with the Contract Documents	None	5 per D&C Failure Event	-	1 day	Technical Requirements, Division 01, Section 1.8.6
1.65	Design Management	Release for Construction Documents	Prepare, submit and update Design Review Report in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.8.6.1
1.66	Sustainability	Sustainability	Prepare, submit and update Sustainability Management Plan in accordance with the Contract Documents	10 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.9.1
1.67	Building Information Modelling	Building Information Modelling	Prepare, submit and update BIM Project Execution Plan in accordance with the Contract Documents	10 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.10.1.1
1.68	Building Information Modelling	Building Information Modelling	Appoint a full-time, project-dedicated BIM Manager in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$500	3 days	Technical Requirements, Division 01, Section 1.10.1.3
1.69	Construction Management	Construction Security	Prepare, submit and update Project Site Security Plan in	10 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.11.2

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
			accordance with the Contract Documents					
1.70	Construction Management	Maintenance of Traffic and Work Restrictions	Comply with requirements for maintenance of traffic and work restrictions in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.11.3
1.71	Construction Management	Temporary Facilities and Utilities	Prepare, submit and update City Temporary Utility Designs and Engineered Drawings in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.11.4.1
1.72	Construction Management	Temporary Facilities and Utilities	Provide temporary Construction Management Office in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.11.4.3
1.73	Coordination with Third Parties	Third Party Coordination	Engage a Third Party and Utility Coordination Manager in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$500	3 days	Technical Requirements, Division 01, Section 1.12.1
1.74	Coordination with Utility Owners	Utility Coordination Work Plan	Prepare, submit and update Coordination Work Plan (UCWP) in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.13.1

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
1.75	Coordination with Utility Owners	Utility Project Execution Plan	Prepare, submit and update Utility Project Execution Plan in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.13.2,
1.76	Coordination with Utility Owners	Utility Tracking Report	Prepare, submit and update Utility Tracking Report in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 01, Section 1.13.3
1.77	Communication and Public Information	Public Outreach and Engagement	Meet requirements to support City Public Outreach and Engagement Program	3 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 01, Section 1.15.2.11-2
1.78	Communication and Public Information	Public Outreach and Engagement	Prepare, submit and update Public Outreach and Engagement Plan in accordance with Contract Documents	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 01, Section 1.15.2.3
2	<b>Division 04 - Supplemental Design Criteria</b>							
2.1	Supplemental Noise and Vibration Requirements	Proprietary Design Review Deliverables	Comply with submittal requirements for Supplemental Noise and Vibration for Proprietary Design Review Deliverables in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	2 days	Technical Requirements, Division 04, Section 1.5
2.2	Supplemental Noise and	Proprietary Design Review Deliverables	Prepare, submit and update Testing Report in	5 days	5 per D&C Failure Event	\$300	2 days	Technical Requirements, Division 04, Section 1.5

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
	Vibration Requirements		accordance with the Contract Documents					
2.3	Seismic Resilience Performance Requirements	Deliverables	Comply with submittal requirements for seismic resilience performance for Proprietary Design Review Deliverables in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	2 days	Technical Requirements, Division 04, Section 2
3	<b>Division 07 - Infrastructure Facility Management (IFM) Specifications</b>							
3.1	IFM Service Procedures	Submission Process	Prepare, submit and update a Schedule of Submittals required under the IFM Specifications before Substantial Completion	10 days	3 per D&C Failure Event	\$150	5 days	Technical Requirements, Division 07, Section B.6.1 (1)
3.2	IFM Service Procedures	IFM Service Procedures	Prepare, submit and update IFM Service Procedures prior to Substantial Completion as required in accordance with the Contract Documents	10 days	1 per D&C Failure Event	\$50	5 days	Technical Requirements, Division 07, Section B.6.1 (1)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
3.3	Move-In Services	Move-In Services	Prepare, submit and update a Move- In Plan no later than six months prior to Substantial Completion	10 days	3 per D&C Failure Event	\$150	5 days	Technical Requirements, Division 07, Section B.25
3.4	Renewal Work Services	Renewal Work Plans and Reports	Prepare, submit and update Initial 30-Year Renewal Work Plan prior to Substantial Completion	10 days	5 per D&C Failure Event	\$150	5 days	Technical Requirements, Division 07, Section E.2
4	<b>Division 10 - SFPW Div 01 General Requirements for Construction</b>							
4.1	Existing Utility Facilities	Governmental Facilities	Comply with requirements related to Governmental Facilities within excavations in accordance with Contract Documents	3 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 10, Section 00 73 20 (1.2)
4.2	Existing Utility Facilities	Non-governmental Facilities	Comply with requirements related to Non-governmental Facilities in accordance with Contract Documents	3 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 10, Section 00 73 20 (1.3)
4.3	Utility Crossings	Existing Utility Company	Comply with requirements for supporting working and protecting existing utility company facilities in	3 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 10, Section 00 73 21

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
			accordance with Contract Documents					
4.4	Special Instructions	General	Comply with requirements associated with Special Instruction in accordance with Contract Documents	3 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 10, Section 01 12 00
4.5	Overhead Contact System (OS) Isolation Support	General	Comply with requirements associated with overhead contract system isolation support	3 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 10, Section 01 13 00
4.6	Artwork Coordination	Artwork Coordination	Comply with requirements for schedules for Pre-Art Installation Conference, Artwork installation and Artwork acceptance in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 10, Section 01 14 00 (1.3, 1.4)
4.7	Artwork Coordination	Artwork Coordination	Comply with requirements by the City and artwork acceptance by Principal Project Company in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 10, Section 01 14 00 (1.5, 1.11)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
4.8	Partnering Procedures	Partnering Training	Attend, complete, and comply with City Partnering Fundamentals Training in accordance with Training Documents	10 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 10, Section 01 31 33 (1.6)
4.9	Partnering Procedures	Partnering Elements	Comply with requirements for partnering in accordance with the Contract Documents	10 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 10, Section 01 31 33 (3.2)
4.10	Photographic Documentation	Photographic Documentation	Comply with requirements for administrative and procedural requirements for construction photographs in accordance with the Contract Documents	3 days	3 per D&C Failure Event	\$150	1 day	Technical Requirements, Division 10, Section 01 32 33 (3.1A)
4.11	Environmental Procedures	Submittals	Prepare, submit and update all Submittals to City's Authorized Representative prior to mobilization in accordance with the Contract Documents except those specifically listed in this Table A1 – D&C Failure Event Table with separate Deductions and Noncompliance Points	3 days	3 per D&C Failure Event	-	2 days	Technical Requirements, Division 10, Section 01 35 43 (1.4.A.1)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
4.12	Environmental Procedures	Qualifications	Comply with various qualified personnel	3 days	3 per D&C Failure Event	\$1,000	2 days	Technical Requirements, Division 10, Section 01 35 43 (1.4.A.2)
4.13	Environmental Procedures	Submittals	Prepare, submit and update all Submittals to City's Authorized Representative during construction in accordance with the Contract Documents except those specifically listed in this Table A1 – D&C Failure Event Table with separate Deductions and noncompliance Points	3 days	3 per D&C Failure Event	\$1,000	2 days	Technical Requirements, Division 10, Section 01 35 43 (1.4.B)
4.14	Environmental Procedures	Submittals	Prepare, submit and update all submittals to ERO prior to receiving a final certificate of occupancy	3 days	3 per D&C Failure Event	\$1,000	2 days	Technical Requirements, Division 10, Section 01 35 43 (1.4.B)
4.15	Environmental Procedures	Inspection and Monitoring	Cooperate with inspection and monitoring activities, including providing access and making facilities/ records available	3 days	3 per D&C Failure Event	\$300	2 days	Technical Requirements, Division 10, Section 01 35 43 (1.5.C)
4.16	Environmental Procedures	Off-road equipment and engines	Comply with requirements associated with Administrative Code Section 6.25 and	None	3 per D&C Failure Event	\$100	1 day	Technical Requirements, Division 10, Section 01 35 43 (1.5.D)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
			Chapter 25 of the Environment Code					
4.17	Environmental Procedures	Tree Protection	Provide adequate protection or selective pruning to trees	None	3 per D&C Failure Event	\$250	1 day	Technical Requirements, Division 10, Section 01 35 43 (1.5.E.1)
4.18	Environmental Procedures	Tree Protection	Appropriate presence of Specialty Environmental Monitor - Archaeologist	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (1.5.F)
4.19	Environmental Procedures	General Construction	Maintain the Project Site and Construction Work areas in a clean and safe condition	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.1.A)
4.20	Environmental Procedures	Stockpile Management	Implement stockpile management best practices	1 day	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.2)
4.21	Environmental Procedures	Dust Control	Ensure dust mitigation measures are in place during construction	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.3)
4.22	Environmental Procedures	Dust Control	Comply with grading/ excavation including complying with Site-Specific Dust Control Plan (DCP)	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.3)
4.23	Environmental Procedures	Stormwater Management	Maintain effective project-specific sediments controls	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.4)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
4.24	Environmental Procedures	Spills and Leaks	Comply with spills and leaks best management practices	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.5)
4.25	Environmental Procedures	Emissions-Control	Comply with Emissions- Control best management practices	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.5)
4.26	Environmental Procedures	Noise Control	Comply with Noise Control best management practices including preparation of Noise- Control Plan	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.6)
4.27	Environmental Procedures	Asbestos	Comply with regulations for construction impacted by Naturally Occurring Asbestos	None	5 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.8)
4.28	Environmental Procedures	Night Work	Comply with requirements for Night Works in accordance with Contract Documents	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.10)
4.29	Environmental Procedures	Bird Protection	Comply with environmental regulations for bird protection	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.12)
4.30	Environmental Procedures	Tree Protection	Arrange meeting with City, General Contractor and others prior to commencement of work	5 days	1 per D&C Failure Event	\$1,000	3 days	Technical Requirements, Division 10, Section 01 35 43 (3.14.A)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
4.31	Environmental Procedures	Tree Protection	Comply with environmental requirements associated with tree management and protection	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.14)
4.32	Environmental Procedures	Site Restoration	Comply with environmental requirements associated with site restoration	5 days	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.15)
4.33	Environmental Procedures	Paleontological Resources	Comply with environmental requirements associated with unanticipated paleontological resources	None	5 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.16)
4.34	Environmental Procedures	Human Remains	Comply with environmental requirements associated encounter of human remains	None	5 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.17)
4.35	Environmental Procedures	Archaeological Resource Protection	Comply with environmental requirements associated with archaeology protection	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.18)
4.36	Environmental Procedures	Historical Cultural Resource Protection	Comply with environmental requirements associated with historical cultural resource protection	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.19)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
4.37	Environmental Procedures	Vibration Control Plan	Prepare, submit and update Vibration Control Plan in accordance with contract documents	5 days	3 per D&C Failure Event	\$1,000	3 days	Technical Requirements, Division 10, Section 01 35 43 (3.19)
4.38	Environmental Procedures	Work in Air Pollutant Exposure Zone	Comply with environmental requirements associated with SF Environment Code Chapter 25	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.20)
4.39	Environmental Procedures	Construction Site Runoff Control Permit	Prepare, submit and update Construction Site Runoff Control Permit in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$1,000	3 days	Technical Requirements, Division 10, Section 01 35 43 (3.21)
4.40	Environmental Procedures	Construction Site Runoff Control Permit	Comply with requirements and conditions associated with the Construction Site Run off Control Permit	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.21)
4.41	Environmental Procedures	City Water-Quality Permitting	Comply with requirements associated with geotechnical well or soil boring	None	3 per D&C Failure Event	\$1,000	1 day	Technical Requirements, Division 10, Section 01 35 43 (3.23)
4.42	Hazardous Building Materials - Scope of Work	Hazardous Building Materials - Scope of Work	Prepare, submit and update to City certifications or proof of the environmental trainings in accordance with the Contract Documents	5 days	3 per D&C Failure Event	-	3 days	Technical Requirements, Division 10, Section 01 35 44 (1.1-E)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
4.43	Hazardous Building Materials - Scope of Work	Abatement Contractor's Qualifications	Prepare, submit and update Hazardous Materials Management Plan (HMMP) in accordance with the Contract Documents	5 days	3 per D&C Failure Event	-	3 days	Technical Requirements, Division 10, Section 01 35 44 (1.4-D)
4.44	Hazardous Building Materials - Scope of Work	Waste Handling and Characterization	Prepare, submit and update Waste Management Plan (WMP) as specified under Section 02 80 13 Building Related Hazardous Materials Remediation	5 days	3 per D&C Failure Event	-	3 days	Technical Requirements, Division 10, Section 01 35 44 (1.8-A)
4.45	Hazardous Building Materials - Scope of Work	Waste Handling and Characterization	Use a bill of lading or non-hazardous waste form in accordance with the Contract Documents when shipping fluorescent lamps to a recycler	5 days	3 per D&C Failure Event	-	3 days	Technical Requirements, Division 10, Section 01 35 44 (1.8-O)
4.46	Hazardous Building Materials - Scope of Work	Waste Handling and Characterization	Provide, Prepare, submit and update Uniform Hazardous Waste Manifest Form for asbestos hazardous waste shipments in accordance with the Contract Documents	5 days	3 per D&C Failure Event	-	3 days	Technical Requirements, Division 10, Section 01 35 44 (1.8-Q)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
4.47	Hazardous Building Materials - Scope of Work	Use of Non-Hazardous Waste Manifest for Class II Material or Lesser	Prepare, submit and update the Non-Hazardous Waste Manifest form for the Generator's signature at least 72 hours in advance in accordance with the Contract Documents	1 day	5 per D&C Failure Event	\$300	0.5 day	Technical Requirements, Division 10, Section 01 35 44 (1.9)
4.48	Health and Safety Criteria	Health and Safety Plan	Prepare, submit and update a complete Health and Safety Plan (HASP) in accordance with the Contract Documents	3 days	5 per D&C Failure Event	-	1 day	Technical Requirements, Division 10, Section 01 35 45 (1.5)
4.49	Health and Safety Criteria	Injury and Illness Prevention Programs (IIPP) and Code of Safe Practices (CSP)	Prepare, submit and update Injury and Illness Prevention Programs (IIPP) and Code of Safe Practices (CSP) in accordance with the Contract Documents	3 days	3 per D&C Failure Event	\$150	1 day	Technical Requirements, Division 10, Section 01 35 45 (1.6)
4.50	Health and Safety Criteria	Submittals	Prepare, submit and update all other health and safety Submittals apart from HASP, IIPP, and CSP in accordance with the Contract Documents	3 days	3 per D&C Failure Event	\$150	1 day	Technical Requirements, Division 10, Section 01 35 45 (1.3A)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
4.51	Health and Safety Criteria	Submittals	Prepare, submit and update sufficient information, to demonstrate the qualifications and experience of the it's Project Safety Representative (PSR) in accordance with the Contract Documents	2 days	3 per D&C Failure Event	\$150	1 day	Technical Requirements, Division 10, Section 01 35 45 (1.3B)
4.52	Health and Safety Criteria	Submittals	Make submissions as required throughout the course of construction - daily inspection reports and records of toolbox meetings in accordance with the Contract Documents	2 days	3 per D&C Failure Event	\$150	1 day	Technical Requirements, Division 10, Section 01 35 45 (1.3C)
4.53	Health and Safety Criteria	Submittals	Make submissions as required throughout the course of construction - initial and final incident or Near-miss investigation reports in accordance with the Contract Documents	1 day	3 per D&C Failure Event	\$150	0.5 day	Technical Requirements, Division 10, Section 01 35 45 (1.3C)
4.54	Health and Safety Criteria	Submittals	Make submissions as required throughout the course of construction - HASP modification	2 days	3 per D&C Failure Event	\$150	1 day	Technical Requirements, Division 10, Section 01 35 45 (1.3C)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
			requests, and others in accordance with the Contract Documents					
4.55	Health and Safety Criteria	Project Safety Representative (PSR)	Comply with Project Safety Representative (PSR)	10 days	3 per D&C Failure Event	\$150	5 days	Technical Requirements, Division 10, Section 01 35 45 (1.7, 1.21)
4.56	Health and Safety Criteria	Contractor's Asbestos Competent Person	Comply with Asbestos Competent Person (ACP)	5 days	3 per D&C Failure Event	\$150	2 days	Technical Requirements, Division 10, Section 01 35 45 (1.8)
4.57	Health and Safety Criteria	Accident Documentation and Reporting	Comply with accident documentation and reporting in accordance with the Contract Documents	1 day	3 per D&C Failure Event	\$150	0.5 days	Technical Requirements, Division 10, Section 01 35 45 (1.22)
4.58	Health and Safety Criteria	San Francisco Municipal Transportation Agency (SFMTA) Health and Safety Requirements	Comply with San Francisco Municipal Transportation Agency (SFMTA) Health and Safety Requirements	5 days	3 per D&C Failure Event	\$150	2 days	Technical Requirements, Division 10, Section 01 35 45 (1.24)
4.59	Additional Environmental Procedures	Submittals	Prepare, submit and update all submittals in accordance with the Contract Documents	5 days	3 per D&C Failure Event	-	3 days	Technical Requirements, Division 10, Section 01 35 50 (Part 2)
4.60	Additional Environmental Procedures	Execution	Comply with requirements associated with the execution of the additional environmental procedures	None	3 per D&C Failure Event	-	1 day	Technical Requirements, Division 10, Section 01 35 50 (Part 3)

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
4.61	Temporary Facilities and Controls	Temporary Project Sign	Comply with Temporary Project Sign in accordance with the Contract Documents	10 days	1 per D&C Failure Event	\$50	5 days	Technical Requirements, Division 10, Section 01 50 00
4.62	Material Reduction and Recovery Plan	Material Reduction and Recovery Plan	Prepare, submit and update a Demolition Debris Recovery Plan (DDRP) in accordance with the Contract Documents	10 days	5 per D&C Failure Event	\$300	5 days	Technical Requirements, Division 10, Section 01 74 50 (1.4)
4.63	Material Reduction and Recovery Plan	Material Reduction and Recovery Plan	Comply with all provisions for Material Reduction and Recovery Plan including monthly updates and Final Recovery Report	5 days	3 per D&C Failure Event	\$150	2 days	Technical Requirements, Division 10, Section 01 74 50, (1.5-1.7)
4.64	Closeout Procedures	Substantial Completion	Prepare, submit and update all Closeout Procedures in accordance with the Contract Documents	5 days	5 per D&C Failure Event	-	3 days	Technical Requirements, Division 10, Section 01 77 00, (1.3)
4.65	Closeout Procedures	Project Record Documents	Prepare, submit and update the final approved Project Record Drawings to the City Representative prior to Final Acceptance. Refer to Section 01 78 39 - Project Record Documents	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 10, Section 01 77 00, (1.6)
4.66	Operation and Maintenance Data	Operation and Maintenance Data Requirements	Comply with submittal and scheduling requirements for	5 days	5 per D&C Failure Event	-	3 days	Technical Requirements, Division 10, Section 01 78 23, 1.4

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
			Operations and Maintenance Data					
4. 67	Operation and Maintenance Data	Electronic and Hard Copy Formats for O&M Manual	Comply with requirements for submittals of Electronic and Hard Copy Formats for O&M Manual	5 days	5 per D&C Failure Event	-	2 days	Technical Requirements, Division 10, Section 01 78 23, 1.5, 1.6
4. 68	Operation and Maintenance Data	Instruction of City Personnel	Comply with requirements with respect to training schedules and procedures	5 days	3 per D&C Failure Event	-	3 days	Technical Requirements, Division 10, Section 01 78 23, Section 1.8
4. 69	Warranties	Warranties	Comply with all warranty requirements in accordance with the Contract Documents	5 days	5 per D&C Failure Event	-	3 days	Technical Requirements, Division 10, Section 01 78 36, (1.2, 1.3, 1.4)
4. 70	Structure Demolitions	Submittals	Prepare, submit and update all submittals in accordance with the Contract Documents	3 days	1 per D&C Failure Event	-	2 days	Technical Requirements, Division 10, Section 02 41 16 (1.06)
4. 71	Structure Demolitions	Execution	Comply with requirements associated with the execution of structure demolition	None	3 per D&C Failure Event	-	1 day	Technical Requirements, Division 10, Section 02 41 16 (Part 3)
4. 72	Hazardous Building Materials Remediation	Submittals	Perform all Hazardous Materials remediation work as per this specification	5 days	3 per D&C Failure Event	-	2 days	Technical Requirements, Division 10, Section 02 80 13

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
4.73	Environmental Management of Excavated Materials	Environmental Management of Excavated Materials	Comply with requirements for Environmental Management of Excavated Materials	5 days	3 per D&C Failure Event	-	2 days	Technical Requirements, Division 10, Section 02 81 10
5	<b>Contracting and Labor Practices</b>	<u>Note that DBE Requirements are still being developed</u>						
5.1	Contracting and Labor Practices	Labor Standards	Comply and require all Contractors to comply, with all applicable federal and State labor, occupational safety and health Laws and orders, including payment of prevailing wages	N/A	3 per D&C Failure Event	-	N/A	DBFOM Agreement, Section 9.8 & Exhibit 16B
5.2	Contracting and Labor Practices	Labor Standards	Submit to City certified payroll records for all employees of Principal Project Company and Contractors at all tiers for the preceding calendar month	5 days	5 per D&C Failure Event	-	N/A	DBFOM Agreement, Section 9.8
5.3	Contracting and Labor Practices	Labor Standards	Require that individuals performing the Work be qualified, experienced, competent, and skilled in the performance of the	N/A	5 per D&C Failure Event	-	N/A	DBFOM Agreement, Section 9.8

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
			Work and related obligations as per requirement					
5.4	Contracting and Labor Practices	Local Hiring Requirements for Construction Work and Renewal Work	Comply with local hiring requirements for Construction Work and Renewal Work as per requirements	5 days	5 per D&C Failure Event	-	N/A	DBFOM Agreement, Section 9.9
5.5	Contracting and Labor Practices	First Source Hiring Program	Comply with all applicable provisions of the First Source Hiring Program as per requirement	5 days	5 per D&C Failure Event	-	N/A	DBFOM Agreement, Section 9.10
5.6	Contracting and Labor Practices	SFMTA Employment Training Program	Comply with all applicable provisions of the SFMTA Employment Training Program	5 days	5 per D&C Failure Event	-	N/A	DBFOM Agreement, Section 9.11
6	<b>Commissioning and Testing Requirements</b>							
6.1	Commissioning Provider (CxP)	Commissioning Provider (CxP) appointment	Prepare, submit and update details on the appointment of the CxP entity for review and acceptance by City	10 days	3 per D&C Failure Event	\$150	5 days	Technical Requirements, Division 6, Section 6.5
6.2	Pre-Construction Requirements	Commissioning Plan	Prepare, submit and update Final Commissioning Plan in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 6, Section 6.6.2.1

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
6.3	Pre-Construction Requirements	Commissioning Issues and Resolution Log	Maintain Commissioning Issues and Resolution Log in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 6, Section 6.6.2.3 and 6.6.3.2
6.4	Construction Requirements	Functional Performance Testing (FPT)	Provide notice and results of Functional Performance Testing in accordance with the Contract Documents	5 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 6, Section 6.6.3.6
6.5	Construction Requirements	Commissioning Report	Prepare, submit and update Commissioning Report in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 6, Section 6.6.3.7
6.6	Post Substantial Completion Requirements	Deliver Systems Manual	Prepare, submit and update the necessary operating documents and reports to City in accordance with the Contract Documents	10 days	1 per D&C Failure Event	\$50	10 days	Technical Requirements, Division 6, Section 6.6.4.1
6.7	Post Substantial Completion Requirements	Post Occupancy Review of Building Operations	Meet requirements associated with the Post Occupancy Review of Building Operations in accordance with Contract Documents	10 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 6, Section 6.6.4.2
6.8	Post Substantial Completion Requirements	Near Warranty End Post Occupancy Review	Meet requirements associated with the Warranty End Post Occupancy Review in accordance with Contract Documents	10 days	3 per D&C Failure Event	\$150	3 days	Technical Requirements, Division 6, Section 6.6.4.3

ID	Main Heading	Subheading	Failure To	Rectification Time	D&C Noncompliance Points	D&C Noncompliance Event Deductions in \$ (for New or Recurred Events)	Recurrence Period	Reference Section(s) of Contract Documents
6.9	Post Substantial Completion Requirements	On-going Commissioning Plan	Prepare, submit and update the Ongoing Commissioning Plan in accordance with the Contract Documents	5 days	1 per D&C Failure Event	\$50	3 days	Technical Requirements, Division 6, Section 6.6.4.4
6.10	Operational Readiness	Operational Readiness	Prepare, submit and update an integrated Operational Readiness Plan in accordance with the Contract Documents	5 days	5 per D&C Failure Event	\$300	3 days	Technical Requirements, Division 6, Section 6.8.

## **EXHIBIT 4B**

### **AVAILABILITY PAYMENT MECHANISM**

#### **3 Availability Payments**

##### **3.1 Maximum Availability Payment**

The Maximum Availability Payment for each Contract Year (y) (“MaxAP<sub>y</sub>”) shall be calculated for any period commencing on or after the Payment Commencement Date as follows:

$$MaxAP_y = MaxAPC_y + (MAPIFM_y \times ESC_y)$$

Where:

*MaxAPC<sub>y</sub>* means the capital portion of the MaxAP for Contract Year y as set out in Appendix D (Payment Schedule) to this Exhibit 4B (Availability Payment Mechanism)

*MaxAPIFM<sub>y</sub>* means the IFM Payment MaxAP for Contract Year y, as set out in Appendix D (Payment Schedule) to this Exhibit 4B (Availability Payment Mechanism)

*ESC<sub>y</sub>* is the escalation factor calculated in accordance with Section 4 (Escalation Factor) of this Exhibit 4B (Availability Payment Mechanism)

##### **3.2 Maximum Quarterly Availability Payment**

Subject to any limitations and exceptions expressly provided in the Agreement, Availability Payments shall be paid to the Principal Project Company through Quarterly Availability Payments. The Maximum Quarterly Availability Payment (“MaxQAP”) shall be calculated as the quarterly amount of the MaxAP in accordance with the following formula.

$$MaxQAP_{q,y} = \frac{1}{4} \times MaxAP_y$$

Where:

*MaxAP<sub>y</sub>* is the Maximum Availability Payment for Contract Year y

*MaxQAP<sub>q,y</sub>* is the MaxQAP for Contract Quarter q in Contract Year y

##### **3.3 Availability Payments**

**3.3.1** The Maximum Availability Payment (“MaxAP”) shall be subject to Deductions, if any, with respect to the availability and performance of the Infrastructure Facility. Each Quarterly Availability Payment paid to the Principal Project Company in Contract Year y shall be calculated as follows:

$$QAP_{q,y} = MaxQAP_{q,y} - \sum D_{q,y} + ENC_{q,y} + \sum OA_{q,y}$$

where:

**QAP<sub>q,y</sub>** is the Quarterly Availability Payment for Contract Quarter **q** in Contract Year **y**;

**MaxQAP<sub>q,y</sub>** is the Maximum Quarterly Availability Payment for Contract Quarter **q** in Contract Year **y**;

$\sum D_{q,y}$  is the aggregate sum of all Deductions for Contract Quarter **q** in Contract Year **y** in relation to D&C Failure Events (to the extent not deducted from the Milestone Payment), Service Failures and Availability Failures calculated in accordance with the provisions set out in Section 5 (Deductions from Availability Payments) of this Exhibit 4B (Availability Payment Mechanism);

**ENC<sub>q,y</sub>** is Energy Net Compensation (determined pursuant to the Energy Pain Share/Gain Share Mechanism) for Contract Quarter **q** in Contract Year **y**;

$\sum OA_{q,y}$  is the aggregate of any other adjustments for Contract Quarter **q** in Contract Year **y** to reflect previous over-payments and/or under-payments, any interest payable in respect of any amounts owed, and, except as set out in Section 11.3.2(ii) of the Agreement any Other Amounts due and payable from Principal Project Company to the City or from the City to Principal Project Company under the Agreement.

**3.3.2** If in the Contract Quarter in which the Payment Commencement Date falls or in the last Contract Quarter of the Term, a pro rata adjustment shall be made to reflect the actual number of days in the Contract Quarter from and including the Payment Commencement Date (for the first Contract Quarter) and up to and including the last day of the IFM Period (for the last Contract Quarter) for purposes of calculating the Quarterly Availability Payments and Deductions.

#### **3.4 Invoicing and Payment of Quarterly Availability Payments**

For each Quarterly Availability Payment, Principal Project Company shall submit an invoice no later than the 10<sup>th</sup> day of the month immediately following the relevant Contract Quarter in accordance with the process in Section 11.3 (Invoice, Other Amounts and Payment) of the Agreement. The City will pay Principal Project Company the Quarterly Availability Payment accordance with the process in Section 11.3 (Invoice, Other Amounts and Payments) of the Agreement.

### **4 ESCALATION FACTOR**

**4.1** The Escalation Factor shall be calculated in accordance with the following formula:

$$ESC_y = \frac{CPI_y}{CPI_0}$$

where:

**ESC<sub>y</sub>** is the escalation factor applicable to the relevant Contract Year **y**;

**CPI<sub>y</sub>** Consumer Price Index as of the reference month that is available in the year that is immediately prior to the commencement of Contract Year **y**, as published by US Bureau of Labor Statistics, for Urban Consumers, for the San Francisco-Oakland-Hayward, CA areas (All Items). **ESC<sub>y</sub>** shall apply to all calculations relating to Contract Year **y**; and

**CPI<sub>0</sub>** is the prevailing value of Consumer Price Index as of the Effective Date, published by US Bureau of Labor Statistics, for Urban Consumers for the San Francisco-Oakland-Hayward, CA areas (All Items).

## 5 DEDUCTIONS FROM AVAILABILITY PAYMENTS

### 5.1 Entitlement to Make Deductions

5.1.1 Subject to the provisions of this Agreement, if at any time during the Term, a D&C Failure Event (to the extent not deducted from the Milestone Payment), Service Failure or Availability Failure occurs, the City may make a Deduction from the relevant Maximum Availability Payment in respect of that Failure Event, except that:

- (a) the maximum aggregate Deduction amount that the City can make from a Quarterly Availability Payment shall not exceed 35% of the Maximum Quarterly Availability Payment (“**MaxQAPIFMq**”) for that Contract Quarter (“**Quarterly Deduction Cap**”); and
- (b) if the aggregate Deduction accrued for a Contract Quarter exceed the Quarterly Deduction Cap, the Deduction amount in excess of the Quarterly Deduction Cap shall be applied to the next Quarterly Availability Payment where the Quarterly Deduction Cap has not been exceeded.

### 5.2 Classification of IFM Failure Events

5.2.1 The classification of an IFM Failure Event as a potential Availability Failure or a Service Failure, shall be made at the time at which the occurrence of the IFM Failure Event is reported to the Help Desk. For clarity, this classification is for the identification of applicable Response Time and Rectification Time, however the IFM Failure Event shall not be considered (a) an Availability Failure unless it causes a Functional Unit or Functional Component (as the case may be) to be Unavailable and the IFM Failure Event is not Rectified within the Rectification Time; or (b) a Service Failure, if the IFM Failure Event is not Responded to within the Response Time or Rectified within the Rectification Time (in the case of IFM Failure Events requiring Rectification which do not constitute a breach of the Availability Conditions). If, in accordance with Performance Measurements Table, no Rectification Time or Response Time applies, the IFM Failure Event shall be a

Service Failure An IFM Failure Event which is incorrectly classified may be re-classified with the approval of Authorized Representatives, acting reasonably, in which case the applicable Performance Monitoring Report will be revised accordingly.

- 5.2.2** For the purposes of calculating Deductions and Noncompliance Points, and noting that classification of IFM Failure Events shall proceed in accordance with Section 5.2.1,
- (a) the identification of Availability Failures will be made in accordance with the Functional Units and Components Table included in Appendix B (Functional Areas, Functional Units, Functional Unit Rankings and Deduction Amounts for Availability Failures and Services Failures) to this Exhibit 4B (Availability Payment Mechanism); and
  - (b) the identification of Service Failures shall be made in accordance with the Performance Measurements included in the Performance Measurements Table and with reference to Appendix A (Space Tolerances) of Division 7 (IFM Specifications) of Exhibit 18 (Technical Requirements).

### **5.3 Bedding-In Period and Seasonal Bedding-In Period**

**5.3.1** During the Bedding-In Period, the number of Noncompliance Points and the amount of any Deductions in respect of Service Failures occurring in the provision of any IFM Service shall be reduced by 25%.

**5.3.2** For the avoidance of doubt, there shall be no relief from Noncompliance Points or Deductions relating to Availability Failures during the Bedding-In Period.

## **6 SERVICE FAILURE DEDUCTIONS**

### **6.1 Service Failure Deductions**

**6.1.1** Service Failure Deductions shall be applied in accordance with Section 15.2 of the Agreement and this Exhibit 4B.

**6.1.2** Subject to this Section 6 (Deductions for Service Failures), the amount of the Service Failure Deduction shall be as specified below.

- (a) in the case of a Minor Service Failure, the sum of \$75 per Service Failure, index-linked using the Escalation Factor calculated in accordance with Section 4 (Escalation Factor) of this Exhibit 4B (Availability Payment Mechanism);
- (b) in the case of a Medium Service Failure, the sum of \$300 per Service Failure, index-linked using the Escalation Factor calculated in accordance with Section 4 (Escalation Factor) of this Exhibit 4B (Availability Payment Mechanism); and
- (c) in the case of a Major Service Failure, the sum of \$650 per Service Failure, index-linked using the Escalation Factor calculated in accordance with Section 4 (Escalation Factor) of this Exhibit 4B (Availability Payment Mechanism).

## 6.2 Performance Action Plans and Energy Performance Action Plans

**6.2.1** Missed submittals of Performance Action Plans or failure to implement particular actions within the Performance Action Plan are to be considered separate and distinct Service Failure Deductions as described below;

- (a) where a complete Performance Action Plan is not submitted within the due date as identified in [Section B.16.2 of Division 7 (IFM Specifications) of Exhibit 18 (Technical Requirements)], a Performance Action Plan deduction of \$300 as of the first missed due date, index-linked using the Escalation Factor calculated in accordance with Section 4 (Escalation Factor) of this Exhibit 4B (Availability Payment Mechanism);
- (b) for every 7 calendar days following the first due date where that Performance Action Plan is not submitted, a further Deduction of \$300 applies, index-linked using the Escalation Factor calculated in accordance with Section 4 (Escalation Factor) of this Exhibit 4B (Availability Payment Mechanism); and
- (c) where each key activity listed in the Performance Action Plan is not implemented according to the milestone date included in the Performance Action Plan, a Deduction of \$300 applies. A further \$300 Deduction applies for each key activity milestone still not implemented every 14 calendar days following the first milestone date, index-linked using the Escalation Factor calculated in accordance with Section 4 (Escalation Factor) of this Exhibit 4B (Availability Payment Mechanism).

**6.2.2** Missed submittals of Energy Performance Action Plans or failure to implement particular actions within the Energy Performance Action Plan are to be considered separate and distinct Service Failure Deductions as described below;

- (a) where a complete Energy Performance Action Plan is not submitted within the due date as identified in Section 4.1.1 of Exhibit 12 Energy Management], an Energy Performance Action Plan deduction of \$500 applies as of the first missed due date, index-linked using the Escalation Factor calculated in accordance with Section 4 (Escalation Factor) of this Exhibit 4B (Availability Payment Mechanism);
- (b) for every 7 days following the first due date where that Energy Performance Action Plan is not submitted, a further Deduction of \$500 applies, index-linked using the Escalation Factor calculated in accordance with Section 4 (Escalation Factor) of this Exhibit 4B (Availability Payment Mechanism); and
- (c) where each key activity listed in the Energy Performance Action Plan is not implemented according to the milestone date included in the Energy Performance Action Plan, a Deduction of \$2,000 applies. A further \$2,000 Deduction applies for each key activity milestone still not implemented every 14 days following the first milestone date, index-linked using the Escalation Factor calculated in accordance with Section 4 (Escalation Factor) of this Exhibit 4B (Availability Payment Mechanism).

### **6.3 Repeat Service Failures and Repeat Failure Ratchet**

- 6.3.1** Following the occurrence of a Service Failure Deduction, Principal Project Company shall be allowed an additional Rectification Time equivalent to the original Rectification Time, provided that:
- (a) there shall be no Rectification Time (where applicable) for a second Service Failure of the same Performance Measurement which occurs within the same Day; and
  - (b) where three or more Service Failures occur with respect to the same Performance Measurement in any rolling period of 10 days, then a repeat failure ratchet of 150% of the applicable Deduction (“Repeat Failure Ratchet”) shall be applied to the third and every subsequent Service Failure Deduction for each Service Failure related to the same Performance Measure in such 10-day period.
- 6.3.2** The provisions of this Section 4.3 (Repeat Service Failures and Repeat Failure Ratchet) of Exhibit 4B (Availability Payment Mechanism) shall not apply to Service Failures in cases where, if the Response or Rectification is not carried out within the Response Time or the Rectification Time, as applicable, the City’s Authorized Representative notifies Principal Project Company’s Authorized Representative that the City no longer requires the relevant IFM Services, in which cases no Deduction shall be applied.
- 6.3.3** Where a Service Failure has no Response Time or Rectification Time, a Service Failure shall occur upon the occurrence of the IFM Failure Event in question.
- 6.3.4** Following the occurrence of a Service Failure Deduction, Principal Project Company shall be allowed additional Rectification Time and a Service Failure Deduction shall apply in accordance with this Section 6 (Service Failure Deductions) of Exhibit 4B (Availability Payment Mechanism) and shall repeat as follows:
- (a) every 24 hours until rectified for Major Service Failures;
  - (b) every 72 hours for Medium Service Failures; or
  - (c) every 7 calendar days for Minor Service Failures.

## **7 DEDUCTIONS FOR AVAILABILITY FAILURES**

### **7.1 Unavailability Deductions**

- 7.1.1** Unavailability Deductions shall be applied in accordance with Section 15.2 of the Agreement and this Exhibit 4B.
- 7.1.2** Subject to this Exhibit 4B (Availability Payment Mechanism), the amount to be deducted from the Maximum Availability Payment in respect of any Availability Failure shall be the aggregate of the Availability Failure Deduction amounts for all Functional Components

made Unavailable as a result of the Availability Failure, calculated based on the duration the Functional Component is Unavailable.

**7.1.3** Availability Failure Deductions will be calculated in accordance with the conditions and deduction thresholds included in Section 7 (Deductions for Availability Failures) of Exhibit 4B (Availability Payment Mechanisms) and Appendix A (Response and Rectification Times) to this Exhibit 4B (Availability Payment Mechanism) and will be indexed using the Escalation Factor calculated in accordance with Section 4 (Escalation Factor) of this Exhibit 4B (Availability Payment Mechanism).

**7.1.4** If any of the Functional Unit are rendered Unavailable but the City continues to use it (or any part thereof), the Availability Failure Deduction for that Functional Unit will be reduced by 50% and the IFM Noncompliance Points will be reduced by 50%. Principal Project Company shall be obliged to continue to provide IFM Services in respect of that Functional Part such that Performance Requirements are normally provided as part of day to day functioning, acting reasonably, and any failure to provide the same may, subject to the provisions of this Exhibit 4B (Availability Payment Mechanism), give rise to a Service Failure.

## **7.2 Service Failure Becoming an Availability Failure**

A Service Failure may become or lead to an Availability Failure if circumstances change, or the Service Failure continues. In such a circumstance, if a Functional Part becomes Unavailable, the Service Failure will have ended (without prejudice to the Service Failure Deductions that have accrued to that point) and an Availability Failure will have occurred.

## **7.3 Effect of Availability Failures on Service Failures**

**7.3.1** Until an Availability Failure has been Rectified, the Deduction in respect of the Availability Failure shall be the only Deduction available to be made in respect of any Functional Part in which the Availability Failure has occurred. No Service Failure Deduction shall be made for any Service Failure that occurs subsequent to the Availability Failure which may occur in the relevant Functional Part during the period until Rectification has been completed.

## **7.4 Total Unavailability**

**7.4.1** Total Unavailability means, that all of the following events have occurred at any given time:

- (a) 40% or greater of all Revenue Vehicle Parking Spaces are Unavailable;
- (b) 100% of the Functional Components associated with the Dispatch Function are Unavailable: and
- (c) the Meet and Greet is Unavailable.

**7.4.2** In the event of Total Unavailability, all Functional Units in the Infrastructure Facility shall be deemed to be Unavailable for purposes of calculating deductions associated with Availability Failures.

**7.5 Repeat Availability Failures and Repeat Failure Ratchet**

- 7.5.1** Following the occurrence of an Availability Failure and the relevant Deduction has been applied, Principal Project Company shall be allowed an additional Rectification Time equivalent to the initial Rectification Time, provided that;
- (a) there shall be no Rectification Time for a second Availability Failure which occurs within the same Day, of the same type of Availability Failure and which relates to the same Functional Component or to a different Functional Component within the same Functional Unit and there is reason to believe that the root cause of each Availability Failure is the same; and
  - (b) where three or more Availability Failures occur with respect to the same type of Availability Failure related to the same Functional Part in any rolling period of 20 days, then a Repeat Failure Ratchet of 150% of the applicable Availability Failure shall be applied to the third and every subsequent Availability Failure Deduction for each Availability Failure related to the same Availability Failures and Functional Part in such 20-day period.

**7.6 Unavailable Component Tiers and Thresholds**

- 7.6.1** For Revenue Vehicle Parking Spaces and Non-Revenue Vehicle Parking Spaces, City shall be entitled to make Deductions with respect to the number of Unavailable Functional Components as a percentage of the Functional Unit, in a tiering system as per Table 2 (Unavailable Tiers for Revenue / Non-Revenue Parking) below.

**Table 2 – Unavailable Tiers for Revenue/ Non-Revenue Vehicle Parking Spaces**

<b>Unavailable % of Functional Unit</b>	<b>Deductions</b>
0-9% of Functional Unit	Deductions to be applied based on number of Unavailable Functional Components
10- 19% of Functional Unit	20% of Functional Unit
20 – 29% of Functional Unit	40% of Functional Unit
30 – 39% of Functional Unit	60% of Functional Unit
40 – 49% of Functional Unit	80% of Functional Unit
50- 100% of Functional Unit	100% of Functional Unit

- 7.6.2** For the Functional Units included in Table 3 (Unavailable Component Thresholds) below, if any combination of Availability Failures occur that render a number of Functional Components Unavailable that exceeds the Unavailable Component Threshold for that Functional Unit, all of the Functional Components in that Functional Unit will be deemed Unavailable until the number of Unavailable Functional Components falls below the Unavailable Component Threshold.

**Table 3– Unavailable Component Thresholds**

Item	Functional Unit Reference	Unavailable Unit Threshold
Elevators at grid A7-B8 (Levels B1, Ground, Mezzanine)	AL-016A	1
60' Bus Repair Bays	GL-011	4
60' Preventative Maintenance Bays	GL-012	2

**7.7 Rectification**

- 7.7.1 No Availability Failure shall occur if Principal Project Company successfully carries out the Rectification within the specified Rectification Time and in such circumstances no Deduction shall be made and no Noncompliance Points shall be assigned.
- 7.7.2 When carrying out a Rectification, or a Temporary Repair pursuant to Section 9 (Temporary Repairs) of this Exhibit 4B (Availability Payment Mechanism), Principal Project Company shall act in accordance with Applicable Law and Standards and Good Industry Practice. Failure to do so shall be deemed to be a new Minor Service Failure, unless the failure constitutes a breach of applicable Law, in which case a Major Service Failure will be deemed to have occurred.

**8 IFM NONCOMPLIANCE POINTS SYSTEM**

**8.1 IFM Noncompliance Points Application**

- 8.1.1 The provisions included in Sections 6 (Deductions for Availability Failures) of this Exhibit 4B (Availability Payment Mechanism) notwithstanding, IFM Noncompliance Points shall accrue to relevant IFM Failure Event in accordance with this Section 8.1, Section 15.4 of the Agreement and Appendix C (IFM Noncompliance Points) to this Exhibit 4B (Payment Mechanism).
- 8.1.2 In the case of failure in more than one Functional Component, the number of IFM Noncompliance Points to be awarded in respect of that the IFM Failure Event shall be determined by the number of Functional Components affected in accordance with conditions and thresholds included in Appendix C (IFM Noncompliance Points) to this Exhibit 4B (Payment Mechanism).
- 8.1.3 The maximum aggregate IFM Noncompliance Points that the City can award in any one Response Time or Rectification Time shall be 250 IFM Noncompliance Points, regardless of the number of Functional Components impacted by such IFM Failure Event.
- 8.1.4 Principal Project Company will report on all accumulated IFM Noncompliance Points in the Performance Monitoring Report, including a report on the accumulated IFM Noncompliance Points per Functional Part, an explanation of the reasons for the accumulation, total IFM Noncompliance Points for the previous quarters and Contract Year and the total cumulative IFM Noncompliance Points for the period since the commencement of the Payment Commencement Date.

**8.1.5** The cumulative points record over the IFM Period will be used for purposes of tracking thresholds leading to Performance Notices, Increased Oversight, cure plans and assessing Persistent PPC Default and other related actions as defined in Article 15 (Deductions and Noncompliance Points) of the Agreement.

## **9 TEMPORARY REPAIRS**

**9.1** If Principal Project Company informs the City that it is unable to Rectify an IFM Failure Event within the specified Rectification Time due to the need for specialized materials or personnel that are not, and cannot reasonably be expected to be, immediately available at the Infrastructure Facility but that a Temporary Repair can be effected:

- (a) the City shall permit Principal Project Company to carry out the Temporary Repair proposed by Principal Project Company unless the City, acting reasonably, considers that, if the Temporary Repair proposed by Principal Project Company is carried out, the use of the relevant Functional Part will not be in accordance with Good Industry Practice or applicable Laws; and
- (b) where a Temporary Repair is permitted pursuant to Section 8.1(a), a deadline by which a Permanent Repair must be made shall be agreed to by the Parties, each acting reasonably, giving Principal Project Company a reasonable period within which to carry out the Permanent Repair (the “**Permanent Repair Deadline**”).

**9.2** During any period beginning at the time when a Temporary Repair is permitted and ending at the earlier of:

- (a) the time at which a Permanent Repair is successfully completed; and
- (b) the Permanent Repair Deadline,

the Availability Conditions shall be replaced by the Minimum Agreed Availability Conditions, to be agreed between the City’s Authorized Representative and the Principal Project Company’s Authorized Representative, each acting reasonably, for the purposes of assessing if the relevant Functional Part is Unavailable.

**9.3** If the Response Time (where applicable) is met, and Temporary Repair is effected within the specified Rectification Time and the Permanent Repair is effected by no later than the Permanent Repair Deadline, no Availability Failure or Service Failure occur, and no Deduction may be made, in respect of the IFM Failure Event.

**9.4** If the Temporary Repair is not effected within the specified Rectification Time, a Service Failure or, as the case may be, Availability Failure, shall be deemed to occur and the following provisions shall apply:

- (a) there shall be a further period in which to effect the Temporary Repair beginning at the expiry of the Rectification Time and of a duration equal to that of the original Rectification Time;
- (b) Principal Project Company shall ensure that the Temporary Repair is successfully carried out prior to the expiry of the additional period referred to in Section 9.4(a);

- (c) if the Temporary Repair is not successfully carried out prior to the expiry of the additional period referred to in Section 8.4(a), a further Service Failure or, as the case may be, Availability Failure shall occur and a further additional period shall commence; and
- (d) if the Temporary Repair is not successfully carried out prior to the Permanent Repair Deadline, and no Permanent Repair has been successfully carried out, the right for Principal Project Company to carry out a Temporary Repair pursuant to this Section 9 (Temporary Repairs) of Exhibit 4B (Availability Payment Mechanism) shall cease and Sections 6 (Deductions for Service Failures) and 7 (Deductions for Availability Failures) of this Exhibit 4B (Availability Payment Mechanism) shall apply.

## **10 AMENDMENT OF IFM PERIOD PERFORMANCE MEASURES TABLE**

Section 15.9 (Amendment of IFM Period Performance Measurement Table) of the Agreement shall apply to any amendment of the Performance Measures Table.

## **11 FAILURE BY PRINCIPAL PROJECT COMPANY TO MONITOR OR REPORT**

- 11.1** The Performance Monitoring Reports produced by Principal Project Company for any month shall be the source of factual information regarding the performance of the IFM Services for the relevant Contract Quarter for the purposes of reporting the occurrence of all Availability Failures and Service Failures, and the calculation of resulting Deductions and Noncompliance Points in accordance with the provisions of this Exhibit 4B (Availability Payment Mechanism).
- 11.2** Principal Project Company shall also report the aggregate Deductions arising as a result of Availability Failures and Service Failures in accordance with the categories and rolling Contract Quarter periods identified for the purposes of measuring the performance of the IFM Services in terms of the amount of Deductions incurred. If there is any error or omission in the Performance Monitoring Report for any Contract Month, Principal Project Company and the City shall agree to an amendment to the Performance Monitoring Report or, failing agreement within 10 days of notification of the error or omission, which shall be made not more than 2 calendar months following the submission of the applicable Performance Monitoring Report to the City, except in the “relevant circumstances” referred to in this Section 10 (Failure by Principal Project Company to Monitor or Report) either Party may refer the matter to the Contract Dispute Procedures.
- 11.3** If Principal Project Company fails to monitor or accurately report an IFM Failure Event (Service Failure or Availability Failure) then, without prejudice to the Deduction to be made in respect of the relevant Service Failure or Availability Failure (if any), the failure to monitor or report the IFM Failure Event shall be deemed to be a new Minor Service Failure, unless the “relevant circumstances” set out below apply, in which case it shall be deemed to be a new Major Service Failure.
- 11.4** In the event that any inspection or investigation by the City of records made available pursuant to the Agreement reveals any further matters of the type referred to in this Section 10 (Failure by Principal Project Company to Monitor or Report), those matters

shall be dealt with in accordance with Section 9 (Amendment of IFM Period Performance Measures Table) of this Exhibit 4B (Availability Payment Mechanism), as appropriate, and the City shall, in addition, be entitled to make Deductions in respect of any Service Failures or Availability Failures in the manner prescribed in Sections 6 (Service Failure Deductions), 7 (Deductions for Availability Failures) and 8 (IFM Noncompliance Points System) of this Exhibit 4B (Availability Payment Mechanism). Any such Deductions shall be made from the Maximum Quarterly Availability Payment payable in respect of the Contract Quarter in which the relevant matters were revealed by the City's investigations.

**11.5** For the purposes of this Section 11 (Failure by Principal Project Company to Monitor or Report) of Exhibit 4B (Availability Payment Mechanism), the "relevant circumstances" are:

- (a) fraudulent action or inaction;
- (b) deliberate misrepresentation; or
- (c) gross misconduct or incompetence in each case on the part of PPC-Related Entities

**11.6** The provisions of this Section 11 (Failure by Principal Project Company to Monitor or Report) of Exhibit 4B (Availability Payment Mechanism) shall be without prejudice to any rights of the City pursuant to the relevant sections of the Agreement.

## **12 EXTENSION OF RESPONSE TIME OR RECTIFICATION TIME**

**12.1** Principal Project Company will be entitled to an extension of the duration of the Response Time or Rectification Time (as applicable) if Principal Project Company is unable to Respond to or Rectify a Service Failure or Availability Failure due to:

- (a) a direction of the City's Authorized Representative to delay or reschedule the Response, or Rectification;
- (b) Principal Project Company performing Scheduled Maintenance and Renewal Work;
- (c) Principal Project Company not being able to access the applicable portion of the Project Site due to work performed by City or Other Contractors, but only to the extent and for the period that Principal Project Company's ability to Respond or Rectify the Noncompliance Event was directly and adversely affected; or
- (d) a Relief Event, but only to the extent and for the period that Principal Project Company's ability to Respond to or Rectify the Service Failure or Availability Failure was directly and adversely affected, as determined by the City's Authorized Representative, acting in good faith.

**APPENDIX A  
 RESPONSE AND RECTIFICATION TIMES**

Service Failures and/or Availability Failures (unless specifically identified otherwise), will only occur upon the expiry of the following Response and Rectification Times in accordance with this Appendix A (Response and Rectification Times) of this Exhibit 4B (Availability Payment Mechanism) and the Performance Measurement Table.

**RESPONSE AND RECTIFICATION TIMES**

**Table A1 – Service Failure Response and Rectification Times by Event Category**

<b>Category</b>	<b>Definition</b>	<b>Response Time</b>	<b>Rectification Time</b>
Priority 1	Situations requiring immediate action to return the Infrastructure Facility to normal operations, stop accelerated deterioration, or correct a safety hazard that imminently threatens life or serious injury to public and/or City employees.	15 minutes	4 hours (for all Functional Component Rank categories)
Priority 2	Situations that will imminently become critical, if not corrected expeditiously, includes intermittent interruptions and/or potential safety hazards.	The longer of 30 minutes or prior to the resumption of core work hours	The longer of 8 hours or prior to the resumption of core work hours (for all FunctionalComponent Rank categories)
Priority 3	Conditions requiring appropriate attention to preclude deterioration or potential downtime and associated damage or higher costs if deferred further. Items representing a practical improvement to existing conditions. These items are not required for the most basic functions of the Infrastructure Facility but will improve the overall usability and accessibility and/or reduce long-term maintenance.	The longer of 2 hours or prior to the resumption of core work hours	7 calendar days

**Table A2 – Availability Failure Response and Rectification Times per Functional Unit Rank Category**

<b>Functional Component Rank Category</b>	<b>Response Time</b>	<b>Rectification Time</b>
5	15 minutes	4 hours
4	15 minutes	8 hours
3	The longer of 30 minutes or prior to the resumption of core work hours	12 hours
2	The longer of 30 minutes or prior to the resumption of core work hours	24 hours
1	The longer of 60 minutes or prior to the resumption of core work hours	48 hours

**APPENDIX B**

**FUNCTIONAL AREAS, FUNCTIONAL UNITS, FUNCTIONAL UNIT RANKINGS, CORE HOURS, AND DEDUCTION AMOUNTS FOR AVAILABILITY FAILURES**

**Table B1: Deduction Amounts for Availability Failures – Facility**

<b>Functional Unit Rank Category</b>	<b>Deduction Amount (per Rectification Time period)</b>
5	\$2,500, index-linked using the Escalation Factor calculated in accordance with <u>Section 2</u> (Escalation Factor) of this <u>Exhibit 4B</u> (Availability Payment Mechanism)
4	\$1,000, index-linked using the Escalation Factor calculated in accordance with <u>Section 2</u> (Escalation Factor) of this <u>Exhibit 4B</u> (Availability Payment Mechanism)
3	\$550, index-linked using the Escalation Factor calculated in accordance with <u>Section 2</u> (Escalation Factor) of this <u>Exhibit 4B</u> (Availability Payment Mechanism)
2	\$200, index-linked using the Escalation Factor calculated in accordance with <u>Section 2</u> (Escalation Factor) of this <u>Exhibit 4B</u> (Availability Payment Mechanism)
1	\$90, index-linked using the Escalation Factor calculated in accordance with <u>Section 2</u> (Escalation Factor) of this <u>Exhibit 4B</u> (Availability Payment Mechanism)

**Table B2: Space Types and Core Hours**

<b>Space Type</b>	<b>Core Hours</b>
Maintenance and Transit Spaces (“Transit/ Maintenance”)	4am – 10pm, Monday to Sunday
Office/ Admin and Training Spaces (“Training/ Administration”)	8am – 5pm, Monday to Friday

### Functional Units in Facility

The following tables presented in this Appendix B identify the Functional Components and Functional Units in the Infrastructure Facility, and Functional Component Rank Category. The Functional Components and Functional Units have been identified by floor level in the Infrastructure Facility and the functions carried out in that part of the Infrastructure Facility.

**Table B3: Functional Components and Functional Units for facilities on multiple levels**

Level	Space	Space Type	Functional Unit	FU Reference	Functional Components	No. of Functional Components	Component Ref.	Rank	
All Levels (Basement, Ground, Levels 2-4)	Parking	Transit/Maintenance	Bus Parking (40' Buses)	AL-010	40' Bus Parking Bays	53	AL-010-1	4	
			Bus Parking (60' Buses)	AL-011	60' Bus Parking Bays	160	AL-011-1	4	
			Parking for Standard Non-Revenue Vehicles (staff)	AL-012	Std N-Rev Parking Bays	151	AL-012-1	2	
			Parking for Large Non-Revenue Vehicles	AL-013	Large N-Rev Parking Bays	12	AL-013-1	2	
	Bus Washing	Transit/Maintenance	Bus Washer Function	AL-014	Bus Washer (Levels 3 & 4)	2	AL-014-1	4	
	Building Spaces	Transit/Maintenance	Stairs		AL-015	Stairs at grid A7-B8 (B1, Ground, Level 1)	1	AL-015-1	5
						Stair at grid A11-B12 (Ground and Level 1)	12	AL-015-2	5
						Stairs at grid D12-E13 (Ground, L1-4) - common stairs	1	AL-015-3	5
						Stairs at grid B1-B2 (L1)	1	AL-015-4	5

					Stairs at grid H11-J12 (Ground, L1-4)	1	AL-015-5	5
					Stairs at grid G1-H2 (Ground, L1)	1	AL-015-6	5
			Elevators at grid A7-B8 (Levels B1, Ground, Mezzanine)	AL-016	Elevators	3	AL-016-1	4
			Other Elevators for BYC	AL-017	Elevator at grid C12-D13 (Ground, Mezzanine)	1	AL-017-1	4
					Elevator at grid H11 (Ground, Mezzanine, L2 and 3)	1	AL-017-2	4
			Distribution Chases, Shafts, or Raceways, vertical or horizontal.	AL-018	Distribution Chases, Shafts, or Raceways, vertical or horizontal.	1	AL-018-1	3
			Common-Use/Exterior Spaces	AL-019	All public spaces such as sidewalks, landscaping, etc.	1	AL-019-1	1

**Table B4: Functional Components and Functional Units for Basement Level**

Level	Space	Space Type	Functional Unit	FU Reference	Functional Components	No. of Functional Components	Component Ref.	Rank
BYC Basement	Parking	Transit/Maintenance	Basement Parking Spaces	B1-010	Parking for Car Share	5	B1-010-1	2
					FMO Parking	3	B1-010-2	2
					Bicycle parking	10	B1-010-3	2
	Service & Clean	Transit/Maintenance	Water Reclamation	B1-011	Water Reclamation	2	B1-011-1	2
FMO			Office spaces	B1-012	Site Manager	1	B1-012-1	2

		Transit/ Maintenance			Admin Open Office Area	1	B1-012-2	2
			Janitor	B1-013	Janitor Closet 1	1	B1-013-1	2
					Janitor Closet 2	1	B1-013-2	2
			IT & Storage	B1-014	IT Room	1	B1-014-1	3
					Tech Shop	1	B1-014-2	2
					Office Storage	1	B1-014-3	3
					Spare Parts Storage	1	B1-014-4	3
			Shared Staff spaces	B1-015	Lunch and Break Room	1	B1-015-1	3
					Male Washroom and Showers	1	B1-015-2	3
					Female Washroom and Showers	1	B1-015-3	3
	FM Locker Room	1			B1-015-4	3		
	Unisex Washroom	1			B1-015-5	3		
	Shared Facilities	Transit/ Maintenance	Electrical-mechanical Facilities	B1-016	Main Point of Entry (MPOE)	1	B1-016-1	3
					BYC Fire Pump	1	B1-016-2	3
					Electrical Room	1	B1-016-3	3
					Mechanical Room	1	B1-016-4	3
		Waste Facilities	B1-017	Trash/Recycling/Compost Compactor	1	B1-017-1	3	
				Hazardous Waste	1	B1-017-2	2	
		Storage	B1-018	Diesel Storage Room	1	B1-018-1	1	
		HCC/BYC MEP	Transit/ Maintenance	HCC/BYC MEP Facilities	B1-019	HCC Thermal Storage Pump Room	1	B1-019-1
AFF Electrical Room	1					B1-019-2	3	

					AFF Emergency Electrical Room	1	B1-019-3	5
					WRK Electrical Room	1	B1-019-4	3
					WRK Emergency Electrical Room	1	B1-019-5	5
					DCW Booster Room	1	B1-019-6	3
					Grey Water Tank	1	B1-019-7	3
					Rain Water Tank	1	B1-019-8	3
					Processing Plant	1	B1-019-9	5
	Unassigned	Training/ Administration	Unassigned Spaces	B1-020	Storage	3	B1-020-1	3

**Table B5: Functional Components and Units for Ground Level**

Level	Space	Space Type	Functional Unit	FU Reference	Functional Components	No. of Functional Components	Component Ref.	Rank (1-5)
BYC Level Ground	Bays & Shops	Transit/ Maintenance	Office Space	GL-010	Running Repair Supervisor	3	LG-010-1	2
					Control Room Clerk	2	LG-010-2	2
					Floor Supervisor	2	LG-010-3	2
					Preventative Maintenance Supervisor	2	LG-010-4	2
					Electronic Supervisor	1	LG-010-5	2
	Repair Bays	GL-011	60' Bus Repair Bays	10	LG-011-1	4		

			Preventive Maintenance	GL-012	60' Preventative Maintenance Bays	5	LG-012-1	4
			Lube and Compressor Rooms	GL-013	Lube Room	1	LG-013-1	4
					Compressor Room	1	LG-013-2	4
			Tire Bay, Shop and Storage	GL-014	60' Bus Tire Bay	1	LG-014-1	4
					Tire Shop	1	LG-014-2	4
					Tire Storage	1	LG-014-3	4
			Body Repair	GL-015	60' Bus Minor Body Repair	1	LG-015-1	4
					60' Bus Chassis Wash	1	LG-015-2	4
					Minor Body Shop	1	LG-015-3	4
			Electronics Shop	GL-016	Electronic Shop Workstations	1	LG-016-1	4
					Electronic Bench Shop	1	LG-016-2	4
					Data/Comm Room	1	LG-016-3	5
			Common Work Area & Tools Storage	GL-017	Common Work Area	2	LG-017-1	3
					Portable Equipment Storage	2	LG-017-2	3
					Tool Box Storage	3	LG-017-3	3
					Tool Storage	1	LG-017-4	3
			Service & Clean	Transit/Maintenance	Service & Clean	GL-018	Cleaning Equipment Storage	1
	Ground Level Parts Spaces	Transit/Maintenance	Staff Spaces	GL-019	Parts Supervisor	1	LG-019-1	2
					Parts Lockers	1	LG-019-2	3
					Break Room	1	LG-019-3	3
Gender Neutral Restroom					1	LG-019-4	3	

			Parts Shop and Storage	GL-020	Parts Storage	1	LG-020-1	3
					Parts Shopkeeper	5	LG-020-2	2
					Parts Window	1	LG-020-3	3
					Receiving Office	1	LG-020-4	3
	Maintenance	Transit/ Maintenance	Staff Work Spaces	GL-021	Superintendent	1	LG-021-1	2
					Assistant Superintendent	1	LG-021-2	2
					Senior Controller	1	LG-021-3	2
					Administrative Assistant	2	LG-021-4	2
					Hoteling - Workstation	4	LG-021-5	1
			Shop, Records and Resources	GL-022	Support Shop	1	LG-022-1	2
					Copy/Supply	1	LG-022-2	2
					Records Storage	1	LG-022-3	2
					Archive Record Storage	1	LG-022-4	2
					Library/Online Resources	1	LG-022-5	2
					Data/Comm Room	1	LG-022-6	5
			Staff Common Spaces	GL-023	Kitchenette/Vending	1	LG-023-1	3
					Break Room	1	LG-023-2	3
					Training Room	1	LG-023-3	3
					Uniform Alcove	1	LG-023-4	3
					Men's Restroom/Shower	1	LG-023-5	3
					Men's Locker	1	LG-023-6	3
Women's Restroom/Shower	1	LG-023-7			3			

					Women's Locker	1	LG-023-8	3
					Gender Neutral Accessible Locker/Shower/Restroom	1	LG-023-9	3
					Custodial	1	LG-023-10	3
	Operations	Transit/Maintenance	Yard Starter Office	GL-024	Yard Starter Office	1	LG-024-1	5
	Shared Offices	Transit/Maintenance	Shared Offices	GL-025	Revenue Office	1	LG-025-1	5
					Meet and Greet	1	LG-025-2	5
	Transit Services (MRO)	Transit/Maintenance	Transit Operations/ Equipment Storage/ Component Rebuilding Assembly	GL-026	Transit Operations/ Equipment Storage/ Component Rebuilding Assembly	1	LG-026-1	3
	Training	Training/ Administration	Training	GL-027	Data/Comm Room	1	LG-027-1	5
	HCC/BYC MEP	Transit/Maintenance	HCC/BYC MEP Facilities	GL-028	Mechanical Room	1	LG-028-1	3
					Main Electrical Room	1	LG-028-2	3
					Electrical Room for Chargers	1	LG-028-3	3
	Unassigned	Training/ Administration	Unassigned Spaces	GL-029	General Shop Processing Equipment	1	LG-029-1	2
					Storage	2	LG-029-2	2

**Table B6: Functional Components and Functional Units for Level 2**

Level	Space	Space Type	Functional Unit	FU Reference	Functional Components	No. of Functional Components	Component Ref.	Rank
-------	-------	------------	-----------------	--------------	-----------------------	------------------------------	----------------	------

<b>BYC Level 2</b>	Operations	Transit/ Maintenance	Staff Work Spaces	L2-010	Superintendent	1	L2-010-1	2
					Assistant Superintendent	2	L2-010-2	2
					Operations Supervisor	1	L2-010-3	2
					Trainer	1	L2-010-4	2
					Administrative Assistant	2	L2-010-5	2
					Hoteling - Workstation	4	L2-010-6	1
					Union Office	1	L2-010-7	2
		Transit/ Maintenance	Dispatch Function	L2-011	Receiver	1	L2-011-1	5
					Dispatch	2	L2-011-2	5
					Operator Check-in/Dispatch/Receiver	1	L2-011-3	5
		Transit/ Maintenance	Records and Comms	L2-012	Copy/Supply	1	L2-012-1	2
					Records Storage	1	L2-012-2	2
					Data/Comm Room	1	L2-012-3	5
			Staff Common Spaces	L2-013	Uniform Storage	1	L2-013-1	3
					Kitchenette/Vending	1	L2-013-2	3
					Break Room	1	L2-013-3	3
					Lockers	1	L2-013-4	3
					Lockers Changing Area	2	L2-013-5	3
					Recreation Area	1	L2-013-6	3
					TV Room	1	L2-013-7	3
		Quiet Room	1	L2-013-8	2			

					Men's Restroom/Shower	1	L2-013-9	3
					Women's Restroom/Shower	1	L2-013-10	3
					Gender Neutral Accessible Locker/Shower/Restroom	1	L2-013-11	3
					Custodial	2	L2-013-12	2
					SFMTA Open Space	1	L2-013-13	2
	Transit Services (MRO)	Transit/Maintenance	Staff Work Spaces	L2-014	Operations Manager	2	L2-014-1	2
					Transit Manager II	1	L2-014-2	2
					Operations Specialist	1	L2-014-3	2
					MRO, Street Operations	10	L2-014-4	2
					Junior Management Assistant	4	L2-014-5	2
		Training/Administration	Conference, Training, Comms	L2-015	Conference Room	1	L2-015-1	4
					Training Room	1	L2-015-2	4
					Data/Comm Room	1	L2-015-3	5
			Staff Common Spaces	L2-016	Break Room	1	L2-016-1	3
					Lockers	1	L2-016-2	3
					Locker Changing Area	5	L2-016-3	3
					Men's Restroom/Shower	1	L2-016-4	3
					Women's Restroom/Shower	1	L2-016-5	3
					Gender Neutral Accessible Locker/Shower/Restroom	1	L2-016-6	3
Custodial	1	L2-016-7	2					

	Shared Facilities	Training/ Administration	Lobby, Conference, Comms	L2-017	Lobby	2	L2-017-1	3
					Medium Conference Room	2	L2-017-2	3
					Large Conference/Small Training	2	L2-017-3	3
		Transit/ Maintenance	Staff Work Spaces, Storage	L2-018	Facilities Stationary Engineer	2	L2-018-1	2
					Transit Maintenance Engineer	2	L2-018-2	2
					Security Office	1	L2-018-3	2
		Transit/ Maintenance	Storage, Comm, MEP	L2-019	Building Maintenance Storage	1	L2-019-1	2
					Data/Comm Room	1	L2-019-2	5
					Main Telecommunication Room	1	L2-019-3	3
					Mechanical Room Allowance	4	L2-019-4	2
	Chiller Room				1	L2-019-5	4	
	Boiler Room				1	L2-019-6	4	
	HVAC Room				1	L2-019-7	4	
	Common Rest/Leisure Spaces	L2-020	Fitness	1	L2-020-1	3		
			Gender Neutral Accessible Restroom	1	L2-020-2	3		
			Community Room	1	L2-020-3	3		
			Lactation Room	1	L2-020-4	3		
	Training	Training/ Administration	Staff Work Spaces	L2-021	Reception	1	L2-021-1	2
					Manager	1	L2-021-2	2
					Superintendent	1	L2-021-3	2
Assistant Superintendent					4	L2-021-4	2	

					Supervisors	2	L2-021-5	2
					Clerical Staff	3	L2-021-6	2
					Team Leader	6	L2-021-7	2
					CAT Training	2	L2-021-8	2
					Instructors	15	L2-021-9	2
			Training Spaces	L2-022	IT Office	1	L2-022-1	3
					Classrooms (A-B)	2	L2-022-2	3
					Classrooms (C-D)	2	L2-022-3	3
					Conference Rooms (A&B)	2	L2-022-4	3
					Simulator Rooms	3	L2-022-5	3
					Computer Lab	1	L2-022-6	3
					Handouts Storage	1	L2-022-7	3
					Training Aid Storage	1	L2-022-8	3
			Storage	L2-023	Records Storage	1	L2-023-1	2
					Records Archive Storage	1	L2-023-2	2
					Copy/Supply	1	L2-023-3	2
					Uniform Storage	1	L2-023-4	2
			Staff Common Spaces	L2-024	Kitchenette/Vending	1	L2-024-1	2
					Break Room	1	L2-024-2	3
					Operator Locker	1	L2-024-3	3
Instructor Locker	1	L2-024-4			3			
Lactation Room	1	L2-024-5			3			

					Men's Restroom/Shower	1	L2-024-6	3
					Women's Restroom/Shower	1	L2-024-7	3
					Gender Neutral Accessible Locker/Shower/Restroom	1	L2-024-8	3
					Custodial	2	L2-024-9	2
	HCC/BYC MEP	Transit/Maintenance	Electrical Room for Chargers	L2-025	Electrical Room for Chargers	2	L2-025-1	3
Unassigned	Training/Administration	Storage	L2-026	Storage	1	L2-025-2	3	

**Table B7: Functional Components and Functional Units for Levels 3 and 4**

Level	Space	Space Type	Functional Unit	FU Reference	Functional Components	No. of Functional Components	Component Ref.	Rank
<b>BYC Level 3</b>	Service & Clean Function	Transit/Maintenance	Service & Clean	L3-010	Service Supervisor Office	1	L3-010-1	3
					Service Position	2	L3-010-2	3
					Cleaning Equipment Storage	3	L3-010-3	3
	Maintenance	Transit/Maintenance	Maintenance	L3-011	CTRL RM	1	L3-011-1	3
	Shared	Training/Administration	Restrooms	L3-012	Gender Neutral Accessible Restroom	2	L3-012-1	1
Unassigned	Training/Administration	Storage, Janitor	L3-013	Wash Equipment Room	1	L3-013-1	1	
				Janitor Closet	1	L3-013-2	1	
<b>BYC Level 4</b>	Service & Clean Function	Transit/Maintenance	Service & Clean	L4-010	Service Supervisor Office	1	L4-010-1	3
					Service Position	1	L4-010-2	3
					Cleaning Equipment Storage	3	L4-010-3	3

	Shared	Training/ Administrati on	Restrooms	L4-011	Gender Neutral Accessible Restroom	2	L4-011-1	1
	Unassigned	Training/ Administrati on	Storage, Janitor	L4-012	Wash Equipment Room	1	L4-012-1	1
					Janitor Closet	1	L4-012-2	1

**APPENDIX C**

**IFM NONCOMPLIANCE POINTS**

IFM Noncompliance Points will be assessed based on the following categorization for IFM Failure Events in accordance with this Exhibit 4 and the Performance Measurement Table.

**Table C1: IFM Noncompliance Points Table for Service Failures**

Service Failure Level	Noncompliance Points	Recurrence Period
MAJOR	10	As per 'FREQ' column in Performance Measurement Table in accordance with relevant Performance Measure
MED	5	As per 'FREQ' column in Performance Measurement Table in accordance with relevant Performance Measure
MINOR	1	As per 'FREQ' column in Performance Measurement Table in accordance with relevant Performance Measure

**Table C2: IFM Noncompliance Points Table for Availability Failures**

Functional Component Rank Category	Noncompliance Points	Recurrence Period
5	10	4 hours
4	10	8 hours
3	5	12 hours
2	5	24 hours
1	1	48 hours

**APPENDIX D**  
**PAYMENT SCHEDULE**

**[To be inserted based on Financial Proosal]**

**EXHIBIT 6**

**FORMS OF PAYMENT AND PERFORMANCE SECURITY**

Exhibit 6A: Financial Close Security

Exhibit 6B: Form of D&C Payment Bond<sup>1</sup>

Exhibit 6C: Form of D&C Performance Bond<sup>1</sup>

Exhibit 6D: Form of Multiple Obligee Rider for D&C Payment Bond<sup>1</sup>

Exhibit 6E: Form of Multiple Obligee Rider for D&C Performance Bond<sup>1</sup>

Exhibit 6F: Form of SFMTA O&M Facilities Warranty Bond

<sup>1</sup> If the bond is to secure the performance or payment obligations of the D&C Contractor or other Key Contractor, rather than Principal Project Company, then the form of the bond shall be revised in accordance with Section 10.3.1.8 of this Agreement.

**EXHIBIT 6A**

**FORM OF FINANCIAL CLOSE SECURITY**

**FORM 6A-1 - FORM OF FINANCIAL CLOSE BOND<sup>1</sup>**

**Bond No.** \_\_\_\_\_

**KNOW ALL PERSONS BY THESE PRESENTS**, that the \_\_\_\_\_, as Principal and \_\_\_\_\_, as Surety, each authorized and licensed to transact business in the State of California (“**State**”), and each a corporation duly organized under the laws of the State indicated on the attached page, having its principal place of business at the address listed on the attached page, in the State indicated on the attached page, and each Surety authorized as a surety in the State, are jointly and severally held and firmly bound unto the City and County of San Francisco (the “**City**”), a municipal corporation acting by and through the **San Francisco Municipal Transportation Authority (“SFMTA”)**, in the sum of [\_\_\_\_\_ **United States Dollars (US \$\_\_\_\_\_)**] (the “**Bonded Sum**”), the payment of which we each bind ourselves, and our heirs, executors, administrators, representatives, successors, and assigns, jointly and severally, firmly by these presents.

**WHEREAS**, the Principal has entered into an Infrastructure Facility Design-Build-Finance-Operate-Maintain Agreement with the City dated as of \_\_\_\_ 2025 (the “**Agreement**”) to design, construct, finance, operate and maintain the Infrastructure Facility of the Potrero Yard Modernization Project (the “**Project**”);

**NOW, THEREFORE**, the condition of this bond is such that this obligation shall be null and void upon (a) occurrence of Financial Close for the Project by the Financial Close Deadline set forth in the Agreement; or (b) Principal’s receipt of written Notice from City that the Agreement is terminated pursuant to Section 17.6 of the Agreement; otherwise it shall remain in full force and effect, and the Bonded Sum will be forfeited to City as liquidated damages and not as a penalty, upon receipt by Principal and Surety of Notice of such forfeiture from City:

The Surety hereby agrees to pay to City the full Bonded Sum hereinabove set forth, as liquidated damages and not as a penalty, within ten days after Notice from City that Principal has failed to achieve Financial Close by the Financial Close Deadline set forth in the Agreement, and such failure is not excused in accordance with the Agreement.

<sup>1</sup> The amount of a single bond may be less than \$[\_\_\_\_\_] on the condition that Proposer provides Financial Close Security that totals \$[\_\_\_\_\_] in the aggregate.

The following terms and conditions shall apply with respect to this bond:

1. If suit is brought on this bond by City and judgment is recovered, Surety shall pay all costs incurred by City in bringing such suit, including, without limitation, reasonable attorneys' fees and costs as determined by the court.

2. Any extension(s) of the time for award of the Agreement that Principal may grant in accordance with the Agreement or otherwise, shall be subject to the reasonable approval of Surety.

3. Correspondence, Notices or claims relating to this bond should be sent to Surety at the following address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This agreement shall be binding on the Principal and Surety executing the same, their legal representatives, successors and assigns.

Capitalized terms used but not defined herein shall have the meaning given to them in the Agreement.

---

**SIGNED and SEALED** this \_\_\_\_\_ day of \_\_\_\_\_, 2025

\_\_\_\_\_  
Principal

By: \_\_\_\_\_

\_\_\_\_\_  
Surety

By: \_\_\_\_\_  
Attorney in Fact

***[add appropriate Surety acknowledgments]***

---

**FORM 6A-2 - FORM OF FINANCIAL CLOSE LETTER OF CREDIT<sup>b</sup>**

**IRREVOCABLE STANDBY LETTER OF CREDIT – FINANCIAL CLOSE**

**ISSUER:** \_\_\_\_\_

**PLACE FOR PRESENTATION OF DRAFT:** (Name and Address of Bank/Branch -- MUST be San Francisco, California, Los Angeles, California, Chicago, Illinois, or New York, New York address)

**APPLICANT:** \_\_\_\_\_

**BENEFICIARY:** CITY AND COUNTY OF SAN FRANCISCO

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**LETTER OF CREDIT NUMBER:** \_\_\_\_\_

**PLACE AND DATE OF ISSUE:** \_\_\_\_\_

**AMOUNT:** [[ \_\_\_\_\_ ] United States Dollars (US \$[ \_\_\_\_\_ ])]

**EXPIRATION DATE:** \_\_\_\_\_

The above named Issuer issues this Irrevocable Standby Letter of Credit in favor of the City and County of San Francisco (“**City**”), for any sum or sums up to the aggregate amount of [[ \_\_\_\_\_ ] **United States Dollars (US \$[ \_\_\_\_\_ ])**], available by draft at sight drawn on the Issuer. Any draft under this Irrevocable Standby Letter of Credit shall be signed by an authorized representative of the above named Beneficiary and shall:

1. Identify this Irrevocable Standby Letter of Credit by the name of the Issuer, and the Letter of Credit number, amount, and place and date of issue, stated above; and
2. State:

“This drawing is due to \_\_\_\_\_ (Applicant’s name)’s failure to achieve Financial Close by the Financial Close Deadline set forth in the Infrastructure Facility Design-Build-Finance-Operate-Maintain Agreement with the City and County of San Francisco dated as of \_\_\_\_ 2025 (the “**Agreement**”) without excuse under the Agreement.”

All drafts presented in compliance with the terms of this Irrevocable Standby Letter of Credit will be honored if presented by physical delivery of such original documents or via overnight courier

---

<sup>b</sup> The amount of a single letter of credit may be less, on the condition that Proposer provides Financial Close Security that totals \$[ \_\_\_\_\_ ] in the aggregate.

---

of such original documents to \_\_\_\_ (Name & San Francisco, California, Los Angeles, California, Chicago, Illinois, or New York, New York address)\_\_\_\_ on or before the stated expiration date described above or any extended expiration date.

This Irrevocable Standby Letter of Credit is subject to the rules of the “International Standby Practices” ISP98. If a conflict between ISP98 and New York law should arise, New York law shall prevail, without regard to principles of conflicts of law. If legal proceedings are initiated by any party with respect to payment of the Irrevocable Standby Letter of Credit, we agree that such proceeding shall be governed by New York law and may be brought in the State Courts of New York, venue in New York City, provided that the obligations of City shall be governed and construed in accordance with California law. Venue for any proceeding involving issues related to the obligations of City shall be in San Francisco, California.

Any failure by you to draw upon this Irrevocable Standby Letter of Credit as permitted hereunder shall not cause this Irrevocable Standby Letter of Credit to be unavailable for any future drawing, provided that this Irrevocable Standby Letter of Credit has not expired prior to such future drawing and that all requirements of this Irrevocable Standby Letter of Credit are independently satisfied with respect to any such future drawing.

Capitalized terms used but not defined herein shall have the meaning given to them in the Agreement.

Issuer:

By: \_\_\_\_\_ (Authorized signature of Issuer)

**EXHIBIT 6B**

**FORM OF D&C PAYMENT BOND**

**(Bond No. \_\_\_\_\_)**

**[INSERT PRINCIPAL PROJECT COMPANY NAME]** (the “**Principal Project Company**”) has entered into a contract with the City and County of San Francisco (the “**City**”), a municipal corporation acting by and through the San Francisco Municipal Transportation Agency (“**SFMTA**”), bearing the date of **[INSERT DATE]**, 2025, to design, build, finance, operate and maintain the Infrastructure Facility of the Potrero Yard Modernization Project (the “**Agreement**”); and

That we **[INSERT CONTRACTOR NAME]**, an entity duly authorized to do business in the State of California (the “**State**”) and having its principal place of business at **[INSERT STREET ADDRESS, CITY, STATE, ZIP AND PHONE #]** (the “**Principal**” or “**Contractor**”), have entered into a contract (the “**Contract**”) with Principal Project Company bearing the date of **[INSERT DATE]**, for the performance of design and construction work in connection with the Infrastructure Facility of the Potrero Yard Modernization Project; and

That the Principal and **[INSERT SURETY NAME]** (the “**Surety**”) (or the “**Co-Sureties**”), duly authorized to do business in the State, having its principal place of business at **[INSERT HOME OFFICE ADDRESS]** are held and firmly bound unto Principal Project Company, in the full and just sum of **[INSERT D&C PAYMENT BOND AMOUNT]** lawful money of the United States of America (**US\$**\_\_\_\_), to whom payment well and truly will be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally;

CONDITIONS OF THIS BOND ARE AS FOLLOWS:

- A. Principal shall promptly make all payments owing when due to all persons who furnish labor, services, or materials for the prosecution of the work provided for in the Contract.
- B. Each said claimant shall have a right of action against the Principal and Surety (or Co-Sureties) for the amount due him or her, including unpaid finance charges due under the claimant’s contract.
- C. A claimant, except a laborer, who is not in privity with the Principal shall, before commencing or not later than 20 days after commencing to furnish labor, materials, or supplies for the prosecution of the work, furnish the Principal with a preliminary Notice that he or she intends to look to this bond for protection. No action for the labor, materials, or supplies may be instituted against the Principal or the Surety (or Co-Sureties) unless the preliminary Notice has been given. Notices required or permitted shall be given in compliance with the requirements of Sections 8100 et seq. and 9300 et seq. of the California Civil Code.
- D. The amount of this bond is a fixed amount and shall not be changed.

E. Neither any change in or under the Contract, nor any compliance or noncompliance with any formalities provided in the Contract nor the change shall relieve the Surety (or Co-Sureties) of its obligations under this bond.

Correspondence, Notices or claims relating to this bond should be sent to the following Surety's authorized representative and address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

If there are Co-Sureties, the Co-Sureties agree to empower the above authorized representative with the authority to act on behalf of all of the Co-Sureties with respect to this bond, so that City will have no obligation to deal with multiple sureties hereunder. The above authorized representative may be changed only by delivery of written Notice (by personal delivery or by certified mail, return receipt requested) to City designating a single new authorized representative, signed by all of the Co-Sureties.

IN WITNESS WHEREOF, Principal and Surety have executed these presents and the Surety (or Co-Sureties) has affixed its seal, this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

**PRINCIPAL:** \_\_\_\_\_ Date: \_\_\_\_\_, 2025

Authorized Signature: \_\_\_\_\_

Print Name & Title: \_\_\_\_\_

**NAME OF SURETY:** \_\_\_\_\_

Date: \_\_\_\_\_, 2025

Signature (Attorney-in-Fact): \_\_\_\_\_

(Affix Seal)

Print Full Name, Address and Telephone No.

**[If more than one Surety, then add appropriate number of lines to signature block]**

**NOTES CONCERNING SURETY AND EXECUTION:**

A. SURETY COMPANY REQUIREMENTS

To be acceptable to the City, each Surety shall meet all of the requirements of the Agreement and laws of California.

**B. EXECUTION OF BOND**

1. Enter each Surety's name and address on each copy of this bond in the space provided.
2. Have each copy of this bond signed on behalf of the Principal by the same person that signed the Contract on behalf of the Principal (affix Corporate Seal, if appropriate).
3. Have each copy of this bond signed by the person authorized to sign on behalf of the Surety (or Co-Sureties). Put the date the signature was affixed in the space provided. Print that person's name in the place provided on each copy of this bond. Also, have each Surety's Corporate Seal affixed to each copy of this bond beside that person's signature (no copies are acceptable).
4. Each copy of this bond must have a Power of Attorney attached indicating that the person in item B.3 above is authorized to sign on behalf of the relevant Surety.
5. Each copy of the Power of Attorney must have the Surety's Corporate Seal manually affixed.
6. The date of execution of the Power of Attorney is the same as the date shown on the signature line for the Surety Attorney-In-Fact.

**CALIFORNIA ALL PURPOSE ACKNOWLEDGEMENT**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy or validity of that document.

State of \_\_\_\_\_

County of \_\_\_\_\_

On this \_\_\_ day of \_\_\_\_\_ in the year of \_\_\_\_\_ before me, a notary public in and for the county and state aforesaid, personally appeared \_\_\_\_\_ who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to within the instrument and acknowledged to me that he/she executed the same in his/her authorized capacity(ies), and that by his/her signature(s) on the instrument, the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.

Witness my hand and official seal:

\_\_\_\_\_ (SEAL) \_\_\_\_\_

*Signature of Notary Public*

**EXHIBIT 6C**

**FORM OF D&C PERFORMANCE BOND**

**(Bond No. \_\_\_\_\_)**

**[INSERT PRINCIPAL PROJECT COMPANY NAME]** (the “**Principal Project Company**”) has entered into a contract with the City and County of San Francisco (the “**City**”), a municipal corporation acting by and through the San Francisco Municipal Transportation Agency (“**SFMTA**”), bearing the date of **[INSERT DATE]**, 2025, to design, build, finance, operate and maintain the Infrastructure Facility of the Potrero Yard Modernization Project (the “**Agreement**”); and

That we **[INSERT CONTRACTOR NAME]**, an entity duly authorized to do business in the State of California (the “**State**”) and having its principal place of business at **[INSERT STREET ADDRESS, CITY, STATE, ZIP AND PHONE #]** (the “**Principal**” or “**Contractor**”), have entered into a contract (the “**Contract**”) with Principal Project Company bearing the date of **[INSERT DATE]** related to the performance of design and construction work for the Infrastructure Facility of the Potrero Yard Modernization Project; and

That the Principal and **[INSERT SURETY NAME]** (the “**Surety**”) (or the “**Co-Sureties**”), duly authorized to do business in the State, having its principal place of business at **[INSERT HOME OFFICE ADDRESS]** are held and firmly bound unto Principal Project Company and the Indemnitees (as defined in the Agreement) (Principal Project Company and the Indemnitees are collectively referred to herein as the “**Obligees**”) in the full and just sum of **[INSERT D&C PERFORMANCE BOND AMOUNT]** lawful money of the United States of America (**US\$ \_\_\_\_\_**), to whom payment well and truly will be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally and firmly by these presents;

**WHEREAS**, it was one of the conditions of the Contract and the Agreement that these presents shall be executed;

**NOW, THEREFORE**, the conditions of this obligation are such that if Principal shall faithfully, promptly, efficiently and fully perform in accordance with the obligations of the Contract and shall indemnify and save harmless the Obligees from all cost and damage by reason of Principal's failure to do so, then this obligation shall be void; otherwise, it shall remain in full force and effect.

The Surety's obligations under this bond shall arise after:

- (a) Either: (i) Principal Project Company provides Notice to Principal and the Surety that Principal Project Company is considering declaring a default by Principal under the Contract; or (ii) the City provides Notice to the Principal Project Company, with a copy to the Surety, that it is considering declaring a default of Principal Project Company under the Agreement as the result of a material breach by Principal of its obligations to Principal Project Company under the Contract. The relevant Notice shall indicate whether the Principal Project Company or the City, as the case may be, is requesting a conference among Principal Project Company, Principal, City and the Surety to discuss Principal's performance. If a conference is not requested, the Surety may, within five (5)

---

business days after receipt of the relevant Notice, request such a conference. If the Surety timely requests a conference, Principal Project Company and City shall attend. Unless Principal Project Company and City agrees otherwise, any such conference shall be held within ten (10) business days of the Surety's receipt of the relevant Notice; and

- (b) Principal Project Company declares a default by Principal under the Contract, terminates the Contract and provides Notice to the Surety.

Failure on the part of Principal Project Company or the City to comply with the Notice requirement in Section (a) shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations.

Should the conditions set forth in (a)-(b) above be satisfied, the Surety (or Co-Sureties) shall pay Principal Project Company (or any one or more of the Obligees) all costs assessed against the Principal because of the default which were not withheld from Contract proceeds, and upon an Obligee's demand, the Surety (or Co-Sureties) shall (i) take over performance of the Contract obligations; provided, however, that in the event Principal Project Company (or any one or more of the Obligees) elects to have the Surety (or Co-Sureties) take over performance of the Contract obligations, the Surety (or Co-Sureties) may not select the Principal or any affiliate of the Principal to perform the Contract obligations for and on behalf of the Surety (or Co-Sureties) without the express written consent of the Obligees; or (ii) waive the right to take over performance of the Contract obligations and tender payment of an amount necessary to compensate the Obligees for the cost to perform the Principal's obligations under the Contract, up to the full penal sum of this bond.

The Surety (or Co-Sureties) shall be fully liable under this bond up to the full penal sum hereof, regardless of any modifications (of whatever amount) to the Contract amount, provided that the Surety's obligations under this bond shall not be greater than those of Principal under the Contract.

No alteration, modification or supplement to the Contract or the nature of the work to be performed thereunder, including without limitation any extension of time for performance, shall in any way affect the obligations of Surety (or Co-Sureties) under this bond. Surety hereby waives Notice of any such alteration, modification or supplement, including changes in time, to the Contract.

Correspondence, Notices or claims relating to this bond should be sent to the following Surety's authorized representative and address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

If there are Co-Sureties, the Co-Sureties agree to empower the above authorized representative with the authority to act on behalf of all of the Co-Sureties with respect to this bond, so that City will have no obligation to deal with multiple sureties hereunder. The above authorized representative may be changed only by delivery of written Notice (by personal delivery or by certified mail, return receipt requested) to City designating a single new authorized representative, signed by all of the Co-Sureties.

If any provision of this bond is found to be unenforceable as a matter of law, all other provisions shall remain in full force and effect.

This bond shall be governed by and construed in accordance with the laws of the State of California, without regard for conflict of laws principles, and any action seeking enforcement of the bond will be litigated exclusively in the courts of the State of California.

WITNESS the signature of the Principal and the signature of the Surety (or Co-Sureties) by \_\_\_\_\_ its \_\_\_\_\_ (Agent or Attorney-in-Fact) with the seals of said Principal and Surety (or Co-Sureties) hereunto affixed this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

Complete the following as appropriate

Principal (Entity Name)*
Authorized Signature: _____
*Signature: _____
Printed Name: _____
* _____
Title: _____
(Seal)
*Include the signature and printed name of each partner required to be affixed per partnership agreement.

Principal shall record this bond in the official records of the Clerk of Court of the county where the improvement is located prior to commencing the work.

Organized and existing under the laws of the State of _____ and authorized to do business in the State of California, pursuant to the laws of the State of California.											
Countersigned: _____ California Licensed Insurance Agent Print information below (California Licensed Insurance Agent; whether in Attorney-in-Fact or Countersignature role): Name: _____ Business Address: _____ Telephone: _____	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; border-bottom: 1px solid black;">Surety Company Name (Print)</td> <td style="text-align: center; border-bottom: 1px solid black;">(Seal)</td> </tr> <tr> <td colspan="2" style="padding: 5px;">By: _____</td> </tr> <tr> <td colspan="2" style="padding: 5px;">California Licensed Insurance Agent or Attorney-in-Fact (Surety)</td> </tr> <tr> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> Above Signatory is also a California Licensed Insurance Agent (check if applicable and complete business name, address and telephone number block; if not, have such an agent countersign and complete block).                 </td> </tr> <tr> <td colspan="2" style="padding: 5px;">NOTE: Power of Attorney showing authority of Surety's Agent or Attorney-in-Fact is to be attached.</td> </tr> </table>	Surety Company Name (Print)	(Seal)	By: _____		California Licensed Insurance Agent or Attorney-in-Fact (Surety)		<input type="checkbox"/> Above Signatory is also a California Licensed Insurance Agent (check if applicable and complete business name, address and telephone number block; if not, have such an agent countersign and complete block).		NOTE: Power of Attorney showing authority of Surety's Agent or Attorney-in-Fact is to be attached.	
Surety Company Name (Print)	(Seal)										
By: _____											
California Licensed Insurance Agent or Attorney-in-Fact (Surety)											
<input type="checkbox"/> Above Signatory is also a California Licensed Insurance Agent (check if applicable and complete business name, address and telephone number block; if not, have such an agent countersign and complete block).											
NOTE: Power of Attorney showing authority of Surety's Agent or Attorney-in-Fact is to be attached.											

**[If more than one Surety, then add appropriate number of lines to signature block]**

---

Send "Notices to City" to:

---

**CALIFORNIA ALL PURPOSE ACKNOWLEDGEMENT**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy or validity of that document.

State of \_\_\_\_\_

County of \_\_\_\_\_

On this \_\_\_\_ day of \_\_\_\_\_ in the year of 2025 before me, a notary public in and for the county and state aforesaid, personally appeared \_\_\_\_\_ who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to within the instrument and acknowledged to me that he/she executed the same in his/her authorized capacity(ies), and that by his/her signature(s) on the instrument, the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.

Witness my hand and official seal:

\_\_\_\_\_(SEAL)\_\_\_\_\_

*Signature of Notary Public*

**EXHIBIT 6D**

**FORM OF MULTIPLE OBLIGEE RIDER FOR D&C PAYMENT BOND**

MULTIPLE OBLIGEE RIDER

This Rider is executed concurrently with and shall be attached to and form a part of Payment Bond \_\_\_\_\_(hereinafter referred to as the “**Payment Bond**”).

WHEREAS, **[INSERT PRINCIPAL PROJECT COMPANY NAME]** (the “**Principal Project Company**”) has entered into a contract with the City and County of San Francisco (the “**City**”), a municipal corporation acting by and through the San Francisco Municipal Transportation Agency (“**SFMTA**”), bearing the date of **[INSERT DATE]**, 2025, to design, build, finance, operate and maintain the Infrastructure Facility of the Potrero Yard Modernization Project (the “**Agreement**”); and

WHEREAS, on or about the \_\_\_\_ day of \_\_\_\_\_, 2025, \_\_\_\_\_ **[INSERT CONTRACTOR NAME]**, (hereinafter called the “**Principal**”), entered into a written agreement bearing the date of \_\_\_\_\_, 2025 (hereinafter called the “**Contract**”) with Principal Project Company, (hereinafter called the “**Primary Obligee**”) for the performance of design and construction work for the Infrastructure Facility of the Potrero Yard Modernization Project; and

WHEREAS, the Primary Obligee requires that Principal provide a payment bond and that the City and County of San Francisco, a municipal corporation acting by and through the San Francisco Municipal Transportation Agency, the other Indemnitees (as defined in the Agreement) [and \_\_\_\_\_ **[INSERT COLLATERAL AGENT, if appropriate]**] (“**Additional Obligee(s)**”) be named as additional obligee(s) under the payment bond; and

WHEREAS, Principal and the Surety (or Co-Sureties) identified below have agreed to execute and deliver this Rider concurrently with the issuance of the Payment Bond, upon the conditions herein stated.

NOW, THEREFORE, the undersigned hereby agree and stipulate as follows:

1. The Additional Obligee(s) is/are hereby added to the Payment Bond as named obligee(s).
2. The aggregate liability of the Surety (or Co-Sureties) to the Primary Obligee and the Additional Obligee(s) is limited to the penal sum of the Payment Bond.
3. The Additional Obligee(s)’s rights under the Payment Bond are subject to the same defenses that the Principal and/or the Surety (or Co-Sureties) have against the Primary Obligee.

---

Signed, sealed and dated this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

---

Attest: \_\_\_\_\_  
(SEAL) (Name of Principal)

Secretary \_\_\_\_\_ By: \_\_\_\_\_  
Title: \_\_\_\_\_

---

Attest: \_\_\_\_\_  
(SEAL) (Surety / Co-Surety)

Signature \_\_\_\_\_ By: \_\_\_\_\_  
Bonding Agent's Name: \_\_\_\_\_ Title: \_\_\_\_\_

Agent's Address: \_\_\_\_\_  
(Business Address of Surety / Co-Surety)

---

Attest: \_\_\_\_\_  
(SEAL) (Co-Surety)

Signature \_\_\_\_\_ By: \_\_\_\_\_  
Bonding Agent's Name: \_\_\_\_\_ Title: \_\_\_\_\_

Agent's Address: \_\_\_\_\_  
(Business Address of Co-Surety)

---

Attest: \_\_\_\_\_  
(SEAL) (Co-Surety)

Signature \_\_\_\_\_ By: \_\_\_\_\_  
Bonding Agent's Name: \_\_\_\_\_ Title: \_\_\_\_\_

Agent's Address: \_\_\_\_\_  
(Business Address of Co-Surety)

---

---

---

Attest: \_\_\_\_\_  
(SEAL) (Co-Surety)

Signature \_\_\_\_\_ By: \_\_\_\_\_  
Bonding Agent's Name: \_\_\_\_\_ Title: \_\_\_\_\_  
Agent's Address: \_\_\_\_\_  
\_\_\_\_\_  
(Business Address of Co-Surety)

---

Approved as to legal form and sufficiency this  
\_\_\_\_\_ day of \_\_\_\_\_ 2025

\_\_\_\_\_  
Deputy City Attorney

---

[Note: Add lines to signature block if needed, and strike signature lines not used.]

[Note: The bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the legal entity involved, evidence of authority must be furnished.]

**EXHIBIT 6E**

**FORM OF MULTIPLE OBLIGEE RIDER FOR D&C PERFORMANCE BOND**

MULTIPLE OBLIGEE RIDER

This Rider is executed concurrently with and shall be attached to and form a part of Performance Bond \_\_\_\_\_(hereinafter referred to as the “**Performance Bond**”).

WHEREAS, **[INSERT PRINCIPAL PROJECT COMPANY NAME]** (the “**Principal Project Company**”) has entered into a contract with the City and County of San Francisco (the “**City**”), a municipal corporation acting by and through the San Francisco Municipal Transportation Agency (“**SFMTA**”), bearing the date of **[INSERT DATE]**, 2025, to design, build, finance, operate and maintain the Infrastructure Facility of the Potrero Yard Modernization Project (the “**Agreement**”); and

WHEREAS, on or about the \_\_\_\_ day of \_\_\_\_\_, 2025, \_\_\_\_\_ **[INSERT CONTRACTOR NAME]**, (hereinafter called the “**Principal**”), entered into a written agreement bearing the date of \_\_\_\_\_, 2025 (hereinafter called the “**Contract**”) with Principal Project Company, (hereinafter called the “**Primary Obligee**”) for the performance of design and construction work for the Infrastructure Facility of the Potrero Yard Modernization Project; and

WHEREAS, the Primary Obligee requires that Principal provide a performance bond and that the City and County of San Francisco, a municipal corporation acting by and through the San Francisco Municipal Transportation Agency, the Indemnitees (as defined in the Agreement) [and \_\_\_\_\_ **[INSERT COLLATERAL AGENT, if appropriate]**] (“**Additional Obligee(s)**”) be named as additional obligee(s) under the performance bond; and

WHEREAS, Principal and the Surety (or Co-Sureties) identified below have agreed to execute and deliver this Rider concurrently with the issuance of the Performance Bond, upon the conditions herein stated.

NOW, THEREFORE, the undersigned hereby agree and stipulate as follows:

1. The Additional Obligee(s) is/are hereby added to the Performance Bond as named obligee(s).

2. The Surety (or Co-Sureties) shall not be liable under the Performance Bond to the Primary Obligee, the Additional Obligee(s), or any of them, unless the Primary Obligee, the Additional Obligee(s), or any of them, shall make payments to the Principal (or in the case the Surety (or Co-Sureties) arrange for completion of the Contract, to the Surety (or Co-Sureties)) in accordance with the terms of the Contract as to payments and shall perform all other obligations to be performed under the Contract in all material respects at the time and in the manner therein set forth such that no material breach by the Primary Obligee shall have occurred and be continuing under the Contract.

3. The aggregate liability of the Surety (or Co-Sureties) under the Performance Bond, to any or all of the obligees, as their interests may appear, is limited to the penal sum of the Performance Bond. The Additional Obligee(s)'s rights hereunder are subject to the same defenses Principal and/or Surety (or Co-Sureties) have against the Primary Obligee. The total liability of the Surety (or Co-Sureties) under the Contract shall in no event exceed the amount recoverable from the Principal by the Primary Obligee.

4. The Surety (or Co-Sureties) may, at their option, make any payments under the Performance Bond by check issued jointly to all of the obligees.

5. In the event of a conflict between the Performance Bond and this Rider, this Rider shall govern and control. All references to the Performance Bond, either in the Performance Bond or in this Rider, shall include and refer to the Performance Bond as supplemented and amended by this Rider. Except as herein modified, the Performance Bond shall be and remains in full force and effect.

Signed, sealed and dated this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

---

Attest: \_\_\_\_\_  
(SEAL) (Name of Principal)

\_\_\_\_\_  
Secretary By: \_\_\_\_\_  
Title: \_\_\_\_\_

---

Attest: \_\_\_\_\_  
(SEAL) (Surety / Co-Surety)

\_\_\_\_\_  
Signature By: \_\_\_\_\_  
Bonding Agent's Name: \_\_\_\_\_ Title: \_\_\_\_\_  
Agent's Address: \_\_\_\_\_  
(Business Address of Surety / Co-Surety)

---

Attest: \_\_\_\_\_  
(SEAL) (Co-Surety)

\_\_\_\_\_  
Signature By: \_\_\_\_\_  
Bonding Agent's Name: \_\_\_\_\_ Title: \_\_\_\_\_  
Agent's Address: \_\_\_\_\_  
(Business Address of Co-Surety)

---

---

Attest: \_\_\_\_\_  
(SEAL) (Co-Surety)

Signature \_\_\_\_\_ By: \_\_\_\_\_  
Bonding Agent's Name: \_\_\_\_\_ Title: \_\_\_\_\_  
Agent's Address: \_\_\_\_\_  
(Business Address of Co-Surety)

---

Attest: \_\_\_\_\_  
(SEAL) (Co-Surety)

Signature \_\_\_\_\_ By: \_\_\_\_\_  
Bonding Agent's Name: \_\_\_\_\_ Title: \_\_\_\_\_  
Agent's Address: \_\_\_\_\_  
(Business Address of Co-Surety)

---

Approved as to legal form and sufficiency this  
\_\_\_\_\_ day of \_\_\_\_\_ 2025

\_\_\_\_\_  
Deputy City Attorney

---

[Note: Add lines to signature block if needed, and strike signature lines not used.]

[Note: The bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the legal entity involved, evidence of authority must be furnished.]

**EXHIBIT 6F**

**FORM OF SFMTA O&M FACILITIES WARRANTY BOND**

Bond No. \_\_\_\_\_

For

**POTRERO YARD MODERNIZATION PROJECT**

**KNOW ALL WHO SHALL SEE THESE PRESENTS:**

**THAT WHEREAS**, the City and County of San Francisco (“City” or “Obligee”), a municipal corporation acting in its proprietary capacity by and through the San Francisco Municipal Transportation Agency, has awarded to [\_\_\_\_\_] (the “Principal Project Company” or “Principal”), an Infrastructure Facility Design-Build-Finance-Operate-Maintain Agreement dated as of [\_\_\_\_\_] 2025 (as amended from time to time, the “Agreement”), which Agreement is specifically incorporated by reference in this Bond, for the design, build, finance, operation and maintenance of the Potrero Yard Modernization Project (the “Project”);

**AND WHEREAS**, initially capitalized terms not otherwise defined in this Bond have the meaning given in the Agreement;

**AND WHEREAS**, pursuant to Section 10.9 of the Agreement, upon achieving Final Acceptance Principal Project Company must provide a warranty bond to City for the SFMTA O&M Facilities warranty Work (this “Bond”);

**NOW THEREFORE**, We the undersigned Principal and \_\_\_\_\_ (the “Surety” or “Co-Sureties”) are firmly bound and held unto the Obligee, in the penal sum of [\_\_\_\_\_] (\$[\_\_\_\_\_] (the “Bonded Sum”), good and lawful money of the United States of America for the payment whereof, well and truly to be paid to the Obligee, we bind ourselves, our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

**THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH THAT**, if Principal shall promptly and faithfully perform all of its obligations under the Agreement, as they may be amended or supplemented, including, without limitation, the performance of all SFMTA O&M Facilities warranty Work and payment of claims as described in paragraph 5 below, then the obligations under this Bond shall be null and void; otherwise this Bond shall remain in full force and effect, it being expressly understood and agreed that the liability of Surety for any and all claims hereunder shall in no event exceed the bonded sum.

The following terms and conditions shall apply with respect to this Bond:

1. The Agreement is incorporated by reference into this Bond.

**2.** If the Principal shall promptly and faithfully perform all of its obligations under the Agreement, as they may be amended or supplemented, related to the SFMTA O&M Facilities warranty Work, enforcement of Contractor warranties, and payment of claims as described in paragraph 6 below, then the obligations under this Bond shall be null and void; otherwise this Bond shall remain in full force and effect, it being expressly understood and agreed that the liability of Surety (or Co-Sureties) for any and all claims hereunder shall in no event exceed the bonded sum.

**3.** If the above bound Principal, or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by and well and truly keep and perform the covenants, conditions, obligations and agreements in the Agreement related to the SFMTA O&M Facilities warranty Work, including any and all amendments, supplements, and alterations made to the Agreement as therein provided, on the Principal's part to be kept and performed at the time and in the manner therein specified, and shall indemnify, defend and save harmless the Obligee and all other Indemnitees (as defined in the Agreement), as therein stipulated, then this obligation shall become and be null and void; otherwise, it shall be and remain in full force and virtue.

**4.** This Bond shall cover the cost to perform all the obligations of the Principal related to the SFMTA O&M Facilities warranty Work. The obligations covered by this Bond specifically include all payment obligations, liability for damages and warranties related to the SFMTA O&M Facilities warranty Work as specified in the Agreement, but not to exceed the bonded sum.

**5.** Whenever the Principal shall be, and is declared by the Obligee to be, in default under the Agreement with respect to the related to the SFMTA O&M Facilities warranty Work, the Surety (or Co-Sureties) shall promptly:

(a) remedy such default;

(b) complete the SFMTA O&M Facilities warranty Work and perform the obligations covered by this Bond in accordance with the terms and conditions of the Agreement then in effect; or

(c) select a contractor or contractors to complete the SFMTA O&M Facilities warranty Work and perform the obligations covered by this Bond in accordance with the terms and conditions of the Agreement then in effect, using a contractor or contractors approved by the Obligee in its sole discretion, arrange for a contract that contains substantially the same terms and conditions of the Agreement between such contractor or contractors and the Obligee, and make available as work progresses (even though there should be a default or a succession of defaults under such contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion of the SFMTA O&M Facilities warranty Work and obligations covered by this Bond; but not exceeding, including other costs and damages for which the Surety (or Co-Sureties) is (are) liable hereunder, the bonded sum.

**6.** This Bond shall inure to the benefit of anyone required to be paid by law under the Agreement so as to give a right of action to such persons or their assigns in any suit brought upon this Bond. The obligations covered by this Bond specifically include:

(a) payments owing to any of the persons involved in prosecution of the SFMTA O&M Facilities warranty Work, as provided for in the Agreement;

(b) any amounts required to be deducted, withheld, and paid over to the Department of Revenue from the wages of employees of the Principal and its Contractors with respect to such work and labor, and

(d) any other payments owing to anyone required to be paid by law.

In case suit is brought to enforce the provisions of this paragraph 6, the Surety (or Co-Sureties) will pay reasonable attorneys' fees, to be fixed by the court.

7. The Surety (or Co-Sureties) agree(s) that no change, extension of time, alterations, additions, omissions or other modifications of the terms of the Agreement, or in the work to be performed with respect to the Project, or in the specifications or plans, or any change or modification of any terms of payment or extension of time for any payment pertaining or relating to the Agreement, or any rescission of this Bond, solely due to acts of Principal, or any fraud practiced by any other person other than the claimant seeking to recover this Bond, shall in any way affect its obligations on this Bond, and it does hereby waive notice of such changes, extension of time, alterations, additions, omissions or other modifications.

8. **[NTD: Use in case of multiple or co-sureties]** The Co-Sureties agree to empower a single representative with authority to act on behalf of all of the Co-Sureties with respect to this Bond, so that the Obligee and claimants will have no obligation to deal with multiple sureties hereunder. All correspondence from the Obligee or claimants to the Co-Sureties and all claims under this Bond shall be sent to such designated representative. The designated representative may be changed only by delivery of written notice (by personal delivery or by certified mail, return receipt requested) to the Obligee designating a single new representative, signed by all of the Co-Sureties. The initial representative shall be \_\_\_\_\_.

---

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this at \_\_\_\_\_ on this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

**Principal (full legal name):** \_\_\_\_\_

\_\_\_\_\_  
**Address:** \_\_\_\_\_

\_\_\_\_\_  
**By:** \_\_\_\_\_

**Contact Name:** \_\_\_\_\_

**Phone: (     )** \_\_\_\_\_

**Surety (full legal name):** \_\_\_\_\_

**Address:** \_\_\_\_\_

**By:** \_\_\_\_\_

**Contact Name:** \_\_\_\_\_

**Phone:** \_\_\_\_\_

[Note: if more than one surety, then add appropriate phone: (\_\_\_\_)]

[Note: If more than one surety, then add appropriate number of lines to signature block.]

[Note: The bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the legal entity involved, evidence of authority must be furnished.]

---

**EXHIBIT 7**

**INSURANCE REQUIREMENTS**

Principal Project Company shall obtain and keep in force, or cause to be obtained and kept in force, the following policies of insurance, in accordance with the terms of this Exhibit 7. Each policy shall be obtained and be effective as set forth below. Each policy shall contain, or be endorsed to contain, a provision that coverage cannot be canceled, voided, suspended, lapsed or modified or reduced in coverage except for 60 days' (or for non-payment of premium, 10 days') prior written notice has been given to City.

**1. Insurance during the Design and Construction Period**

As a condition precedent to Financial Close and issuance of NTP 1, Principal Project Company shall obtain and keep in force, or cause to be obtained and kept in force, from and after the Financial Close Date and throughout the D&C Period, the following insurance coverage.

1.1. Worker's Compensation and Employer's Liability. Worker's compensation and employer's liability insurance for Principal Project Company and Contractors as required by applicable Law, and employer's liability insurance having coverage limits of \$1,000,000 for each accident, \$1,000,000 for disease (each employee), and \$1,000,000 for disease (policy limit). Policies shall contain a voluntary compensation endorsement; an alternative employer endorsement; and on an "if any" basis, endorsements providing coverage for all states, U.S. Longshore and Harbor Workers' Act, Jones Act and Federal Employer's Liabilities Act.

1.2. Commercial General Liability. A commercial general liability insurance policy, written on an occurrence basis and covering liabilities arising out of the construction of the Project. Coverage shall be at least as broad as the broadest available version of Insurance Services Office form CG 00 01. This insurance policy shall:

- (a) have a limit for any one occurrence of not less than \$2,000,000 per occurrence, a \$4,000,000 general aggregate with one reinstatement during the D&C Period, and a \$4,000,000 completed operations aggregate, applicable solely to the construction of the Project;
- (b) have no "contractor's limitation" endorsements, as that term is defined, as of the date of this Agreement, in the Glossary of Insurance and Risk Management Terms published by the International Risk Management Institute, that have not been reviewed and approved by the City. There shall be no endorsement or modification of the CGL limiting the scope of coverage for liability assumed under an insured contract;
- (c) have no exclusion for professional services except the latest ISO form CG 22 79 or CG 22 80 or both;
- (d) include products and completed operations liability coverage for a period of not less than the California Statute of Repose which is currently 10 years following Final Completion or the Termination Date, whichever occurs later; and
- (e) be maintained throughout the Term until Final Completion.

---

The City, SFMTA, and San Francisco Board of Supervisors and their employees, officers, and officials shall be added to the primary policy as insureds using Insurance Services Office forms CG 20 10 10 01 and CG 20 37 10 01 or, in City's sole discretion, forms providing the same scope of coverage, including coverage for completed operations. The policy shall provide for separation of insureds. The policy shall contain no insured vs. insured exclusion. Principal Project Company shall require its Contractors to have these additional insureds included as insureds in the same manner as specified for Principal Project Company in this Section 1.2 (Commercial General Liability), and shall prohibit use of any endorsement forms that require, to effect additional insured status, the execution or existence of any contract directly between such Contractors and any of the additional insureds. Exclusions are prohibited for work within 50 feet of a railroad. For use of any unmanned aircraft vehicles (UAV), any Principal Project Company-Related Entity may provide insurance either through an aircraft liability insurance policy, or by endorsement to the entity's commercial general liability insurance policy and excess liability policies, which shall be not less than \$10,000,000 per occurrence.

1.3. Commercial Excess Liability. A policy or policies of commercial umbrella/excess liability insurance covering bodily injury, property damage, personal injury and advertising injury with an annual reinstatement of limits of not less than \$100,000,000 per occurrence and general aggregate. There shall also be a project-specific products and completed operations aggregate of not less than \$100,000,000. Coverage may be arranged in any combination or structure so that total required limits of liability are met. Coverage must apply as excess over commercial general liability insurance as required in Section 1.2 (Commercial General Liability), and may apply as excess over commercial automobile liability insurance and employer's liability insurance. Umbrella/excess liability policies shall follow form to all underlying policies, including coverage in the excess liability policies for insureds covered under the primary policies.

1.4. Commercial Automobile Liability. Commercial automobile liability insurance with limits of liability of not less than \$20,000,000 combined single limit for Principal Project Company and Key Contractors. The required limits can be met in any combination of primary and excess/umbrella liability policies. Coverage shall be at least as broad coverage provided in Insurance Services Office form CA 00 01. The insurance must cover "any auto" ("**Symbol 1**"). If Principal Project Company or any Contractor's activities involve transportation of materials (including Hazardous Materials) that require endorsement MCS 90 (as described below), the automobile liability Insurance Policy for Principal Project Company or such Contractor shall be endorsed to include for private, non-commercial vehicles Motor Carrier Act Endorsement-Hazardous Materials Clean up (MCS-90) and shall be endorsed to provide coverage for liability arising from release of pollutants (CA 99 48 – Pollution Liability – Broadened Coverage for Covered Autos – Business Auto, Motor Carrier and Truckers Coverage Form).

1.5. Contractor's Pollution Liability. Contractor's pollution liability insurance written on an occurrence form with a limit for any one occurrence of not less than \$20,000,000 and a policy aggregate limit of \$20,000,000. The policy must be written on an occurrence basis and not on a "claims made" form. The policy must include coverage to extend to the full California statute of repose, which is currently 10 years.

The policy shall cover sums that the insured becomes legally obligated to pay to a third party or for the investigation, removal, remediation (including associated monitoring) or disposal of soil, surface water, groundwater or other contamination to the extent required by environmental laws (together "**clean-up costs**") caused by pollution conditions resulting from covered operations, subject to the policy terms and conditions, including bodily injury, property

damage (including natural resource damages), clean-up costs, and legal defense costs. Such policy shall cover claims related to pollution conditions to the extent such are caused (a) by the performance of Work, (b) by transportation, including loading and unloading, by owned and non-owned vehicles and/or (c) by other activities performed by or on behalf of Principal Project Company that occur on the Project. The policy shall have no exclusions or limitations for loss occurring over water including but not limited to a navigable waterway. Coverage shall apply to sudden and non-sudden pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, waste materials, or other irritants, contaminants, or pollutants. The policy shall contain a severability provision.

1.6. Professional Liability Insurance. Professional liability insurance, in one or more policies, at Principal Project Company's discretion, which shall:

- (a) cover claims for liability for providing Design Work for the Project;
- (b) cover claims for liability for providing Design Work by any Contractor;
- (c) be in an amount not less than \$20,000,000 per claim and in the aggregate;
- (d) have a deductible or self-insured retention no greater than \$1,000,000 unless approved by the City;
- (e) cover the performance of Design Work or other professional services in connection with the Project (except Design Work that results in the provision of a product) and shall be fully retroactive to the first date any such Design Work was performed, with no exclusion for prior acts applying to any pre-award professional services provided by any insured; and
- (f) have an extended reporting period, or be renewed to be continuous for a period, of not less than ten years after the Effective Date.

1.7. Builder's Risk. A builder's risk insurance policy covering all real property at the Project Site, during testing and commissioning, while in transit and at any temporary off-site location; including all materials, supplies, machinery, fixtures and equipment intended to become a permanent part of the Project or for permanent use in the Project. Property that is incidental to the construction; foundations, including pilings, but excluding normal settling, shrinkage, or expansion. All temporary structures at the Project Site that are to be used in or incidental to the fabrication, erection, testing, or completion of the Project shall be insured and declared to and approved by the insurers and to the extent the cost thereof is included in the Work, included in the coverage while on or about the Project Site awaiting or during construction. The builder's risk policy:

- (a) shall be obtained prior to the start of construction and maintained until the end of the D&C Period;
- (b) shall be in an amount not less than the estimated completed value of the Project or other such amount as may be agreed up on by Principal Project Company and the City;

- 
- (c) shall be written on an “all risk,” replacement cost basis with no coinsurance clauses or penalties;
  - (d) during any period of exposure to loss of property in transit, shall cover transit, including ocean marine (unless insured by the Supplier or through a separate marine cargo policy), with sub-limits sufficient to insure the maximum value of any property in transit at any one time;
  - (e) shall cover physical damage arising because of faulty workmanship or materials;
  - (f) shall cover ensuing loss from design error not otherwise excluded (LEG 3);
  - (g) shall cover water damage and flood, (including the overflow of inland or tidal waters, the unusual accumulation or runoff of surface waters from any source, or mudslides or mudflows which are caused by flooding) with a sublimit of no less than \$10,000,000;
  - (h) shall cover perils of earthquake and earth movement with a sublimit of no less than \$10,000,000;
  - (i) shall cover physical damage resulting from machinery accidents but excluding normal and natural wear and tear, corrosion, erosion, inherent vice or latent defect in the machinery;
  - (j) shall cover demolition and debris removal coverage, with a sublimit of 20% of the loss or no less than \$10,000,000 insuring the buildings, structures, machinery, equipment, materials, facilities, fixtures and all other properties constituting a part of the Project;
  - (k) shall cover increased cost for repair, rebuilding or reconstruction of damaged property due to enforcement of any law or ordinance with a sublimit of no less than \$20,000,000, including professional fees with a sublimit of no less than \$10,000,000;
  - (l) shall include a sublimit for soft costs to include recurring costs should there be physical damage to the project, delay costs, loss of revenues during a delayed opening, including architects and engineers fees, and owner’s extended project costs including administration and overhead during a restoration period of 12 months,
  - (m) shall include civil authority ingress and egress;
  - (n) shall cover plans, blueprints and specifications;
  - (o) shall cover full collapse, including collapse resulting from design error, as set forth in LEG3 coverage;
  - (p) shall include as named insureds City, SFMTA, Principal Project Company, and Contractors;
  - (q) shall not include “as their interests may appear” language pertaining to insureds;

- 
- (r) shall include a blanket waiver of subrogation as required by contract; and
  - (s) may include deductibles, but such deductible shall not exceed \$1,000,000 per occurrence unless prior approval from the City.

1.8. Railroad Protective Liability. If required by any railroad, a railroad protective liability insurance policy or policies as required by one or more railroads operating near or adjacent to the Project location. The terms, limits, and specifications of such policy(ies) are set forth by each railroad.

1.9. Other. Any other form of insurance and with such limits, in such form, in amounts and for risks as the City or SFMTA, acting reasonably, may require from time to time. Principal Project Company's compensation shall be adjusted to reflect the cost of any such additionally required insurance.

## 2. Insurance During the Infrastructure Facilities Maintenance (IFM) Period

Principal Project Company shall obtain and keep in force, or cause to be obtained and kept in force, throughout the IFM Period the following insurance coverage:

2.1. Worker's Compensation and Employer's Liability. Worker's compensation and employer's liability insurance as required by applicable Law, and employer's liability insurance having coverage limits of \$1,000,000 for each accident, \$1,000,000 for disease (each employee), and \$1,000,000 for disease (policy limit).

2.2. Commercial General Liability. Commercial general liability insurance insuring against liability of Principal Project Company and Lead IFM Contractor with respect to the Project or arising out of the Work, written on an occurrence basis. Coverage shall be at least as broad as the broadest available version of Insurance Services Office form CG 00 01. City, SFMTA, and the Board of Supervisors and their employees, officers, and officials shall be added to the primary policy as insureds using Insurance Services Office form CG 20 10 10 01 or, in City's sole discretion, forms providing the same scope of coverage. Principal Project Company shall require its Contractors to have these additional insureds included as insureds in the same manner as specified for Principal Project Company in this Section 2.2 (Commercial General Liability), and shall prohibit use of any endorsement forms that require, to effect the insured status, the execution or existence of any contract directly between such Contractors and any of the additional insureds. The insurance shall (a) apply separately for each insured against whom a claim is made or a lawsuit is brought, subject only to the insurance policy limits of liability and (b) have coverage for any one occurrence of not less than \$50,000,000, \$50,000,000 general aggregate, and \$50,000,000 products/completed operations which requirement may be met by any combination of primary and excess coverage so long as the excess coverage is written on a "follow form" basis. Exclusions are prohibited for work within 50 feet of a railroad.

2.3. Commercial Automobile Liability. Commercial automobile liability insurance with limits of liability of not less than \$5,000,000 per accident. The insurance must cover liability arising from any motor vehicle (i.e., "**Symbol 1**"), including owned, hired or non-owned vehicles, assigned to or used in connection with the operation and maintenance of the Project.

2.4. Pollution Legal Liability. Pollution legal liability insurance applicable to bodily injury, property damage, including loss of use of damaged property or of property that has not

---

been physically injured or destroyed, cleanup costs, and defense, including costs and expenses incurred in the investigation, defense, or settlement of claims, all in connection with any loss arising from the Project. Coverage shall be maintained in an amount of at least \$10,000,000 per loss, with an annual aggregate of at least \$10,000,000. Coverage shall apply to sudden and non-sudden pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, waste materials, or other irritants, contaminants, or pollutants. If coverage is written on a claims-made basis, Principal Project Company warrants that continuous coverage will be maintained or an extended discovery period will be exercised for a period of 10 years beginning from the Termination Date.

2.5. Property Insurance. A property insurance policy covering the full replacement value of the Project throughout the entire IFM Period. Coverage shall include the following: equipment breakdown, wind perils, collapse, terrorism, water damage including overflow, leakage, sewer backup or seepage, utility interruption, debris removal, extra expense, boiler and machinery and valuable papers. Coverage shall also include earthquake insurance at a limit of \$25,000,000 and flood insurance with a sublimit of not less than \$10,000,000. City shall be named a named insured. The Collateral Agent shall be the sole loss payee on the property throughout the entire IFM Period.

During the period of any Renewal Work or other significant capital maintenance or repair work that is not associated with a loss from a covered peril, Principal Project Company shall provide coverage either through a course of construction coverage extension under the property policy or insure through a separately placed Builder's Risk Insurance policy.

The property insurance policy shall also include coverage for:

- (a) Foundations and pilings;
- (b) Physical damage resulting from machinery accidents or mechanical or electrical breakdown including electrical substations but excluding normal and natural wear and tear, corrosion, erosion, inherent vice, or latent defect in the machinery;
- (c) Plans, blueprints, and specifications;
- (d) Demolition and debris removal coverage insuring the buildings, structures, machinery, equipment, materials, facilities, fixtures, and all other properties constituting a part of the Project, with a sublimit of no less than \$10,000,000;
- (e) Increased replacement cost due to any change in applicable Law;
- (f) Business interruption/time element coverage, including loss of revenue, including loss of any Availability Payments, expediting and extra expense, with a sublimit in the amount of \$\_\_\_\_\_; **[NTD: AMOUNT TO BE DETERMINED BASED ON AP/AGREEMENT BEFORE COMMERCIAL CLOSE]**
- (g) Building ordinance compliance, with the building ordinance exclusion deleted;
- (h) All buildings, fixtures, improvements, and equipment that are built or placed on the Project Site; and

- (i) Coverage at least as broad as coverage provided by the most recent Insurance Services Office commercial property Special Cause of Loss form.

2.6. Other. Any other form of insurance and with such limits, in such form, in amounts and for risks as the City or SFMTA, acting reasonably, may require from time to time. Principal Project Company's compensation shall be adjusted to reflect the cost of any such additionally required insurance.

**EXHIBIT 8**

**FORM OF INTERFACE AGREEMENT**

***[NOTE TO PNC: TO FOLLOW FROM PNC ONCE FINALIZED]***

## **EXHIBIT 9**

### **CHANGE PROCEDURES**

#### **1. City Change Procedures**

**1.1** The provisions of this Section 1 (City Change Procedures) and of Section 2 (Unilateral Change Orders) shall apply with respect to any City Change.

**1.2** If City desires to initiate or evaluate whether to initiate a City Change, then City may issue a proposed Change Order (a “**Proposed Change Order**”). The Proposed Change Order shall state the nature, extent and details of the contemplated City Change.

#### **1.3 Response to Proposed Change Order**

**1.3.1** As soon as possible, and in any case, within 20 days after City delivers to Principal Project Company a Proposed Change Order, Principal Project Company shall deliver to City a change proposal (“**Change Proposal**”) prepared in accordance with this Section 1.3 (Response to Proposed Change Order). Except as expressly set forth in this Section 1.3.1, the obligation of Principal Project Company to provide a Change Proposal is not Extra Work and shall not entitle Principal Project Company to any additional compensation, time extension or other relief. Upon receipt of a Proposed Change Order from City, if Principal Project Company believes it will incur substantial out-of-pocket contracted design costs to prepare a Change Proposal, Principal Project Company, within 7 days of the receipt of the Proposed Change Order, provide Notice to City setting forth the reasonable out-of-pocket contracted design costs that Principal Project Company will incur to prepare such Change Proposal. Failure to provide such Notice within such 7 day period shall forfeit any Claim for payment for such out-of-pocket contracted design costs. Upon delivery of such Notice by Principal Project Company, Principal Project Company shall promptly meet with City, at City’s request, to explain and discuss such potential costs and such discussions and negotiations shall occur on an Open Book Basis. City, in its sole discretion, may agree to compensate Principal Project Company for such specified and approved reasonable out-of-pocket contracted design costs as Extra Work Costs, in which case, Principal Project Company shall proceed with the Change Proposal as required in the Contract Documents. Payment of such approved amounts shall be the sole compensation to Principal Project Company and no other compensation, time extension or other relief shall be available or provided. Should City elect, in its sole discretion, to not approve such potential costs, the Proposed Change Order shall be deemed withdrawn. The Parties agree that the foregoing payment of reasonable out-of-pocket contracted design costs for preparation of a Change Proposal shall only apply to unusual circumstances involving substantial design and out-of-pocket contracted design costs.

**1.3.2** Each Change Proposal shall include:

- (a) a detailed explanation of how the contemplated City Change would impact both the D&C Work and the IFM Services;
- (b) if the Proposed Change Order is issued before Substantial Completion, a detailed description of any suggested adjustments to the Project Schedule. This includes changes

- to any Contract Deadline that would be necessary because of potential delays caused by implementing the contemplated City Change;
- (c) if adjustments to any Contract Deadline are suggested:
- (i) a time impact analysis that identifies Critical Path impacts (including activity numbers, durations, predecessor and successor activities, resources, costs and impact, if any, on Float). The time impact analysis must show how schedule changes or disruptions would affect the Contract Deadlines while complying with the requirements of Section 1.2.1 of Division 1 of the Technical Requirements;
  - (ii) an assessment of the feasibility of accelerating the Work to meet the original deadline or to reduce the total delay period; and
  - (iii) if acceleration is feasible, an estimate of the cost to accelerate, as well as information about any Extra Work Costs, Financing Delay Costs, and Delay Costs, if any, payable by City if the schedule is not accelerated;
- (d) a detailed, itemized estimate of any applicable Extra Work Costs, Financing Delay Costs or Delay Costs claimed; Principal Project Company shall provide all information on an Open Book Basis as specified in Exhibit 13 (Costs Schedule);
- (e) an estimate of the cost savings, if any, resulting from the contemplated City Change, including reductions in direct labor, material and equipment, site overhead and home office overhead, operations and maintenance, and financing costs;
- (f) the effect (if any) of the contemplated City Change on Principal Project Company's ability to perform the IFM Services stated by Contract Year;
- (g) where relief from obligations under the Contract Documents is sought, the effect of the contemplated City Change on Principal Project Company's ability to perform any of its obligations under the Contract Documents that if not performed would result in the accrual of Noncompliance Points, the assessment of Deductions or the occurrence of a PPC Default, in each case including details of the relevant obligations, the effect on each such obligation, the likely duration of that effect and the specific relief sought;
- (h) a description of any additional consents or approvals required, including amendments, if any, of any Regulatory Approvals required to implement the contemplated City Change;
- (i) a detailed description of the steps Principal Project Company will take to implement the contemplated City Change, including measures that Principal Project Company will take to mitigate the costs, delay and other consequences of the contemplated City Change; and
- (j) any other relevant information related to the contemplated City Change.

## 1.4 Negotiation of Change Order

**1.4.1** Following City's receipt of Principal Project Company's Change Proposal and City's further assessment of the cost, schedule and other impacts of the contemplated City Change, City and Principal Project Company, shall engage in good faith negotiations to reach agreement on the terms of a change order, including any Extra Work Costs, Financing Delay Costs or Delay Costs, adjustment of the Contract Deadlines or other relief to which Principal Project Company is entitled, and any net cost savings and schedule savings to which City is entitled.

**1.4.2** City may, by written Notice, modify or abandon a contemplated City Change at any time prior to the Parties reaching an agreement on the Change Order. Principal Project Company will, as soon as practicable but in no event more than 10 Business Days after receipt of a modification, provide Notice to City of any subsequent changes to the Change Proposal.

**1.4.3** A City Change will become effective upon mutual execution of a written change order (a "**Change Order**"). The Change Order shall be in a form provided by City, and shall specify, as applicable, the timing and method for payment or deduction of any Extra Work Costs, Financing Delay Costs, Delay Costs or Financing Costs, or for realizing any net savings in the cost of the Work.

## 1.5 Disagreement on Change Proposal

If the Parties do not agree on a Change Proposal, then City may seek to resolve any points of disagreement through the Contract Dispute Procedures without issuing a Unilateral Change Order, or City may issue a Unilateral Change Order.

## 2. Unilateral Change Orders

**2.1** City may, at any time, in its sole discretion, issue a Unilateral Change Order to Principal Project Company regarding any matter for which a Change Order can be issued or, in the event of any Contract Dispute, regarding the scope of the Work or whether Principal Project Company has performed the Work in accordance with the requirements of the Contract Documents (a "**Unilateral Change Order**"). The Unilateral Change Order will state that it is issued under this Section 2 (Unilateral Change Orders), will describe the Work to be performed and will state the basis for determining compensation, if any, and schedule adjustment, if any. The Unilateral Change Order will either: (a) direct Principal Project Company to implement a City Change; or (b) state that disputed Work is within Principal Project Company's original scope of Work or is necessary to comply with the requirements of the Contract Documents.

**2.2** If the Unilateral Change Order does not state that the Work constitutes a City Change, Principal Project Company shall proceed with the Work as directed but may assert a Claim that a City Change has occurred under the procedures in Article 12 (City Change Process; Unilateral Change Orders; Deviations) of this Agreement.

**2.3** If the Unilateral Change Order provides for the implementation of a City Change, Principal Project Company shall, within 21 Business Days after the issuance of the Unilateral Change Order, deliver to City a Change Proposal in accordance with Section 1.3 (Response to Proposed Change Order) of this Exhibit 9 (Change Procedures), and the Parties shall subsequently follow the procedures and provisions set forth in Section 1.4 (Negotiation of Change Order) of this Exhibit 9 (Change Procedures).

**2.4** If the Unilateral Change Order provides for the implementation of a City Change or Principal Project Company intends to assert a Claim under Section 2.2, Principal Project Company shall maintain records for such Work in accordance with Section 2.2.9 of Exhibit 13 (Costs Schedule), pending resolution of the Contract Dispute or execution of a Change Order.

**2.5** The fact that a Unilateral Change Order was issued by City shall not be considered evidence that a City Change has occurred. The determination whether a City Change has occurred shall be based on an analysis of the original requirements of the Contract Documents and a determination as to whether the Unilateral Change Order in fact constituted a change in those requirements.

### **3. Principal Project Company Change Requests**

**3.1** Principal Project Company may, at any time, request a Change by submitting to City a written request for a Change ("**PPC Change Request**"). PPC Change Requests must comply with the requirements of Section 1.3.2 of this Exhibit 9 (Change Procedures) and be in a form approved by the City.

**3.2** City has the sole discretion to accept or reject any PPC Change Request. If the City accepts a PPC Change Request, Principal Project Company shall execute a Change Order and implement the proposed change in accordance with the Change Order, applicable Technical Requirements, the Project Management Plan, Good Industry Practice and all applicable Law. Acceptance is only valid when documented in a written Change Order signed by City's Authorized Representative or their designee appointed in writing.

**3.3** If City accepts a PPC Change Request, Principal Project Company shall be solely responsible for bearing any increase in the Extra Work Costs or other costs, and any additional risks that result from the accepted Change, except as may otherwise provided in the Change Order. Principal Project Company shall not be entitled to any extension of the Project Schedule or any Contract Deadline due to delays or other impacts that result from the City accepting the PPC Change Request, except as may otherwise provided in the Change Order.

**3.4** If a PPC Change Request accepted by City results in a net cost savings to Principal Project Company, City will be entitled to 50% of such savings. City will obtain its share of the savings in the manner described in Section 1.4.3 and otherwise in accordance with Exhibit 13 (Costs Schedule).

Certain minor changes without significant cost savings may be approved in writing by City as Deviations, and in such event, shall not require a Change Order. Any other change in the requirements of the Contract Documents shall require a Change Order.

**EXHIBIT 10**

**INITIAL DESIGNATION OF AUTHORIZED REPRESENTATIVES**

City Representative: ]

Chris Lazaro, Project Director  
San Francisco Municipal Transportation Agency  
1 South Van Ness, 8th Floor  
San Francisco, CA 94103  
Attn: Chris Lazaro  
Email: [Chris.Lazaro@sfmta.com](mailto:Chris.Lazaro@sfmta.com)  
Telephone: 415-549-6572

Principal Project Company Representative:

[NAME], [TITLE]  
[ADDRESS]  
Email: \_\_\_\_\_  
Telephone: [\_\_\_\_\_]

## **EXHIBIT 11**

### **SUBMITTALS REVIEW PROCESS**

#### **1. Submittal Requirements**

Each Submittal provided by Principal Project Company to City for information, review and comment, review and acceptance or approval shall:

- (a) be accurate, complete and in conformity with the Contract Documents;
- (b) include a completed transmittal form in form agreed between City and Principal Project Company; and
- (c) include all necessary information and documentation concerning the subject matter and any additional information reasonably requested by City.

#### **2. Submittal Types and Time Periods**

**2.1** Submittals provided by Principal Project Company to City will consist of the following types:

- (a) Submittals for information. Submittals for City information do not include any deadline for City to respond. City may provide comments at any time or not at all.
- (b) Submittals for review and comment. For any Submittal subject to review and comment, City may respond at any time or not all. Principal Project Company is only required to resubmit a Submittal if City responds within 14 days. City responses include: (i) reviewed with no comments; (ii) reviewed with comments, resubmittal not required; or (iii) reviewed with comments, resubmittal required. Submittals are subject to City's review and comment unless either the Contract Documents or the City-accepted Submittal Schedule contemplates a different type of review.
- (c) Submittals for review and acceptance. For any Submittal subject to City review and acceptance, City will have 21 days to respond. City responses include: (i) reviewed and accepted; (ii) reviewed and accepted with comments, resubmittal not required; or (iii) reviewed and not accepted with comments, resubmittal required.
- (d) Submittals for approval. For any Submittal subject to City approval, City will have 21 days to respond. City responses include: (i) approved; (ii) approved with comments, resubmittal not required; or (iii) not approved with comments, resubmittal required.

**2.2** If any other provision of the Contract Documents expressly provides a longer or shorter period for City to act in response to a specific Submittal, then such period shall prevail over the time periods set forth in Section 2.1.

**2.3** The Parties shall agree in good faith upon any necessary extensions of the review period to accommodate particularly complex or comprehensive Submittals.

**2.4** If the number of Submittals delivered simultaneously to City exceeds the limits specified in Section 1.3 of Division 1 of the Technical Requirements, then City may extend the applicable period for it to act with respect to such Submittals to allow City a reasonable period to respond, and no such extension shall constitute a City-Caused Delay Event, a City-Caused Relief Event, or other basis for any Claim. Submittals are considered “delivered simultaneously” if the review time periods available to City under this Article 2 (Submittal Types and Time Periods) for two or more Submittals entirely or partially overlap.

**2.5** Whenever City is in receipt of Submittals delivered simultaneously, Principal Project Company may provide Notice to City including a requested order of priority for processing such Submittals. Upon receipt of such Notice, City will use reasonable efforts to accommodate the requested order of priority; provided, however, that City will not be obligated to shorten the review times otherwise applicable under this Article 2 (Submittal Types and Time Periods).

**2.6** All time periods for City to act under this Article 2 (Submittal Types and Time Periods) shall be extended by the period of any delay in City’s review caused by any Relief Event (other than a City-Caused Delay Event or City-Caused Relief Event) or any PPC Fault.

**2.7** During any time that City is entitled to increase the level of its Oversight under Section 15.5 (Persistent PPC Default and Increased Oversight) of this Agreement, the applicable period for City to act on any Submittals received during such time and not related to addressing events that instigated the Section 15.5 (Persistent PPC Default and Increased Oversight) of this Agreement action shall be extended as reasonably needed due to the increased level of Oversight, but not to exceed an additional 10 Business Days per Submittal. No such extension shall constitute a City-Caused Delay Event, City-Caused Relief Event or other basis for any Claim.

**2.8** Principal Project Company may, by Notice to City, request expedited action on a specific Submittal. City has no obligation to expedite any Submittal but upon receipt of such a request will use reasonable efforts to accommodate such request within the practical limitations (a) on availability of City personnel relevant to the request or (b) imposed by restrictions upon City’s rights under agreements with Third Parties and Utility Owners. However, City’s obligation to use reasonable efforts to accommodate such a request shall not apply with respect to the review periods described in Section 2.7.

### **3. City Actions Relevant to Submittals**

If a Submittal is subject to City’s acceptance or approval, Principal Project Company may not proceed without receiving City’s acceptance or approval, as applicable.

### **4. City Objection, Rejection Binding**

**4.1** Any exception, objection, rejection, non-acceptance or disapproval by City shall be deemed reasonable if, among other reasons, the determination is based on any of the following grounds:

- (a) the Submittal or subject provision fails to comply, or is inconsistent, with any applicable Standards and Specifications or any covenant, condition, requirement, term or provision of the Contract Documents, Project Management Plan;
- (b) the Submittal or subject provision does not at a minimum meet Good Industry Practice;
- (c) Principal Project Company has not provided all necessary information and documentation concerning the subject matter and any additional information reasonably requested relating to the Submittal (provided that Principal Project Company may subsequently resubmit the Submittal with the required or reasonably requested content or information); or
- (d) adoption of the Submittal or subject provision, or of any course of action proposed in the Submittal, would result in a conflict with or violation of any Law or Regulatory Approval.

**4.2** Principal Project Company shall respond in writing to all of City's comments (including any exceptions, objections, rejections and disapprovals) relating to a Submittal, and subject to Sections 2.1(a) and (b), shall make modifications to the Submittal as necessary to fully reflect and resolve all such comments in accordance with the review processes in this Exhibit 11 (Submittals Review Process), prior to executing the Work identified in the Submittal.

**4.3** If Principal Project Company does not accommodate or otherwise resolve any City comment, Principal Project Company shall, within 10 Business Days after receipt of City's comments, provide an explanation setting out:

- (a) why modifications based on City's comments are not required;
- (b) the facts, analyses and reasons that support Principal Project Company's conclusion; and
- (c) the basis for any belief that incorporating City's comments or resolving exceptions, objections, rejections or disapprovals that would render the Submittal erroneous, defective or reflective of less than Good Industry Practice.

**4.4** Promptly following delivery of Principal Project Company's explanation under Section 4.3, Principal Project Company shall meet with City with the goal of reaching agreement regarding changes to be made to the Submittal. City may at any time issue a Unilateral Change Order, in which case Principal Project Company shall proceed in accordance with City's Unilateral Change Order with the right to seek resolution of the Contract Dispute under the Contract Dispute Procedures.

**4.5** If Principal Project Company fails to provide an explanation to City in accordance with Section 4.3, City may deliver to Principal Project Company a Notice setting out comments that have not been addressed and relevant dates for Principal Project Company to respond. If Principal Project Company fails to address such comments by the dates specified by City, Principal Project Company shall make all changes necessary to accommodate and resolve the comment and will be fully responsible for such changes without right to assert a City-Caused

Delay Event, City-Caused Relief Event or other basis for a Claim that City has assumed design or other liability.

**EXHIBIT 12**

**ENERGY MANAGEMENT**

**1. DEFINITIONS**

1.1 Capitalized terms used but not defined herein shall have the meaning given to them in Exhibit 1 of the Agreement.

**2. CALCULATION OF ANNUAL ENERGY TARGET**

**2.1 Annual Energy Target**

(a) After the second anniversary of the Final Acceptance Date, Principal Project Company and City shall appoint an Independent Energy Auditor to provide a report inclusive of operating assumptions, current Weather Data and energy model simulation files regarding the Infrastructure Facility's Energy performance and to establish an Annual Energy Target (the "**Annual Energy Target**").

**2.2 Program or Variation Adjustments to the Annual Energy Target**

2.2.1 At any time commencing after the Energy Performance Commencement Date, City or PPC can apply an adjustment to the Annual Energy Target for the purposes of preparing the Energy Analysis Report to account for:

- (a) any Regulated Load change(s) that results from a Change Order;
  - (b) changes in Infrastructure Facility occupancy;
  - (c) changes to Core Hours; or
  - (d) changes in the utilization or other foreseen operating conditions of the Infrastructure Facility which materially differ from those assumed for the purpose of calculating the Annual Energy Target.

For greater certainty, Principal Project Company and City acknowledge that an adjustment to the Annual Energy Target shall be made only as a result of a circumstance specified in Section 2.2.1.

2.2.2 Upon an adjustment to the Annual Energy Target as a result of a circumstance specified in Section 2.2.1, the Parties shall appoint, subject to the other Party's approval (acting reasonably), a complete energy audit to be conducted by an Independent Energy Auditor. The costs associated with the Independent Energy Auditor shall be shared equally between the Parties. Each Party shall cooperate with (including providing any information requested by) the IEA. The IEA shall prepare a report making recommendations regarding adjustments to the Annual Energy Target; the report shall include a detailed computer simulation, or other mutually agreed energy analysis method, of Energy usage by function and a comprehensive evaluation of Energy usage patterns. The

Parties shall work in good faith to have such IEA deliver its report within 30 days of the IEA's appointment. In preparing the report, the IEA shall have access to the most recent Energy Analysis Report. For greater certainty, the recommended adjustments should only apply for that period of time that the circumstance(s) in Section 2.2.1 giving rise to such adjustments occur, continue or impacted. Both City and Principal Project Company, each acting reasonably, shall have 20 days following receipt of such report to provide notice to the other of (i) its agreement to the recommended adjustments to the Annual Energy Target set forth in such report; or (ii) its disagreement with such recommendations, together with its rationale for such disagreement. In the event that either Party provides notice of its disagreement with the IEA's recommendations, then either Party may refer the matter to the Contract Dispute Procedures. If both Parties are in agreement with the recommendations, then the Annual Energy Target shall be adjusted in accordance with such recommendations effective as of the date on which the circumstance(s) in Section 2.2.1 commenced.

### 3. MEASUREMENT

- 3.1 Without prejudice to Exhibit 18 – Technical Requirements or anything else in this Exhibit 12, Principal Project Company shall measure the amount of Aggregate Actual Consumption to meet LEED BD+C Measurement and Verification mandatory credits and to meet LEED EBOM reporting requirements for the Infrastructure Facility in respect of each calendar month beginning on the Substantial Completion Date and ending on the earlier of expiry of Term or termination of the Agreement.
- 3.2 For each Contract Year after the Energy Performance Commencement Date, Principal Project Company shall provide City with a draft Energy Analysis Report within 60 days following the end of each Contract Year, which report shall include copies of all working papers to fully support the draft Energy Analysis Report. The draft Energy Analysis Report shall be consistent with the format and content requirements set out in Section 3.7.
- 3.3 As soon as practicable and in any event within 30 days after receipt by City of the draft Energy Analysis Report (or on such other date as may be agreed between City and Principal Project Company ), Principal Project Company and City shall convene an annual energy review meeting to be attended by the PPC Representative, the City Representative and such other individuals as may be agreed to by the Parties (the “**Annual Energy Review Meeting**”). At the Annual Energy Review Meeting, Principal Project Company shall present the draft Energy Analysis Report to City, and City and Principal Project Company shall discuss the Aggregate Actual Consumption for each discrete Energy Service for the preceding Contract Year.
- 3.4 Principal Project Company shall assist the City Representative and afford the City Representative such information and access to the Infrastructure Facility, building management system records, Utility meters, and Help Desk (as such services are described in Exhibit 18 – Technical Requirements) and by other means as may reasonably be required for the City Representative to review and confirm the content of the draft Energy Analysis Report provided by Principal Project Company.

3.5 City shall notify Principal Project Company within 21 days after the Annual Energy Review Meeting of the details of any disagreement of all or any aspect of the draft Energy Analysis Report, and the Parties shall then seek to agree to any matters in dispute. Where matters cannot be resolved within 20 days following receipt by Principal Project Company of notification by City of a disagreement (or such other period as may be otherwise agreed between the City Representative and the PPC Representative, acting reasonably), the disagreement shall be dealt with in accordance with the Dispute Resolution Procedure.

3.6 Subject to Section 3.5, within 20 days following each Annual Energy Review Meeting, or within such period as may be otherwise agreed between the City Representative and the PPC Representatives, acting reasonably, City shall confirm its acceptance of all or any aspects of the Energy Analysis Report.

### 3.7 Content and Format of the Energy Analysis Report

3.7.1 The Energy Analysis Report shall present findings of Aggregate Actual Consumption for each separate Energy Service for the relevant Contract Year and calculation of the Corrected Aggregate Energy Consumption (CAEC) and shall include the following:

- 3.7.1.1 a summary of (A) actual usage and breakdown by Utility in megajoules and cubic meters, or other Utility rate units; and (B) any exceptional changes in consumption or pattern of use since any previous Energy Analysis Report;
- 3.7.1.2 accurate and precise consumption data;
- 3.7.1.3 identification of potential cost savings in respect of Energy usage at the Infrastructure Facility and provide an estimate of potential Energy Service consumption savings broken down by fuel type, implementation costs, and projected savings, along with identifying potential risks associated with each proposed cost savings measure;
  - (i) presentation of Aggregate Actual Consumption for each individual Energy Service;
  - (ii) presentation of correlated energy Weather Data for the relevant Contract Year;
  - (iii) detailed analysis of all sub metered end-uses; and
  - (iv) calculation of the Corrected Aggregate Energy Consumption for each individual Energy Service;
- 3.7.1.4 outline of any outstanding issues from any previous Energy Analysis Report; and,
- 3.7.1.5 summary of adjustments to the Annual Energy Target, if any, as agreed upon in accordance with Section 2.2.

3.8 Principal Project Company shall deliver a Monthly Energy Report to City, following Substantial Completion, five business days following the end of each Contract Month.

3.9 Content and Format of the Monthly Energy Report

3.9.1.1 The Energy Analysis Report shall show monthly Aggregate Actual Consumption and monthly Corrected Aggregate Energy Consumption data for each individual Energy Service

3.9.1.2 For the monthly Corrected Aggregate Energy Consumption:

- (i) A comparison against the previous month's value, as well as supporting narrative articulating reasons for any variance
- (ii) A comparison against the value of the same month of the previous Contract Year, as well as supporting narrative articulating reasons for any variance
- (iii) A comparison of current rolling 12-month average against the previous month's rolling 12-month average, as well as supporting narrative articulating reasons for any variance

**4. COMPARING CORRECTED AGGREGATE CONSUMPTION WITH ADJUSTED ANNUAL ENERGY TARGET**

4.1 After the acceptance of the Energy Analysis Report as described in Section 3.6 for each Contract Year, the CAEC for each Energy Service shall be compared to the Annual Energy Target or Adjusted Annual Energy Target for each Energy Service, and:

4.1.1 if the CAEC in respect of any discrete Energy Service is greater than 115% of the AET or AAET in respect of such Energy Service, then City may request that the Principal Project Company prepare and submit an Energy Performance Action Plan ('EPAP'). For the purposes of an Energy Performance Action Plan in respect of this Section 4.1.1, the PAP will be due no later than 30 days after acceptance of the Energy Analysis Report; and

4.1.2 if the CAEC in respect of any Energy Service is less than 115% of the AET or AAET in respect of such Energy Service, no further action is required.

4.2 If an EPAP is required pursuant to Section 4.1.1, the Energy Performance Action Plan will, at a minimum;

- (a) identify the variances between the CAEC and the AET or AAET;
- (b) summarize potential issues giving rise to the variances;
- (c) include a root cause analysis, where possible, or a plan to develop root cause analysis if it cannot be established prior to issuance of the PAP; and

- (d) the steps or actions that will be undertaken by Principal Project Company to address the issues and specific and reasonable timeframes for such steps.

4.3 If an EPAP is required pursuant to Section 4.1.1, any missed submittals of Energy Performance Action Plans or failure to implement particular steps or actions of such EPAPs shall be addressed in accordance with Section 6.2.2 of Exhibit 4 (Payment Mechanism).

## **5. EXTERNAL ENERGY AUDITOR**

5.1 In accordance with Section 8.9.2 of the Agreement, City has the right to procure an External Energy Auditor to provide Infrastructure Facility operations and energy usage and consumption advice. This review would likely also include recommendations that cover PPC IFM Services and SFMTA O&M Services scope.

5.2 Similar to Section 4.1.1, if the CAEC is greater than 115% of the AET or AAET, then Principal Project Company will be required to comply with the recommendations of the External Energy Auditor, if procured, at its own cost. Such recommendations may include operational and maintenance recommendations, but may not require Principal Project Company to replace any material equipment or incur any material capital expenditure. Any requirement to replace material equipment or incur material capital expenditures shall be addressed in accordance with Section 12 of the Agreement. Additionally, Principal Project Company would not be required to comply with any recommendations that contradict specific advice provided by equipment manufacturers.

## **EXHIBIT 13**

### **COSTS SCHEDULE**

#### **1.0 Overview and General Principles**

**1.1** This Exhibit 13 (Costs Schedule) describes the methods for calculating:

- (A) Extra Work Costs, Delay Costs, and Financing Delay Costs owing from City to Principal Project Company pursuant to Article 12 (City Change Process; Unilateral Change Orders; Deviations) and Article 14 (Compensation and Other Relief for Delay Events and Relief Events) of this Agreement; and
- (B) Any other amount expressly payable by City or Principal Project Company under this Agreement.

**1.2** The following general principles apply to Extra Work Costs, Delay Costs, and Financing Delay Costs calculated under this Exhibit 13 (Costs Schedule):

- (A) Principal Project Company shall provide all information referred to in this Exhibit 13 (Costs Schedule) or Exhibit 9 (Change Procedures) on an Open Book Basis;
- (B) All payments or deductions made by City to Principal Project Company in accordance with this Exhibit 13 (Costs Schedule) will be made as and when incurred or in arrears in accordance with Section 7.0 (Form of Timing of Compensation) or as otherwise expressly provided under this Agreement;
- (C) In calculating Extra Work Costs, Delay Costs, and Financing Costs, the time value of money and timing of cash flows shall be accounted for. This means cash flows, whether they are costs incurred or payments received, shall be discounted or inflated to reflect when they occur (if applicable);
- (D) Extra Work Costs shall not include Delay Costs or Financing Delay Costs; and
- (E) No amounts shall be double counted.

**1.3** Principal Project Company's recovery for any Extra Work Costs, Delay Costs, and Financing Delay Costs under this Exhibit 13 (Costs Schedule) is subject to Principal Project Company complying with the timeframes specified in Article 14 (Compensation and Other Relief for Delay Events and Relief Events), and Exhibit 9 (Change Procedures) as applicable, and otherwise in accordance with this Agreement.

## 2.0 Extra Work Costs

### 2.1 Methods of Determining Extra Work Costs

Extra Work Costs, payable in accordance with Article 14 (Compensation and Other Relief for Delay Events and Relief Events) or Exhibit 9 (Change Procedures) of this Agreement, shall be determined using the following methods:

- (A) negotiated lump sum;
- (B) unit prices; or
- (C) Force Account.

Each method is described below.

### 2.2 Negotiated Lump Sum

If the City determines in its good faith discretion, Extra Work Costs will be determined on a negotiated lump sum basis. Subject to the City's right to issue a Unilateral Change Order, lump sum costs of Extra Work, negotiated and agreed with Principal Project Company shall be based on the direct costs to perform the Extra Work, as follows:

**2.2.1 Direct Costs.** The City will pay Principal Project Company the sum of the direct costs of labor, materials, and equipment used to perform Extra Work as follows:

- (A) Labor. The direct costs of labor for workers that actually perform Extra Work. Such workers include superintendents and supervisory foremen only if they are at the Project Site planning, coordinating, or overseeing Extra Work. All other supervision costs shall be included in the markup defined in Section 2.2.3 (Markup for Overhead and Profit). Whether the employer is Principal Project Company, a Contractor, a lower tier Contactor, or other forces, the direct cost of labor is the sum of the following:
  - (1) Actual Wages. The actual wages paid, including any actual payments by the employer for its workers' health and welfare, pension, vacation, training, and similar purposes.
  - (2) Labor Surcharge. The applicable labor surcharges in the California Department of Transportation's Labor Surcharge and Equipment Rental Rates publication in effect on the date the Extra Work is completed. These labor surcharges shall constitute full compensation for employer's payment of workers' compensation insurance, Social Security, Medicare, state and federal unemployment insurance, and state training taxes. City will not pay any other fixed labor burdens unless approved in writing by the City.
  - (3) Subsistence and Travel Allowance. The actual allowance paid to workers for subsistence and travel.

- (B) Materials. The direct costs of materials required and furnished specifically for Extra Work. This includes only the direct expenditure, including sales tax, borne by the purchaser from the Supplier and any transportation expenses (e.g., shipping fees, freight charges), except delivery charges unless specifically required for the Extra Work. If a genuine Supplier offers a trade discount to purchaser, Principal Project Company shall credit the City with this discount, even if the discount was not originally taken. If materials originate from a Supplier wholly or partially owned by a PPC-Related Entity, the City's payment therefor shall not exceed the current wholesale price, as determined by the City. The term "trade discount" includes the concept of cash discounting.
- (C) Equipment. The direct costs of equipment are the applicable rental rates for equipment in the California Department of Transportation's Labor Surcharge & Equipment Rental Rate Book (including its supplement Miscellaneous Equipment Rental Rates) in effect on the date the Extra Work is completed.
- (1) As deemed appropriate, the City may adjust such rental rates and use them to compute payments for equipment, regardless of whether the equipment is under the control of a PPC-Related Entity through direct ownership, leasing, renting, or other method of acquisition; except that, for equipment rented or leased in arm's length transactions with outside vendors, the City will reimburse Principal Project Company at the actual rental or leased invoice rates when such rates are reasonably in line with the applicable rates specified in the Labor Surcharge & Equipment Rental Rate Book (including its supplement Miscellaneous Equipment Rental Rates) as determined by the City. Arm's length rental or lease transactions are those in which the firm involved in the rental or lease of such equipment is not associated with, owned by, have common management, directorship, facilities, or stockholders with the firm renting the equipment. Principal Project Company has the burden of proof to demonstrate that a rental or lease transaction was an arm's length transaction. Principal Project Company shall submit copies of all rental or lease invoices, and other information as requested by the City, if any, as supporting documentation with each Proposed Change Order cost proposal.
  - (2) For equipment that is not listed in the Labor Surcharge & Equipment Rental Rate Book, Principal Project Company shall provide to the City three separate quotes for rental of the applicable equipment for City's consideration.
  - (3) The City will pay for equipment based on daily, weekly, or monthly rates, whichever are lowest. The City will not pay for equipment based on hourly rates including operator. Unless otherwise specified, Principal Project Company shall use manufacturer's ratings and manufacturer-approved modifications to classify equipment for determination of applicable rental rates. If, however, equipment of unwarranted size or type and cost is used, Principal Project Company shall calculate the cost at the rental rate for equipment of proper size and type.

- (4) The City will pay for equipment only for the time the equipment is in productive operation on the Extra Work. The City will not pay for equipment while inoperative due to breakdown or for non-work days. In addition, the City will not pay for any equipment rental time required to move the equipment to and from the Project Site. The City will pay for equipment loading and transportation costs, in lieu of rental time, only if the equipment does not move under its own power and is utilized solely for the Extra Work. The City will not pay for mobilization or demobilization of equipment already on the Project Site. The City will reimburse Principal Project Company for equipment that is idle, non-operating, or in standby mode at the lesser of Caltrans' rates, as adjusted by Caltrans Delay Factor (defined in the Labor Surcharge & Equipment Rental Rate Book), as adjusted by its standby calculation, unless such equipment is rented or leased as provided above.
- (5) Individual pieces of equipment having a replacement value of \$1,000 or less are considered small tools or small equipment; City will not pay for such tools and equipment since the costs of these tools and equipment are included as part of markups for overhead and profit as defined in Section 2.2.3 (Markup for Overhead and Profit).
- (6) Payment to Principal Project Company for the use of equipment as set forth in this Exhibit 13 (Costs Schedule) shall constitute full compensation to Principal Project Company for the cost of fuel, power, oil, lubricants, supplies, small equipment, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, labor (except for equipment operators), and any and all costs to Principal Project Company incidental to the use of the equipment.

**2.2.2 Costs Included as Part of Markup for Overhead and Profit.** To the total of the direct costs of labor, materials, and equipment computed as provided in Section 2.2.1 (Direct Costs), the City will pay Principal Project Company markups for overhead and profit, as specified in Section 2.2.3 (Markup for Overhead and Profit). These markups shall constitute full compensation for all direct and indirect overhead costs and profit, which shall be deemed to include all items of expense not specifically listed in Section 2.2.1 (Direct Costs) as direct costs. The City shall not be obligated to pay for any separate allowance or itemization for any overhead costs. The following is a list, not intended to be comprehensive, of the types of costs that are included in the markups for overhead and profit for all Extra Work:

- (A) Home office and field personnel including, principals, project managers, superintendents and supervisory foremen (unless they are at the Project Site planning, coordinating, or overseeing Extra Work), estimators, project engineers, detailers, draftspersons, schedulers, consultants, watchpersons, payroll clerks, administrative assistants, and secretaries.
- (B) All field and home office expenses, including: field trailers; parking; storage sheds; office equipment and supplies; telephone service at the Project Site; long-distance telephone calls; fax machines; computers and software; internet and e-mail services; temporary utilities; sanitary facilities and services; janitorial

services; small tools and equipment with a cost under \$1,000 each; portable scaffolding; blocking; shores; appliances; job vehicles; security and fencing; conformance to all regulatory requirements including compliance with safety regulations, safety programs, and safety meetings; cartage; warranties; record documents; and all related maintenance costs.

- (C) Administrative functions, including reviewing, coordinating, distributing, processing, posting, recording, estimating, negotiating, scheduling, schedule updating and revising, expediting, surveying, engineering, drawing, detailing, revising shop drawings, preparing record drawings, carting, cleaning, protecting the Work, and other incidental Work related to the Change Order.
- (D) Bond and insurance costs.
- (E) All other costs and taxes required to be paid, but not included under direct costs as defined in Section 2.2.1 (Direct Costs).

**2.2.3 Markup for Overhead and Profit.** To the actual total direct costs of labor, material, and equipment used to perform Extra Work, the City will apply the following markups for overhead and profit:

- (A) Initial Markup. An initial maximum markup for the PPC-Related Entity that performs the Extra Work based on the direct cost categories, as follows:

Direct Cost Categories	Maximum Markup
Principal Project Company – labor *	10%
Principal Project Company – materials*	10%
Principal Project Company – equipment*	10%
Prime Contractor/Subcontractor (of any tier) – labor	10%
Prime Contractor/Subcontractor (of any tier) – materials	10%
Prime Contractor/Subcontractor (of any tier) – equipment	10%

\* Extra Work self-performed by Principal Project Company.

- (B) Additional Markup. An additional maximum markup for the administration of Extra Work performed by a Contractor, as follows:
  - (1) Prime Contractor. For Extra Work performed by a Prime Contractor, an additional maximum markup of 5% for Principal Project Company’s administration of the Extra Work.

- (2) Subcontractor. For Extra Work performed by a Subcontractor, additional maximum markups of 5% each for Principal Project Company, Prime Contractor, and, if applicable, the higher-tier Subcontractor(s) for their respective administration of the Extra Work. The total of these additional markups shall not exceed 10% regardless of the number of Subcontractor tiers involved with the Extra Work.

**2.2.4 Adjustments and Considerations for Extra Work Costs.**

- (A) When both additions and credits are involved in any one Change Order, Principal Project Company's markup for direct costs shall be computed on the basis of its direct costs and labor productivity for the net change in the quantity of the Extra Work. For example, if a Change Order adds 14 units on one drawing and deletes 5 units on another drawing, the markup shall be based on the net addition of 9 units. No markup will be allowed if the deductive cost exceeds the additive cost.
- (B) If the City issues written notice of deletion of a portion of Extra Work after the commencement of such Extra Work or after Principal Project Company has ordered acceptable materials for such Work which cannot be cancelled, or if part or all of such Extra Work is not performed by Principal Project Company because it is unnecessary due to actual Project Site conditions, City will pay Principal Project Company for direct costs of such Work actually performed plus markup for overhead and profit as provided in Section 2.2.3 (Markup for Overhead and Profit).
- (C) The City shall not be obligated to compensate Principal Project Company for costs incurred after Principal Project Company receives the City's written notice deleting the portion of Extra Work.
- (D) Materials ordered by Principal Project Company prior to the City's issuance of a notice of deletion and paid for by the City shall become the property of the City, and the City will pay for the actual cost of any further handling of such material. If the material is returnable to the vendor, and if the City so directs, Principal Project Company shall return the material and the City will pay Principal Project Company only for the actual charges made by the vendor for returning the material including restocking charges.
- (E) Principal Project Company shall be solely responsible for determining which of its Contractors and Suppliers are assigned Change Orders. The City will not provide additional compensation to Principal Project Company for the cost of its Contractors and Suppliers to review, post, coordinate, or perform related tasks to administer Change Orders.

**2.2.5 Records.** Principal Project Company shall maintain its records in such a manner as to provide a clear distinction between the direct costs of Change Orders and the cost of original Work. This requirement pertains to all types of Change Orders, as well as the additions, deletions, revisions, and Claims initiated by Principal Project Company.

## 2.3 Unit Prices

If mutually agreed by the Parties or specified in the Contract Documents, the cost of Extra Work will be determined on a unit-cost basis.

**2.3.1 Initial Estimate.** The City will calculate an initial cost estimate by multiplying the pre-agreed unit prices by the estimated quantities indicated in the corresponding Change Order.

**2.3.2 Final Cost Calculation.** The actual cost payable to Principal Project Company for the Extra Work will be based on the real quantities of work completed, not the initial estimates.

**2.3.3 Overhead and Profit.** Unit prices must include any overhead and profit, the calculation of which shall follow the guidelines provided in this Exhibit 13 (Costs Schedule).

## 2.4 Force Account

If the City determines in its good faith discretion, Extra Work Costs will be determined on a Force Account basis. In such a case, the City will direct Principal Project Company to proceed with the Extra Work on a Force Account basis, subject to a "not to exceed" budget established by the City.

**2.4.1 General.** When the City pays Extra Work on a Force Account basis, all direct costs itemized in accordance with Section 2.2.1 (Direct Costs) shall be subject to the approval of the City and compensation will be determined as set forth in this Exhibit 13 (Costs Schedule).

- (A) All requirements for direct costs and markup for overhead and profit provided in Section 2.2.3 (Markup for Overhead and Profit) shall apply to Force Account Work. However, the City will pay only the actual necessary costs verified in the field by the City on a daily basis.
- (B) Principal Project Company shall be responsible for all costs related to the documentation, data preparation, and administration of Force Account Work. Compensation for these costs shall be fully covered by the markup for overhead and profit markup as provided in Section 2.3 (Unit Prices).
- (C) Notification and Verification. Before commencing any Force Account Work, Principal Project Company shall provide written notice to the City at least 24 hours before the scheduled Work. The Force Account Work must be witnessed, documented, and approved in writing by the City on the day the Work is performed. Failure by the Principal Project Company to provide timely notice to the City before initiating Force Account Work shall result in the City not being obligated to compensate for such Work.

In addition, Principal Project Company shall notify the City when the cumulative costs incurred by Principal Project Company for the Force Account Work equal 80% of the budget pre-established by the City. The City shall not be obligated to compensate Principal Project Company for Force Account Work exceeding the "not to exceed" budget amount if Principal Project Company fails to provide the required notice before exceeding 80% of the Force Account budget.

- (D) Reports. Principal Project Company shall diligently proceed with City-directed Force Account Work and shall submit to the City no later than 12:00 p.m. of the day following performance of Force Account Work a daily Force Account Work report on a form obtained from the City. The report shall provide an itemized, detailed account of the daily Force Account labor, material, and equipment, including names of the individuals and the specific pieces of equipment identified by manufacturer's model type and serial number. Principal Project Company's authorized representative shall complete and sign the report. The City shall not be obligated to compensate Principal Project Company for Force Account Work for which Principal Project Company does not timely complete and submit the aforementioned report to the City.
- (E) Agreement. If Principal Project Company and the City reach a negotiated, signed agreement on the cost of a Change Order while the Extra Work is proceeding on a Force Account basis, Principal Project Company's signed written reports shall be discontinued and all previously signed reports shall become invalid.

### 3.0 Delay Costs

- (A) General. In the event of a City-Caused Delay Event, the City will pay Principal Project Company for incurred Delay Costs as specified in this Section 3.0 (Delay Costs) to the extent (i) expressly allowed under Section 14.1.4(b) of this Agreement, and (ii) such costs have not been previously paid as allowed under Section 2.4 (Force Account). Such payment constitutes full compensation for incurred Delay Costs.
- (B) The City will not pay for Delay Costs until Principal Project Company submits an itemized statement of those costs; Principal Project Company must provide the content specified in Section 2.4 (Force Account), for the applicable items in this statement and as follows:
- (1) Proof of cost of superintendent, or other project staff salaries, wages, and payroll taxes and insurance;
  - (2) Proof of cost of office rent, utilities, land rent, and office supplies;
  - (3) Proof of escalated cost for labor, equipment, and material;
  - (4) Proof of material storage costs; and
  - (5) Proof of other increased Delay Costs consistent with this Section 3.0 (Delay Costs).
- (C) Allowable Delay Costs. Increases in cost for labor, equipment, and materials will be calculated as follows:
- (1) Idle Labor. Labor costs during delays must be calculated as specified in Section 2.2.1(A) for all non-salaried personnel remaining on the Project as required under collective bargaining agreements or for City-approved reasons.

- (2) Escalated Labor. Payments authorized for increases in labor costs will be based on (i) the difference between old and new labor rates established by a State or federal agency, or (ii) a project labor agreement or other agreement between the employee's and Principal Project Company's bargaining agency, which is accepted by City. Payment will be based on certified payrolls. Payment will also include the increases in fringe benefit rates and increases in payroll taxes that Principal Project Company is required to pay.
- (3) Idle Equipment. Payment may be allowed on a rental basis for the idled equipment if any of the following criteria is met:
  - a. The equipment is on the Project Site at the time of the delay, is required for the controlling operation, and cannot be used at other locations on the Project Site.
  - b. The equipment is specialized and directly related to the controlling operation, whether on or off the Project Site. This must be certified by Principal Project Company and verified by the City.
  - c. The rental rate for idled leased or rented equipment will be the leased or rented rate established in Section 2.2.1(C). However, the City may direct Principal Project Company to return equipment and take it off rental.
  - d. The rental rate for idled equipment owned by PPC-Related Entities will be one-half the rate established in Section 2.2.1(C). No payment will be allowed for operating costs.
  - e. Payment will be limited to the difference between the hours used and 8 hours in any one day and to the difference between the hours used and 40 hours in any one week. No additional compensation for overhead will be allowed.
  - f. Equipment demobilization and remobilization, if directed by City, will be paid in accordance with Section 2.0 (Extra Work Costs).
- (4) Material Escalation or Material Storage. Payment for increased cost of materials will be based on differences in the invoice costs before and after the delay period. When requesting an increase in cost of materials, Principal Project Company shall document the increased costs due to the delay. The cost of materials storage during the delay will be the invoiced storage cost.

#### **4.0 Financing Delay Costs**

Financing Delay Costs, when allowed under this Agreement, will be paid in the form and timing as described in Section 7.0 (Form and Timing of Compensation).

## 5.0 Directed Acceleration

If the City orders Principal Project Company to accelerate the D&C Work in accordance with Section 1.3.2(c) of Exhibit 9 (Change Procedures), and in the absence of agreed upon compensation, the City will compensate Principal Project Company for performance of the accelerated work in accordance with Section 2.4 (Force Account).

## 6.0 Unrecoverable Costs

Principal Project Company is not entitled to compensation for the following costs:

- (A) Loss of anticipated profit.
- (B) Consequential damages, including loss of bonding capacity, loss of bidding opportunities, insolvency, and the effects of force account work on other projects, or business interruption.
- (C) Indirect costs.
- (D) Attorneys' fees, claim preparation expenses, and the costs of litigation.
- (E) Unabsorbed or extended field or home office overhead or any damages using an Eichleay or similar equation, except as otherwise provided in the mark ups specified in Section 2.2.2 (Costs Included as Part of Markup for Overhead and Profit).
- (F) The cost of project management services provided by Principal Project Company.

The following do not constitute cause for a Claim for Extra Work Costs or Delay Costs:

- (1) The inability to secure satisfactory materials, for reasons beyond Principal Project Company's control, from the source upon which the proposal was based, unless project specific single source Suppliers are specified by City; or
- (2) Changes in carrier rates or the alteration of transportation facilities for these materials during the Term.

## 7.0 Form and Timing of Compensation

### 7.1 Payments or Deductions of Extra Work Costs, Delay Costs and Financing Delay Costs

If a Delay Event or Relief Event:

- (A) results in an amount owing from Principal Project Company to City in accordance with this Agreement, City will deduct such amount from the Milestone Payment (only to the extent that such Delay Event or Relief Event affects the (1) D&C Work or (2) IFM Services prior to the Substantial Completion Date) or Availability Payments payable to Principal Project Company after the Delay Event or Relief

Event, or if no subsequent Milestone Payment or Availability Payments are payable to Principal Project Company, such amount will be a debt due and payable by Principal Project Company to City;

- (B) results in an amount owing from City to Principal Project Company that is not financed by Principal Project Company in accordance with Section 7.2 (Additional Funding), City will compensate Principal Project Company as follows:
- (1) subject to Sections 7.1(B)(2) and 7.1(B)(3) in the form of:
    - a. an adjustment to the Milestone Payment or Availability Payments over the Term;
    - b. a lump sum payment;
    - c. progress or other periodic payments invoiced as Extra Work is completed or as other multiple payments over the Term; or
    - d. any combination of the above,in accordance with the payment arrangements set out in the Change Order or Unilateral Change Order or otherwise as determined by the City in its sole discretion;
  - (2) in respect of Extra Work Costs or Delay Costs, within 1 calendar month after the date of the receipt from Principal Project Company of the Change Order except to the extent that any Extra Work Costs or Delay Costs are disputed by City and referred for dispute resolution in accordance with Article 18 (Contract Dispute Procedures); and
  - (3) in respect of Financing Delay Costs, on the date which City would have paid the Milestone Payment or Availability Payment relating to those days of delay had Substantial Completion not been delayed by the relevant Compensable Delay Event; or
- (C) results in an amount owing from City to Principal Project Company that is financed by Principal Project Company in accordance with Section 7.2 (Additional Funding), City will pay such amount to Principal Project Company in the same manner as Section 7.1(B).

## 7.2 Additional Funding

Where City requests Principal Project Company obtain funding for a Delay Event or Relief Event, Principal Project Company shall use all reasonable endeavors to obtain such funding, including by:

- (A) using any savings resulting from other Delay Events or Relief Events which have resulted in amounts being available under the Financing Documents;
- (B) utilizing any standby facility that may be available to Principal Project Company;

- (C) arranging for additional funding under the Financing Documents and from other sources (if permitted under the Financing Documents); and
- (D) arranging other funding obtained on commercial terms for Principal Project Company by City (without any obligation on City to make any such arrangements).

To the extent Principal Project Company is able to obtain funding, the cost of the funding will be taken into consideration by the parties in the compensating Principal Project Company for the Delay Event or Relief Event in accordance with Section 7.1 (Payments or Deductions of Extra Work Costs, Delay Costs and Financing Delay Costs). City shall pay Principal Project Company an amount equal to the reasonable out-of-pocket expenses incurred by Principal Project Company in seeking such financing, provided that City approved such expenses prior to Principal Project Company incurring them.

Where, having used all reasonable endeavors, Principal Project Company is unable to obtain funding or funding is on terms which are not satisfactory to City, City will, without limiting its rights under Exhibit 9 (Change Procedures), compensate Principal Project Company in accordance with Section 7.1(A)-(C).

**EXHIBIT 14**

**KEY CONTRACT PROVISIONS**

**I. Key Contracts**

Each Key Contract shall:

- (a) Include a covenant to maintain all licenses required by applicable Law;
- (b) Require the Key Contractor to carry out its scope of work in accordance with applicable requirements of the Contract Documents, the Regulatory Approvals, applicable Law, and plans, systems and manuals developed and used by Principal Project Company under the Contract Documents;
- (c) Set forth representations, warranties, guaranties and liability provisions of the Key Contractor appropriate for work of a similar scope and scale;
- (d) Expressly state that all warranties and guaranties remaining in effect upon the expiration of the Term or earlier termination of this Agreement, whether express or implied, shall inure to the benefit of City, its successors and assigns, and any Third Parties for whom Work is being performed;
- (e) Set forth a standard of professional responsibility or a standard for commercial practice (as applicable) equal to or better than the requirements of the Contract Documents and in accordance with Good Industry Practice for work of similar scope and scale;
- (f) To the extent applicable, if not obtained by Principal Project Company, require the Key Contractor to provide Payment Bond(s) and Performance Bond(s) as required under Section 10.2 (Performance Security) of this Agreement before commencement of any work by or on behalf of the Key Contractor, and expressly require such Key Contractor to provide any surety Notices of loss or potential loss to Principal Project Company and City;
- (g) Preclude suspension of performance or demobilization by the Key Contractor unless and until it delivers to City Notice of the other contracting party's breach or default under such Key Contract and allows City the reasonable opportunity to cure such breach or default;
- (h) Not be assignable by the Key Contractor without Principal Project Company's and City's prior consent, provided that this provision shall not prohibit subcontracting of portions of the Work to qualified Subcontractors;
- (i) Include the requirements and provisions in this Agreement applicable to Contractors regarding title to and other Intellectual Property rights and licenses;
- (j) Require the Key Contractor to participate in meetings between Principal Project Company and City concerning matters pertaining to such Key Contractor, its work or the coordination of its work with Other Contractors in accordance with direction to such Key

- Contractor provided by Principal Project Company or other party to the Key Contract, provided that City retains authority to give such direction or take such action as in its opinion is necessary to remove an immediate and present threat to the safety of life or property;
- (k) Require the Key Contractor to participate in, be subject to and give evidence in any dispute resolution proceeding under Article 18 (Contract Dispute Procedures) of this Agreement, if such participation is requested by either City or Principal Project Company;
  - (l) Without cost to Principal Project Company or City, and subject to the rights of the Collateral Agent under any Direct Agreement, permit assignment to City or its successors, assigns or designees of all Principal Project Company's or other contracting party's rights under the Key Contract (with such assignment to include the benefit of all Key Contractor warranties, indemnities, guarantees and professional responsibility), contingent only upon delivery of Notice from City following the Termination Date, allowing City or its successor, assign or designee to obtain the benefit of Principal Project Company's or other contracting party's rights with liability only for those remaining obligations of Principal Project Company or the other contracting party accruing after the date of delivery of said Notice from City, without extinguishing existing claims of the Key Contractor against Principal Project Company or the corresponding Claims of Principal Project Company against City;
  - (m) Expressly state that any acceptance of assignment of the Key Contract by City, the Collateral Agent or either or their respective successors, assigns or designees shall not operate to make the assignee responsible or liable for any breach of the Key Contract by Principal Project Company or for any amounts due and owing under the Key Contract for work or services rendered before acceptance of the assignment;
  - (n) Expressly include the Indemnitees as indemnitees, with direct right of enforcement, in any indemnity given by the Key Contractor under the Key Contract;
  - (o) Expressly include an acknowledgement that, except to the extent of stop notice rights under State law, the Key Contractor has no right or claim to any lien or encumbrance upon the Project and Project Site for failure of the other contracting party to pay amounts due the Key Contractor, and a waiver of any such right or claim that may exist at Law or in equity;
  - (p) Expressly include the right of Principal Project Company to terminate the Key Contract in whole or in part upon any termination of this Agreement without liability of Principal Project Company or City for the Key Contractor's lost profits or business opportunity;
  - (q) Not contain any terms that do not comply or are inconsistent with the terms of the Contract Documents;
  - (r) Include:
    - (i) a covenant acknowledging that, subject to the rights of the Collateral Agent under any Direct Agreement, upon receipt of written Notice from City, City is entitled to exercise step-in rights with respect to the Key Contract (where City is also

exercising its step-in rights under Section 16.2.5 (City Step-in Rights) of this Agreement), without any necessity for a consent or approval from Principal Project Company or the making of a determination whether City validly exercised its step-in rights; and

- (ii) a waiver and release by Principal Project Company of any claim or cause of action against the Key Contractor arising out of, relating to or resulting from its recognition of City's step-in rights in reliance on any such written Notice from City;
- (s) Include a covenant that will survive termination of the Key Contract obligating the Key Contractor to promptly execute and deliver to City or its successor, assign or designee a new contract between the Key Contractor and City or its successor, assign or designee on the same terms as the Key Contract, if (i) the Key Contract is rejected by Principal Project Company in bankruptcy or is wrongfully terminated by Principal Project Company and (ii) City delivers a request for such new contract within 60 days following termination or expiration of this Agreement;
- (t) Include a covenant that will survive termination of the Key Contract to the effect that if the Key Contractor was a party to an escrow agreement for an IP Escrow and Principal Project Company terminates it, then the Key Contractor also shall execute and deliver to City, concurrently with such new contract, a new escrow agreement on the same terms as the terminated escrow agreement, and shall concurrently make the same deposits to the new IP Escrow as made or provided under the terminated escrow agreement. The obligation to include the same terms in each such new contract (including new IP Escrows) is subject to the following exceptions: (i) terms of a Key Contract or IP Escrow agreement rendered moot or inapplicable solely due to change in the identity of the contracting party; and (ii) terms of a Key Contract that must be adjusted due to schedule delay caused solely by Principal Project Company's rejection in bankruptcy or wrongful termination;
- (u) Require the Key Contractor to (i) maintain usual and customary Books and Records for the type and scope of operations of business in which it is engaged and retain such Books and Records for the period stated in Section 21.1.1(e) of this Agreement or other applicable period specified in the Contract Documents, (ii) permit audit of Books and Records by City and (iii) provide progress reports to Principal Project Company appropriate for the type of work it is performing sufficient to enable Principal Project Company to furnish reports required under this Agreement;
- (v) Include a right of inspection for City, or City's designee(s), consistent with City's inspection rights under the Contract Documents;
- (w) Include provisions for Renewal Work during the last two years of the Term ensuring that warranties and guaranties under each Key Contract inure to the benefit of both City and Principal Project Company; and
- (x) Provide that any purported amendment contrary to the requirements of this Exhibit 14 (Key Contract Provisions), without the prior written consent of City, shall be null and void.

## II. D&C Contract

Each D&C Contract shall:

- (b) Ensure D&C Contractor participation in and compliance with commissioning tasks, including the requirements under Division 6 (Testing & Commissioning and Operational Readiness) of the Technical Requirements, to provide a properly functioning building that includes fundamental commissioning requirements; and
- (c) At a minimum, outlining the following commissioning requirements, in accordance with Division 6 (Testing & Commissioning and Operational Readiness) of the Technical Requirements:
  - (i) Commissioning team roles and responsibilities;
  - (ii) Requirements for a communication protocol between Principal Project Company, D&C Contractor, and the Commissioning Provider;
  - (iii) Submittal requirements and review procedures;
  - (iv) Operation and maintenance documentation requirements;
  - (v) Meetings;
  - (vi) Construction verification procedures;
  - (vii) Cost of retesting;
  - (viii) Start-up, testing, adjusting and balancing documentation and verification;
  - (ix) Functional performance testing requirements;
  - (x) Systems Manual requirements;
  - (xi) Training of IFM Provider and City personnel;
  - (xii) Schedule and contractual milestones;
  - (xiii) End of warranty site visit; and
  - (xiv) Commissioning specifications are to be provided to the D&C Contractor.

**EXHIBIT 15**

**CONDITIONS PRECEDENT**

- Exhibit 15A: Conditions to NTP 1 - Commencement of Non-Construction Work
- Exhibit 15B: Conditions to NTP 2 - Commencement of Construction Work
- Exhibit 15C: Conditions to Substantial Completion
- Exhibit 15D: Conditions to Final Acceptance

**EXHIBIT 15A**

**CONDITIONS TO NTP1 - COMMENCEMENT OF NON-CONSTRUCTION WORK**

The conditions to NTP 1 are:

- (a) Financial Close has occurred;
- (b) City has accepted the following elements of the Project Management Plan: (i) the Design Management Plan; and (ii) the Quality Management Plan (Design);
- (c) all Insurance Policies required to be in effect at NTP 1 pursuant to Exhibit 7 (Insurance Requirements) have been obtained and are in full force and effect and Principal Project Company has delivered to City verification thereof as required under Section 10.1.2.4(a) of this Agreement;
- (d) Principal Project Company has certified to City that all personnel who will perform D&C Work either hold all licenses, certifications, registrations, permits or approvals necessary for performance of the D&C Work or will obtain them before starting work;
- (e) Principal Project Company is not then in receipt of any Notice of PPC Default from City unless any such default has been cured or waived in writing by City;
- (f) Principal Project Company is not then in receipt of any Notice of default delivered pursuant to the Financing Documents unless any such default has been cured, and no Lender has otherwise indicated that it is unwilling or unable to presently fund Principal Project Company's costs of the Work; and
- (g) All representations and warranties of Principal Project Company in Section 19.1 (Principal Project Company Representations and Warranties) of this Agreement shall be and remain true and correct in all material respects, and Principal Project Company has delivered to City a certificate certifying to the same.

**EXHIBIT 15B**

**CONDITIONS TO NTP 2 - COMMENCEMENT OF CONSTRUCTION WORK**

The conditions to NTP 2 are:

- (a) City has issued NTP 1;
- (b) City has accepted the Project Schedule;
- (c) City has accepted the Project Management Plan;
- (d) City's has accepted the Health and Safety Plan required pursuant to Section 01 35 45 of Division 10 of the Technical Requirements;
- (e) all Insurance Policies required to be in effect at NTP 1 pursuant to Exhibit 7 (Insurance Requirements) remain in full force and effect, and Principal Project Company has delivered to City verification thereof as required under Section 10.1.2.4(a) of this Agreement;
- (f) all Regulatory Approvals necessary to begin the applicable portions of the Construction Work have been obtained and Principal Project Company has furnished to City fully executed copies of such Regulatory Approvals other than the CEQA Approval;
- (g) the Access Date has occurred and all rights of access necessary for commencement of Construction Work on the applicable portion of the Project Site have been obtained;
- (h) all applicable pre-construction requirements, as set forth in the final MMRP contained in Section 01 35 50 (Appendix A) of Division 10 of the Technical Requirements and contained in Section 01 35 43, Section 01 35 50, Section 02 80 13, and Section 02 81 10 of Division 10 of the Technical Requirements, have been reviewed and confirmed to be completed by City in its regulatory capacity;
- (i) all applicable pre-construction requirements contained in any Regulatory Approvals, in each case for the applicable portion of the Construction Work, have been satisfied;
- (j) All Utility Adjustments have been completed and Principal Project Company certifies that, other than Utility Adjustments arising out of any Unidentified Utilities found after the Setting Date, no further Utility conflicts exist with respect to the Project;
- (k) Principal Project Company has obtained approvals from Authorities Having Jurisdiction required for, as well as City approval of, any proposed lane closures, and has taken other appropriate measures to ensure maintenance of traffic in the area affected by the Work;
- (l) Principal Project Company has delivered to City, and City has accepted or approved (as applicable), all Submittals relating to the applicable portion of the Construction Work required by the Project Management Plan and the Contract Documents to be accepted or

- approved, in the form and content required by the Project Management Plan or Contract Documents;
- (m) Principal Project Company has delivered to City, and City has approved, the Final Commissioning Plan;
  - (n) Principal Project Company has obtained City approval of the Release for Construction Documents for the affected Construction Work in accordance with Section 1.8.6 of Division 1 of the Technical Requirements;
  - (o) the guarantees in favor of City, if any, required under Section 10.5 (Guarantees) of this Agreement have been executed, obtained and delivered to, and received by, City and are in full force and effect;
  - (p) Principal Project Company is not then in receipt of any Notice of PPC Default from City unless any such default has been cured or waived in writing by City;
  - (q) Principal Project Company is not then in receipt of any Notice of default delivered pursuant to the Financing Documents unless any such default has been cured, and no Lender has otherwise indicated that it is unwilling or unable to presently fund Principal Project Company's costs of the Work; and
  - (r) All representations and warranties of Principal Project Company in Section 19.1 (Principal Project Company Representations and Warranties) of this Agreement shall be and remain true and correct in all material respects, and Principal Project Company has delivered to City a certificate certifying to the same.

**EXHIBIT 15C**

**CONDITIONS TO SUBSTANTIAL COMPLETION**

The conditions to Substantial Completion are:

- (a) Principal Project Company has completed all D&C Work in accordance with the requirements of this Agreement and the Infrastructure Facility can be utilized safely for its intended purpose, including (i) full access to all points of entry and exit and (ii) completion of all Construction Work other than Punch List items approved by City;
- (b) each Authority Having Jurisdiction has issued a temporary certificate of occupancy for the Infrastructure Facility, to the extent such certificate is required by applicable Law, or has accepted the Infrastructure Facility, as applicable;
- (c) Principal Project Company has accepted the updated IFM Management Plan;
- (d) the Infrastructure Facility is in a condition of full operational functionality and operational readiness to allow the SFMTA's transit operations to relocate to the Infrastructure Facility as required in Section 01 77 00 of Division 10 and Division 6 of the Technical Requirements, respectively including with all emergency testing and commissioning activities successfully completed, and with the Help Desk established and operating;
- (e) Principal Project Company has:
  - (i) completed training of Principal Project Company's IFM Services personnel in accordance with Section 1.7 of Division 1 of the Technical Requirements;
  - (ii) completed training of City's SFMTA O&M Services personnel in accordance with Section 1.7 of Division 1 of the Technical Requirements;
  - (iii) delivered to City a certificate, in form acceptable to City, executed by Principal Project Company that it and its Contractors are fully staffed with such trained personnel and are ready, willing and able to operate and maintain the Infrastructure Facility in accordance with the terms of the Contract Documents including the approved Project Management Plan;
  - (iv) delivered to City training records evidencing compliance with training requirements for both Principal Project Company's IFM Services personnel and City's SFMTA O&M Services personnel, including copies of course completion certificates issued to each of the subject personnel, and including SFMTA O&M Services training manuals and video recordings of training sessions;
  - (v) completed and documented completion of all training required to allow full access to the Project Site to those individuals designated by City in accordance Section 1.7 of Division 1 of the Technical Requirements; and
  - (vi) satisfactorily demonstrated integrated operational functionality through "live" coordinated responses (in conjunction with City staff including emergency response

personnel) to failure management and other emergency events during the operations of the Infrastructure Facility in accordance with Division 6 of the Technical Requirements;

- (f) the relevant systems and equipment have passed all required tests and Principal Project Company has delivered to City all reports, data, and documentation relating to such tests;
- (g) Principal Project Company has delivered to City, and City has approved, the Systems Manual;
- (h) Principal Project Company has, in accordance with Section 21.4 (Intellectual Property), granted to City all Base License Rights to PPC IP and Third Party IP, delivered to City all Developed IP, delivered to City all IP Materials, and made all deposits to the IP Escrow required with respect to the D&C Work;
- (i) Principal Project Company has prepared and submitted a Punch List in accordance with the Contract Documents and City has accepted such list;
- (j) Principal Project Company is not then in receipt of any Default Notice from City unless any such default has been cured or waived in writing by City;
- (k) Principal Project Company is not then in receipt of any Notice of default delivered pursuant to the Financing Documents unless any such default has been cured;
- (l) Principal Project Company has delivered to City (i) all manufacturers' warranties required under, and in the form and content specified by the Technical Requirements (including Division 3 of the Technical Requirements and Section 01 78 36 of Division 10 of the Technical Requirements) and (ii) all documents and other evidence of warranties under Sections 7.9 (Final Acceptance) and 6.11 (Warranties) of this Agreement;
- (m) all Insurance Policies required to be in effect for the IFM Period pursuant to Exhibit 7 (Insurance Requirements) have been obtained and are in full force and effect and Principal Project Company has delivered to City verification thereof as required under Section 10.1.2.4(a) of this Agreement; and
- (n) all Submittals required by the Project Management Plan or Contract Documents to be submitted, accepted and/or approved by City have been submitted to and accepted or approved by City, as applicable.

**EXHIBIT 15D**

**CONDITIONS TO FINAL ACCEPTANCE**

The conditions to Final Acceptance are:

- (a) Principal Project Company has completed all D&C Work in accordance with this Agreement;
- (b) City has issued a Certificate of Substantial Completion for the Infrastructure Facility;
- (c) all Punch List items have been completed to the reasonable satisfaction of City;
- (d) Principal Project Company has delivered to City a reasonable inventory of all spare parts, spare components, spare equipment, special tools, materials, expendables and consumables necessary for the operation and maintenance of the Infrastructure Facility;
- (e) all Submittals that Principal Project Company is required by the Contract Documents to submit upon Final Acceptance have been submitted to City;
- (f) each Authority Having Jurisdiction has issued a certificate of occupancy, to the extent such certificate is required by applicable Law, and/or has provided other approvals required for operation of the Infrastructure Facility, as applicable;
- (g) City has received a complete set of the As-Built Documents and documentation for the Infrastructure Facility;
- (h) Principal Project Company has, in accordance with Section 21.4 (Intellectual Property), granted to City all Base License Rights to PPC IP and Third Party IP, delivered to City all Developed IP, delivered to City all IP Materials, and made all deposits to the IP Escrow required at or prior to Final Acceptance;
- (i) all Insurance Policies required to be in effect for the IFM Period pursuant to Exhibit 7 (Insurance Requirements) have been obtained and are in full force and effect and Principal Project Company has delivered to City verification thereof as required under Section 10.1.2.4(a) of this Agreement;
- (j) Principal Project Company has completed the Move-In, in accordance with Section 7.13 (Move-In) of this Agreement.
- (k) Principal Project Company is not then in receipt of any Notice of PPC Default from City unless any such default has been cured or waived in writing by City; and
- (l) Principal Project Company is not then in receipt of any Notice of default delivered pursuant to the Financing Documents unless any such default has been cured.

**EXHIBIT 16**

**FEDERAL, STATE AND CITY REQUIREMENTS**

- Exhibit 16A: Federal Requirements
- Exhibit 16B: State Requirements
- Exhibit 16C: City Requirements
- Exhibit 16D: SFMTA's Surveillance Technology Policy

**EXHIBIT 16A**

**FEDERAL REQUIREMENTS**

***[NOTE TO PNC: FEDERAL PROVISIONS UNDER DEVELOPMENT AND SUBJECT TO ADDITIONAL REVISION]***

**1. NO FEDERAL GOVERNMENT OBLIGATIONS TO THIRD PARTIES**

Principal Project Company and City acknowledge and agree that, notwithstanding any concurrence by the federal government in, or approval of, the solicitation or award of this Agreement, absent the express written consent by the federal government, the federal government is not a party to this Agreement and shall not be subject to any obligations or liabilities to City, Principal Project Company or any other party pertaining to any matter resulting from this Agreement. Principal Project Company agrees to include the above clause in each Contract financed in whole or in part with federal assistance provided by the FTA. It is further agreed that the clause shall not be modified, except to identify the Contractor who will be subject to its provisions.

**2. FALSE STATEMENTS OR CLAIMS – CIVIL OR CRIMINAL FRAUD**

49 U.S.C. § 5323(l)(1)  
31 U.S.C. §§ 3801-3812  
18 U.S.C. § 1001  
49 C.F.R. part 31

Principal Project Company acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. part 31, apply to its actions pertaining to the Project. Upon execution of this Agreement, Principal Project Company certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to this Agreement or the Project. In addition to other penalties that may be applicable, Principal Project Company further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the federal government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on Principal Project Company to the extent the federal government deems appropriate. Principal Project Company also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the federal government under a contract connected with a project that is financed in whole or in part with federal assistance originally awarded by FTA under authority of 49 U.S.C. chapter 53, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5323(l) on Principal Project Company, to the extent the federal government deems appropriate. Principal Project Company agrees to include the above two clauses in each Contract financed in whole or in part with federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the Contractor who will be subject to the provisions.

---

### 3. ACCESS TO THIRD PARTY CONTRACT RECORDS

49 U.S.C. § 5325(g)  
2 C.F.R. § 200.333  
49 C.F.R. part 633

- (a) **Record Retention.** Principal Project Company will retain, and will require its Contractors of all tiers to retain, complete and readily accessible records related in whole or in part to this Agreement, including, but not limited to, data, documents, reports, statistics, sub-agreements, leases, subcontracts, arrangements, other third party agreements of any type, and supporting materials related to those records.
- (b) **Retention Period.** Principal Project Company agrees to comply with the record retention requirements in accordance with 2 C.F.R. § 200.333. Principal Project Company shall maintain all books, records, accounts and reports required under this Agreement for a period of at not less than three (3) years after the date of termination or expiration of this Agreement, except in the event of litigation or settlement of claims arising from the performance of this Agreement, in which case records shall be maintained until the disposition of all such litigation, appeals, claims or exceptions related thereto.
- (c) **Access to Records.** Principal Project Company agrees to provide sufficient access to FTA and its contractors to inspect and audit records and information related to performance of this Agreement as reasonably may be required and to the U.S. Secretary of Transportation and the Comptroller General of the United States, the state, or their duly authorized representatives, access to all third party contract records (at any tier) as required under 49 U.S.C. § 5325(g).
- (d) **Access to the Sites of Performance.** Principal Project Company agrees to permit FTA and its contractors access to the sites of performance under this Agreement as reasonably may be required.

### 4. CHANGES TO FEDERAL REQUIREMENTS

- (a) Principal Project Company shall at all times comply with all applicable FTA regulations, policies, procedures and directives, as these regulations, policies, procedures, and directives may be amended from time to time, including those listed directly or by reference in any Master Agreement between City and FTA. Principal Project Company's failure to so comply shall constitute a material breach of this Agreement.
- (b) Federal requirements that apply to City or the award, this Agreement, and any amendments thereto may change due to changes in federal law, regulation, other requirements, or guidance, or changes in the City's underlying agreement including any information incorporated by reference and made part of that underlying agreement.
- (c) Applicable changes to those federal requirements will apply to this Agreement and Parties thereto at any tier.

---

## 5. TERMINATION

2 C.F.R. § 200.339  
2 C.F.R. App. II(B) to part 200

See Article 17 (Termination) of this Agreement.

## 6. CIVIL RIGHTS

Principal Project Company is an Equal Opportunity Employer. As such, Principal Project Company agrees to comply with all applicable federal civil rights laws and implementing regulations. Apart from inconsistent requirements imposed by federal laws or regulations, Principal Project Company agrees to comply with the requirements of 49 U.S.C. § 5323(h)(3) by not using any federal assistance awarded by FTA to support procurements using exclusionary or discriminatory specifications. Under this Agreement, Principal Project Company shall at all times comply with the following requirements and shall include these requirements in each Contract entered into as part thereof.

- (a) **Nondiscrimination.** In accordance with federal transit law at 49 U.S.C. § 5332, Principal Project Company agrees that it will not discriminate against any employee or applicant for employment because of race, color, religion, national origin, sex, disability, or age; and that the Principal Project Company and each Contractor maintains no employee facilities segregated on the basis of race, color, religion or national origin. In addition, Principal Project Company agrees to comply with applicable federal implementing regulations and other implementing requirements FTA may issue.
- (b) **Race, Color, Religion, National Origin, Sex.** In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e et seq., and federal transit laws at 49 U.S.C. § 5332, Principal Project Company agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. chapter 60, and Executive Order No. 11246, "Equal Employment Opportunity in Federal Employment," September 24, 1965, 42 U.S.C. § 2000e note, as amended by any later Executive Order that amends or supersedes it, referenced in 42 U.S.C. § 2000e note. Principal Project Company agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, national origin, or sex (including sexual orientation and gender identity). Such action shall include, but not be limited to, the following: employment, promotion, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, Principal Project Company agrees to comply with any implementing requirements FTA may issue.
- (c) **Nondiscrimination – Title VI of the Civil Rights Act.** Principal Project Company will:
  - (i) prohibit discrimination based on race, color, or national origin;

- 
- (ii) comply with: (A) Title VI of the Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000d, et seq.; (B) U.S. DOT regulations, “Nondiscrimination in Federally-Assisted Programs of the Department of Transportation – Effectuation of Title VI of the Civil Rights Act of 1964,” 49 C.F.R. Part 21; and (C) Federal transit law, specifically 49 U.S.C. § 5332; and
  - (iii) follow: (A) The most recent edition of FTA Circular 4702.1, “Title VI Requirements and Guidelines for Federal Transit Administration Recipients,” to the extent consistent with applicable federal laws, regulations, requirements, and guidance; (B) U.S. DOJ, “Guidelines for the enforcement of Title VI, Civil Rights Act of 1964,” 28 C.F.R. § 50.3; and (C) All other applicable federal guidance that may be issued.

For more information on Title VI of the Civil Rights Act requirements, Principal Project Company shall review City’s Title VI Program developed for the Project to comply with Title VI of the Civil Rights Act of 1964.

- (d) **Age.** In accordance with the Age Discrimination in Employment Act, 29 U.S.C. §§ 621- 634, U.S. Equal Employment Opportunity Commission (U.S. EEOC) regulations, “Age Discrimination in Employment Act,” 29 C.F.R. part 1625, the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6101 et seq., U.S. Health and Human Services regulations, “Nondiscrimination on the Basis of Age in Programs or Activities Receiving Federal Financial Assistance,” 45 C.F.R. part 90, and Federal transit law at 49 U.S.C. § 5332, Principal Project Company agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, Principal Project Company agrees to comply with any implementing requirements FTA may issue.
- (e) **Disabilities.** In accordance with section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794, the Americans with Disabilities Act of 1990, as amended, 42 U.S.C. § 12101 et seq., the Architectural Barriers Act of 1968, as amended, 42 U.S.C. § 4151 et seq., and Federal transit law at 49 U.S.C. § 5332, Principal Project Company agrees that it will not discriminate against individuals on the basis of disability. In addition, Principal Project Company agrees to comply with any implementing requirements FTA may issue.
- (f) **Department of Transportation Funding Requirements.** To ensure compliance with requirements applicable to agreements funded in whole or in part by USDOT funds the following requirements shall apply to this Agreement:
  - (i) Principal Project Company and each Contractor shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of this Agreement.
  - (ii) Principal Project Company and each Contractor shall carry out applicable requirements of 49 C.F.R. Part 26, and shall take all necessary and reasonable steps under 49 C.F.R. Part 26 to ensure nondiscrimination in the award and administration of USDOT-assisted Contracts.

- 
- (iii) Failure by Principal Project Company and any of its Contractors to carry out the requirements of this Section 6(f) (Department of Transportation Funding Requirements) is a material breach of this Agreement, which may result in the termination of this Agreement or such other remedy as the City deems appropriate, which may include but which are not limited to: withholding of monthly payments, assessment of sanctions, liquidated damages, and/or disqualifying Principal Project Company from future work as non-responsible.

**7. SPECIAL DEPARTMENT OF LABOR EQUAL EMPLOYMENT OPPORTUNITY  
CLAUSE FOR CONSTRUCTION PROJECTS**

During the performance of this Agreement, Principal Project Company agrees as follows:

- (a) Principal Project Company will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. Principal Project Company will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Principal Project Company agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- (b) Principal Project Company will, in all solicitations or advertisements for employees placed by or on behalf of Principal Project Company, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.
- (c) Principal Project Company will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with Principal Project Company's legal duty to furnish information.
- (d) Principal Project Company will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of Principal Project Company's commitments under this section,

and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

- (e) Principal Project Company will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (f) Principal Project Company will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (g) In the event of Principal Project Company's noncompliance with the nondiscrimination clauses of this Agreement or with any of the said rules, regulations, or orders, this Agreement may be canceled, terminated, or suspended in whole or in part and Principal Project Company may be declared ineligible for further government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- (h) Principal Project Company will include the portion of the sentence immediately preceding paragraph (a) and the provisions of paragraphs (a) through (h) in every Contract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each Contractor or vendor. Principal Project Company will take such action with respect to any Contract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided*, however, that in the event Principal Project Company becomes involved in, or is threatened with, litigation with a Contractor or vendor as a result of such direction by the administering agency, Principal Project Company may request the United States to enter into such litigation to protect the interests of the United States.

## 8. DISADVANTAGED BUSINESS ENTERPRISES (DBES)

49 C.F.R. part 26

- (a) **DBE Goals.** City will establish a DBE Program and DBE Program goals for the Project, and will be required to report on DBE participation on a semi-annual basis so that its attainment efforts may be evaluated. Such requirements are in addition to all other equal opportunity employment requirements of this Agreement. Principal Project Company shall comply with the DBE goals that City establishes for the Project and this Agreement.
- (b) **Post-Award Compliance Monitoring.** City will conduct post-award monitoring of Principal Project Company's compliance with the DBE provisions of this

Agreement. Principal Project Company shall cooperate with City requests for assistance with post-award monitoring. Principal Project Company shall maintain records sufficient to document, on an ongoing basis, name of each DBE Contractor, work assignment of each DBE Contractor, DBE commitments, amounts paid to each DBE Contractor during the reporting period, amounts paid to each DBE Contractor as a percentage of the total commitment to each DBE Contractor, etc., among other information. Principal Project Company will be required to submit supplemental reports on a monthly basis including a monthly DBE report and forecast chart showing planned and actual attainment of DBE Contractors.

- (c) **California Unified Certification Program.** Principal Project Company shall only use, and City shall only accept the use of, DBEs that are certified through the California Unified Certification Program.
- (d) **Listed DBEs.** Principal Project Company shall utilize the specific DBEs listed in this Agreement unless Principal Project Company obtains City's written consent to terminate or substitute a DBE Contractor. Unless City's consent is provided, Principal Project Company shall not be entitled to any payment for work or material unless it is performed or supplied by the listed DBE.
- (e) **Access to Records.** City will require Principal Project Company and its Contractors to maintain records and documents of payments to DBEs for three years following the performance of the contract. These records will be made available for inspection upon request by any authorized representative of City or the USDOT. This reporting requirement also extends to any certified DBE Contractor. The authorized representative(s) of City, the USDOT, the Comptroller General of the United States, shall have the right to inspect and audit all data and records of Principal Project Company relating to its performance under this Article 8 (Disadvantaged Business Enterprises (DBEs)).
- (f) **Special Requirements for a Transit Vehicle Manufacturer.** The transit vehicle manufacturer, as a condition of being authorized to bid or propose on FTA-assisted transit vehicle procurements, must certify that it has complied with the requirements of 49 C.F.R. part 26.
- (g) **No Discrimination.** Principal Project Company and its Contractors shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Agreement. Principal Project Company shall carry out applicable requirements of 49 C.F.R. Part 26 in the award and administration of USDOT-assisted contracts. Failure by Principal Project Company to carry out these requirements is a material breach of this Agreement, which may result in the termination of this Agreement or such other remedy as City deems appropriate, which may include, but is not limited to:
  - (i) Withholding monthly progress payments;
  - (ii) Assessing sanction;
  - (iii) Liquidated damages; and/or

- 
- (iv) Disqualifying Principal Project Company from future bidding as non-responsible (49 C.F.R. § 26.13(b)).

## 9. INCORPORATION OF FTA TERMS

This Agreement includes, in part, certain standard terms and conditions required by the USDOT and FTA, whether or not expressly set forth in the preceding contract provisions. All contractual provisions required by the USDOT, as set forth in FTA Circular 4220.1F, dated November 1, 2008, as revised by Rev. 1, dated April 14, 2009, Rev. 2, dated July 1, 2010, Rev. 3, dated February 14, 2011, and Rev. 4, dated March 18, 2013, as may be amended, are hereby incorporated by reference. Principal Project Company shall comply with all applicable FTA regulations, policies, procedures and directives, including those listed directly in or referred to in the current FTA Master Agreement. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. Principal Project Company shall not perform any act, fail to perform any act, or refuse to comply with any City requests which would cause the City to be in violation of FTA terms and conditions. Principal Project Company will include these requirements in all Contracts issued pursuant to this Agreement.

## 10. DEBARMENT AND SUSPENSION

2 C.F.R. part 180  
2 C.F.R. part 1200  
2 C.F.R. § 200.213  
2 C.F.R. part 200 Appendix II (I)  
Executive Order 12549  
Executive Order 12689

Principal Project Company shall comply and facilitate compliance with USDOT regulations, “Non-procurement Suspension and Debarment,” 2 C.F.R. part 1200, which adopts and supplements the U.S. Office of Management and Budget (U.S. OMB) “Guidelines to Agencies on Government wide Debarment and Suspension (Non-procurement),” 2 C.F.R. part 180. These provisions apply to each contract at any tier of \$25,000 or more, and to each contract at any tier for a federally required audit (irrespective of the contract amount), and to each contract at any tier that must be approved by an FTA official irrespective of the contract amount. As such, Principal Project Company shall verify that its principals, Affiliates, and Contractors are eligible to participate in this federally funded contract and are not presently declared by any federal department or agency to be:

- (i) debarred from participation in any federally assisted award;
- (ii) suspended from participation in any federally assisted award;
- (iii) proposed for debarment from participation in any federally assisted award;
- (iv) declared ineligible to participate in any federally assisted award;
- (v) voluntarily excluded from participation in any federally assisted award; or

(vi) disqualified from participation in any federally assisted award.

The certification in this clause is a material representation of fact relied upon by City. If it is later determined by City that Principal Project Company knowingly rendered an erroneous certification, in addition to remedies available to City, the federal government may pursue available remedies, including but not limited to suspension and/or debarment. Principal Project Company agrees to comply with the requirements of 2 C.F.R. part 180, subpart C, as supplemented by 2 C.F.R. part 1200 throughout the period of any contract that may arise from this Agreement or the Project. Principal Project Company further agrees to include a provision requiring such compliance in its lower tier covered transactions and agreements.

## 11. BUY AMERICA

49 U.S.C. 5323(j)  
49 C.F.R. part 661  
Pub. L. No. 117-58, §§ 70901-17

Principal Project Company agrees to comply with 49 U.S.C. 5323(j), 49 C.F.R. part 661 and Pub. L. No. 117-58, §§ 70901-17, which provide that federal funds may not be obligated unless all steel, iron, and manufactured products used in FTA funded projects are produced in the United States and designated construction materials are manufactured in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 C.F.R. § 661.7. Separate requirements for rolling stock are set out at 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. § 661.11.

The Buy America requirements flow down from the City to Principal Project Company, which is responsible for ensuring that lower tier Contractors are in compliance.

***In accordance with 49 C.F.R. § 661.6, for the procurement of steel, iron, manufactured products or construction materials, use the certifications below.***

### *Certificate of Compliance with Buy America Requirements*

The bidder or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j)(1), the applicable regulations in 49 C.F.R. part 661 and Pub. L. No. 117-58, §§ 70901-17.

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Company: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

### *Certificate of Non-Compliance with Buy America Requirements*

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j), but it may qualify for an exception to the requirement pursuant to 49 U.S.C. 5323(j)(2),

---

as amended, the applicable regulations in 49 C.F.R. § 661.7 and Pub. L. No. 117-58, §§ 70901-17.

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Company: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

***In accordance with 49 C.F.R. § 661.12, for the procurement of rolling stock (including train control, communication, and traction power equipment), use the certifications below.***

*Certificate of Compliance with Buy America Rolling Stock Requirements*

The bidder or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j), and the applicable regulations in 49 C.F.R. § 661.11.

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Company: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

*Certificate of Non-Compliance with Buy America Rolling Stock Requirements*

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j), but it may qualify for an exception to the requirement pursuant to 49 U.S.C. 5323(j)(2)(C), as amended, and the applicable regulations in 49 C.F.R. § 661.7.

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Company: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**12. RESOLUTION OF DISPUTES, BREACHES, OR OTHER LITIGATION**

See Article 18 (Contract Dispute Procedures) of this Agreement.

---

**13. LOBBYING RESTRICTIONS**

31 U.S.C. § 1352  
2 C.F.R. § 200.450  
2 C.F.R. part 200 appendix II (J)  
49 C.F.R. part 20

Principal Project Company certifies, to the best of its knowledge and belief, that:

- (a) no federally appropriated funds have been paid or will be paid, by or on behalf of Principal Project Company, to any person for influencing or attempting to influence an officer or employee of an agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.
- (b) if any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, Principal Project Company shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (c) Principal Project Company shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including Contracts, sub-grants, and Subcontracts under grants, loans, and cooperative agreements) and that all sub recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

**14. CLEAN AIR ACT AND CLEAN WATER ACT**

42 U.S.C. §§ 7401 – 7671q  
33 U.S.C. §§ 1251-1387  
2 C.F.R. part 200, Appendix II (G)

The Clean Air and Federal Water Pollution Control Act requirements apply to each contract and subcontract exceeding \$150,000.

Principal Project Company agrees:

- (a) it will not use any violating facilities;

- (b) it will report the use of facilities placed on or likely to be placed on the U.S. EPA “List of Violating Facilities”;
- (c) it will report violations of use of prohibited facilities to the FTA; and
- (d) it will comply with the inspection and other requirements of the Clean Air Act, as amended, (42 U.S.C. §§ 7401 – 7671q) and the Federal Water Pollution Control Act, as amended, (33 U.S.C. §§ 1251-1387).

**15. FLY AMERICA**

49 U.S.C. § 40118  
41 C.F.R. part 301-10  
48 C.F.R. part 47.4

- (a) As used in this clause “international air transportation” means transportation by air between a place in the United States and a place outside the United States or between two places both of which are outside the United States. “United States” means the 50 States, the District of Columbia, and outlying areas. “U.S.-flag air carrier” means an air carrier holding a certificate under 49 U.S.C. Chapter 411.
- (b) When federal funds are used to fund travel, Section 5 of the International Air Transportation Fair Competitive Practices Act of 1974 (49 U.S.C. 40118) (Fly America Act) requires contractors, recipients, and others use U.S.-flag air carriers for U.S. government-financed international air transportation of personnel (and their personal effects) or property, to the extent that service by those carriers is available. It requires the Comptroller General of the United States, in the absence of satisfactory proof of the necessity for foreign-flag air transportation, to disallow expenditures from funds, appropriated or otherwise established for the account of the United States, for international air transportation secured aboard a foreign-flag air carrier if a U.S.-flag air carrier is available to provide such services.
- (c) if available, Principal Project Company, in performing work under this Agreement, shall use U.S.-flag carriers for international air transportation of personnel (and their personal effects) or property.
- (d) In the event that Principal Project Company selects a carrier other than a U.S.-flag air carrier for international air transportation, Principal Project Company shall include a statement on vouchers involving such transportation essentially as follows:

*Statement of Unavailability of U.S.-Flag Air Carriers*

*International air transportation of persons (and their personal effects) or property by U.S.-flag air carrier was not available or it was necessary to use foreign-flag air carrier service for the following reasons. See FAR § 47.403.*

*[State reasons]:* \_\_\_\_\_

*(End of statement)*

- 
- (e) Principal Project Company shall include the substance of this clause, including this paragraph (e), in each Contract or purchase under this Agreement that may involve international air transportation.

## **16. EMPLOYEE PROTECTIONS**

49 U.S.C. § 5333(a)  
40 U.S.C. §§ 3141-3148  
29 C.F.R. part 5  
18 U.S.C. § 847  
29 C.F.R. part 3  
40 U.S.C. §§ 3701-3708  
29 C.F.R. part 1926

### **16.1 PREVAILING WAGE AND COPELAND ANTI-KICKBACK ACT**

For all prime construction, alteration or repair contracts in excess of \$2,000 awarded by FTA, Principal Project Company shall comply with the Davis-Bacon Act and the Copeland “Anti-Kickback” Act. Under 49 U.S.C. § 5333(a), prevailing wage protections apply to laborers and mechanics employed on FTA assisted construction, alteration, or repair projects. Principal Project Company will comply with the Davis-Bacon Act, 40 U.S.C. §§ 3141-3144, and 3146-3148 as supplemented by DOL regulations at 29 C.F.R. part 5, “Labor Standards Provisions Applicable to Contracts Governing Federally Financed and Assisted Construction.” In accordance with the statute, Principal Project Company shall pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, Principal Project Company agrees to pay wages not less than once a week. Principal Project Company shall also comply with the Copeland “Anti-Kickback” Act (40 U.S.C. § 3145), as supplemented by DOL regulations at 29 C.F.R. part 3, “Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in part by Loans or Grants from the United States.” Principal Project Company is prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled.

### **16.2 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT**

For all contracts in excess of \$100,000 that involve the employment of mechanics or laborers, Principal Project Company shall comply with the Contract Work Hours and Safety Standards Act (40 U.S.C. §§ 3701-3708), as supplemented by the DOL regulations at 29 C.F.R. part 5. Under 40 U.S.C. § 3702 of the Act, Principal Project Company shall compute the wages of every mechanic and laborer, including watchmen and guards, on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. § 3704 and DOL regulations, “Recording and Reporting Occupational Injuries and Illnesses,” 29 C.F.R. part 1904; “Occupational Safety and Health Standards,” 29 C.F.R. part 1910; and “Safety and Health Regulations for Construction,” 29 C.F.R. part 1926 are applicable to construction work and provide that no laborer or mechanic be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchase of supplies or materials or articles ordinarily available on the open market, or to contracts for transportation or transmission of intelligence.

In the event of any violation of the clause set forth herein, Principal Project Company and any Contractor responsible therefor shall be liable for the unpaid wages. In addition, Principal Project Company and Contractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of this clause in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by this clause.

The FTA shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by Principal Project Company or any Contractor under this Agreement or any Contract entered into in furtherance thereof or any other federal contract with Principal Project Company, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by Principal Project Company, such sums as may be determined to be necessary to satisfy any liabilities of Principal Project Company or any Contractor for unpaid wages and liquidated damages as provided in this section.

Principal Project Company or any Contractor shall insert in any Contracts the clauses set forth in this section and also a clause requiring the Contractors to include these clauses in any lower tier Contracts. Principal Project Company shall be responsible for compliance by any Contractor or lower tier Contractor with the clauses set forth in this Agreement.

#### **Contract Work Hours and Safety Standards for Awards Not Involving Construction**

Principal Project Company shall comply with all federal laws, regulations, and requirements providing wage and hour protections for non-construction employees, in accordance with 40 U.S.C. § 3702, Contract Work Hours and Safety Standards Act, and other relevant parts of that Act, 40 U.S.C. § 3701 *et seq.*, and U.S. DOL regulations, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction (also Labor Standards Provisions Applicable to Non-construction Contracts Subject to the Contract Work Hours and Safety Standards Act)," 29 C.F.R. part 5.

Principal Project Company shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three (3) years from the completion of this Agreement for all laborers and mechanics, including guards and watchmen, working on this Agreement. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid.

Such records maintained under this paragraph shall be made available by Principal Project Company for inspection, copying, or transcription by authorized representatives of the FTA and the Department of Labor, and Principal Project Company will permit such representatives to interview employees during working hours on the job.

Principal Project Company shall require the inclusion of the language of this clause within Contracts of all tiers.

### **16.3 AWARDS INVOLVING COMMERCE**

Principal Project Company agrees to comply with the Fair Labor Standards Act (FLSA), 29 U.S.C. § 201 *et seq.* to the extent that the FLSA applies to employees performing work involving commerce, and as the federal government otherwise determines applicable.

### **17. BONDING REQUIREMENTS**

2 C.F.R. 200.326

See Section 10.2 (Performance Security) of this Agreement.

### **18. SEISMIC SAFETY**

42 U.S.C. 7701 *et seq.*

49 C.F.R. part 41

Executive Order (E.O.) 12699

Principal Project Company agrees that any new building or addition to an existing building will be designed and constructed in accordance with the standards for seismic safety required in Department of Transportation (DOT) seismic safety regulations 49 C.F.R. part 41 and will certify to compliance to the extent required by the regulation. Principal Project Company also agrees to ensure that all work performed under this Agreement, including work performed by a Contractor, is in compliance with the standards required by the seismic safety regulations and the certification of compliance issued on the project.

### **19. ENERGY CONSERVATION**

42 U.S.C. 6321 *et seq.*

49 C.F.R. part 622, subpart C

These requirements apply to Principal Project Company and extend to all third-party contractors and their contracts at every tier and sub-recipients and their subcontracts at every tier.

Principal Project Company agrees to comply with mandatory standards and policies relating to energy efficiency, which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

### **20. RECYCLED PRODUCTS**

42 U.S.C. § 6962

40 C.F.R. part 247

2 C.F.R. part § 200.322

These requirements apply to Principal Project Company and extend to all third-party contractors and their contracts and subcontracts at every tier where the value of an EPA designated item exceeds \$10,000.

Principal Project Company agrees to provide a preference for those products and services that conserve natural resources, protect the environment, and are energy efficient by complying with

and facilitating compliance with Section 6002 of the Resource Conservation and Recovery Act, as amended, 42 U.S.C. § 6962, and U.S. Environmental Protection Agency (U.S. EPA), “Comprehensive Procurement Guideline for Products Containing Recovered Materials,” 40 C.F.R. part 247.

## 21. ADA ACCESS

Federal Protections for Individuals with Disabilities. The Americans with Disabilities Act of 1990, as amended (ADA), 42 U.S.C. Sections 12101 *et seq.*, prohibits discrimination against qualified individuals with disabilities in programs, activities, and services, and imposes specific requirements on public and private entities. Principal Project Company must comply with its responsibilities under Titles I, II, III, IV, and V of the ADA in employment, public services, public accommodations, telecommunications, and other provisions, many of which are subject to regulations issued by other federal agencies.

## 22. SAFE OPERATION OF MOTOR VEHICLES

23 U.S.C. part 402  
Executive Order No. 13043  
Executive Order No. 13513  
U.S. DOT Order No. 3902.10

The Safe Operation of Motor Vehicles requirements shall apply to Principal Project Company and all Contractors at every tier.

- (a) **Seat Belt Use.** Principal Project Company is encouraged to adopt and promote on-the-job seat belt use policies and programs for its employees and other personnel that operate company-owned vehicles, company-rented vehicles, or personally operated vehicles. The terms “company-owned” and “company-leased” refer to vehicles owned or leased either by Principal Project Company or City.
- (b) **Distracted Driving.** Principal Project Company agrees to adopt and enforce workplace safety policies to decrease crashes caused by distracted drivers, including policies to ban text messaging while using an electronic device supplied by an employer, and driving a vehicle the driver owns or rents, a vehicle Principal Project Company or Contactor owns, leases, or rents, or a privately-owned vehicle when on official business in connection with the work performed under this Agreement.

## 23. ENVIRONMENTAL PROTECTIONS

- (a) **General.** Principal Project Company will comply with all applicable environmental and resource use laws, regulations, and requirements, and follow applicable guidance, now in effect or that may become effective in the future, including state and local laws, ordinances, regulations, and requirements and follow applicable guidance.
- (b) **National Environmental Policy Act.** An award of federal assistance requires the full compliance with applicable environmental laws, regulations, and requirements. Accordingly, Principal Project Company shall:

- 
- (i) comply and facilitate compliance with federal laws, regulations, and requirements, including, but not limited to: (A) federal transit laws, such as 49 U.S.C. § 5323(c)(2), and 23 U.S.C. § 139; (B) the National Environmental Policy Act of 1969 (NEPA), as amended, 42 U.S.C. §§ 4321, et seq., as limited by 42 U.S.C. § 5159, and CEQ's implementing regulations 40 C.F.R. Part 1500 – 1508; (C) Joint FHWA and FTA regulations, "Environmental Impact and Related Procedures," 23 C.F.R. Part 771 and 49 C.F.R. Part 622; (D) Executive Order No. 11514, as amended, "Protection and Enhancement of Environmental Quality," March 5, 1970, 42 U.S.C. § 4321 note (35 Fed. Reg. 4247); and (E) other federal environmental protection laws, regulations, and requirements applicable to City or the Project.
  - (ii) follow the federal guidance identified herein to the extent that the guidance is consistent with applicable authorizing legislation: (A) Joint FHWA and FTA final guidance, "Interim Guidance on MAP-21 Section 1319, Accelerated Decision-making in Environmental Reviews," January 14, 2013; (B) Joint FHWA and FTA final guidance, "SAFETEA-LU Environmental Review Process (Public Law 109-59)," 71 Fed. Reg. 66576, November 15, 2006; and (C) other federal environmental guidance applicable to the Project.
- (c) **Environmental Justice.** Principal Project Company will promote environmental justice by following:
- (i) Executive Order No. 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," February 11, 1994, 42 U.S.C. § 4321 note, (59 Fed. Reg. 7629, 3 C.F.R. 1994 Comp., p. 859) as well as facilitating compliance with that Executive Order;
  - (ii) U.S. DOT Order 5610.2(a), "Department of Transportation Updated Environmental Justice Order," 77 Fed. Reg. 27534, November 8, 2012; and
  - (iii) the most recent edition of FTA Circular 4703.1, "Environmental Justice Policy Guidance for Federal Transit Administration Recipients," August 15, 2012, to the extent consistent with applicable federal laws, regulations, requirements, and guidance.
- (d) **Other Environmental Federal Laws.** Principal Project Company will comply or facilitate compliance with all applicable federal laws, regulations, and requirements, and will follow applicable guidance, including, but not limited to, the Clean Air Act, Clean Water Act, Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§ 1271-1287), Coastal Zone Management Act of 1972, the Endangered Species Act of 1973, Magnuson Stevens Fishery Conservation and Management Act, Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation, and Liability Act, Executive Order No. 11990 relating to "Protection of Wetlands," and Executive Order No. 11988, as amended, "Floodplain Management."

- 
- (e) **Use of Certain Public Lands.** Principal Project Company will comply with USDOT laws, specifically 49 U.S.C. § 303 (often referred to as “section 4(f)”), and joint FHWA and FTA regulations, “Parks, Recreation Areas, Wildlife and Waterfowl Refuges, and Historic Sites,” 23 C.F.R. Part 774, and referenced in 49 C.F.R. Part 622.
- (f) **Historic Preservation.** Principal Project Company will:
- (i) comply with USDOT laws, including 49 U.S.C. § 303 (often referred to as “section 4(f)”), which requires certain findings be made before an award may be undertaken if it involves the use of any land from a historic site that is on or eligible for inclusion on the National Register of Historic Places;
  - (ii) encourage compliance with the federal historic and archaeological preservation requirements of section 106 of the National Historic Preservation Act, as amended, 54 U.S.C. § 306108;
  - (iii) comply with the Archeological and Historic Preservation Act of 1974, as amended, 54 U.S.C. § 312501, et seq.;
  - (iv) comply with U.S. Advisory Council on Historic Preservation regulations, “Protection of Historic Properties,” 36 C.F.R. Part 800; and
  - (v) comply with federal requirements and follow federal guidance to avoid or mitigate adverse effects on historic properties.
- (g) **Indian Sacred Sites.** Principal Project Company will facilitate compliance with federal efforts to promote the preservation of places and objects of religious importance to American Indians, Eskimos, Aleuts, and Native Hawaiians, and facilitate compliance with the American Indian Religious Freedom Act, 42 U.S.C. § 1996, and Executive Order No. 13007, “Indian Sacred Sites,” May 24, 1996, 42 U.S.C. § 3161 note (61 Fed. Reg. 26771).

## 24. FEDERAL TAX LIABILITY AND RECENT FELONY CONVICTIONS

- (a) **Transactions Prohibited.** Principal Project Company must certify that it:
- (i) does not have any unpaid federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with City responsible for collecting the tax liability; and
  - (ii) was not convicted of the felony criminal violation under any federal law within the preceding 24 months from the Effective Date.
- (b) If Principal Project Company cannot so certify, City agrees to refer the matter to FTA and not to enter into any contract with Principal Project Company without FTA’s written approval. Principal Project Company shall include this requirement in Contracts at all lower tiers, without regard to the value of such Contracts.

---

## 25. NOTIFICATION TO FTA

If a current or prospective legal matter that may affect the federal government emerges, Principal Project Company must notify City, who will promptly notify the FTA Chief Counsel and FTA Regional Counsel for the region in which City is located. Principal Project Company must include a similar notification requirement in its sub-agreements at every tier, for any agreement that is a “covered transaction” according to 2 C.F.R. §§ 180.220 and 1200.220.

- (a) **Types.** The types of legal matters that require notification include, but are not limited to, a major dispute, breach, default, litigation, or naming any federal government as a party to litigation or a legal disagreement in any forum for any reason.
- (b) **Matters.** Matters that may affect any federal government include, but are not limited to, the federal government’s interests in the award, this Agreement, and any amendments thereto, or the any federal government’s administration or enforcement of federal laws, regulations, and requirements.
- (c) **Additional Notice to U.S. DOT Inspector General.** Principal Project Company must notify City, who will promptly notify the USDOT Inspector General in addition to the FTA Chief Counsel or Regional Counsel for the Region in which City is located, if Principal Project Company has knowledge of potential fraud, waste, or abuse occurring on a project receiving assistance from FTA. The notification provision applies if a person has or may have submitted a false claim under the False Claims Act, 31 U.S.C. § 3729, et seq., or has or may have committed a criminal or civil violation of law pertaining to such matters as fraud, conflict of interest, bid rigging, misappropriation or embezzlement, bribery, gratuity, or similar misconduct involving federal assistance. This responsibility occurs whether the Project is subject to any agreement between City and FTA. Knowledge, as used in this paragraph, includes, but is not limited to, knowledge of a criminal or civil investigation by a federal, state, or local law enforcement or other investigative agency, a criminal indictment or civil complaint, or probable cause that could support a criminal indictment, or any other credible information in the possession of Principal Project Company. In this paragraph, “promptly” means to refer information without delay and without change.

## 26. PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

- (a) Pursuant to section 889 of the National Defense Authorization Act of 2019 (H.R. 5515 at pp. 282-284; Pub. L. 115-232) (NDAA), and as promulgated at 2 C.F.R. § 200.216, Principal Project Company and any Contractor at any tier shall not procure or obtain the Covered Equipment and Services in the performance of work for the Project or in connection with this Agreement.
- (b) “Covered Equipment and Services” is defined to include any telecommunication or video surveillance equipment, systems, or services produced or provided by any of the following entities, or any subsidiary or affiliate of the following entities:
  - (i) Huawei Technologies Company;

- 
- (ii) ZTE Corporation;
  - (iii) Hytera Communications Corporation;
  - (iv) Hangzhou Hikivision Digital Technology Company;
  - (v) Dahua Technology Company; and
  - (vi) any entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.
- (c) The burden of proof for the origin or place of production of telecommunications or video surveillance equipment, systems, or services is the responsibility of Principal Project Company.
  - (d) Prior to the use of any telecommunication or video surveillance equipment, systems, or services pursuant to this Agreement, Principal Project Company shall furnish a certification to City stating that the telecommunication or video surveillance equipment, systems, or services are not Covered Equipment and Services pursuant to this Article 26 (Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment), 2 C.F.R. § 200.216, and the NDAA.

## **27. SENSITIVE SECURITY INFORMATION**

Principal Project Company must protect, and take measures to ensure that its Contractors at each tier protect “sensitive security information” made available during the administration of this Agreement or any Contract to ensure compliance with 49 U.S.C. Section 40119(b) and implementing USDOT regulations, “Protection of Sensitive Security Information,” 49 C.F.R. Part 15, and with 49 U.S.C. Section 114(r) and implementing Department of Homeland Security regulations, “Protection of Sensitive Security Information,” 49 C.F.R. Part 1520.

## **28. FLOOD INSURANCE**

Principal Project Company agree to comply with flood insurance laws and guidance as follows:

- (a) It will have flood insurance as required by the Flood Disaster Protection Act of 1973, 42 U.S.C. § 4012a(a), for any building located in a special flood hazard area (100-year flood zone), before accessing federal assistance to acquire, construct, reconstruct, repair, or improve that building.
- (b) Each such building and its contents will be covered by flood insurance in an amount at least equal to the federal investment (less estimated land cost) or to the maximum limit of coverage made available with respect to the particular type of property under the National Flood Insurance Act of 1968, 42 U.S.C. § 4001, et seq., whichever is less.

- 
- (c) It will follow FTA guidance, except to the extent FTA determines otherwise in writing.

## 29. PROMPT PAYMENT AND RETENTION

- (a) **Payment of Contractors.** Principal Project Company shall pay its Contractors within 30 calendar days from receipt of each payment made to Principal Project Company by City or any Lender. The 30 calendar days is applicable unless a shorter time period controls as provided in Section 9.4 (Prompt Payment to Contractors) of this Agreement. Any delay or postponement of payment over 30 calendar days (or any controlling shorter period) may occur only for good cause and with the prior written approval of City.
- (b) **Retention of Funds.**
  - (i) No standard retention will be withheld by City from payments due to Principal Project Company.
  - (ii) Any retention withheld by Principal Project Company or Contractors from Progress Payments due applicable Contractors shall be promptly paid in full to Contractors within 30 days (or any shorter time period that controls as provided in Section 9.4 (Prompt Payment to Contractors) of this Agreement) after the Contractor's work is satisfactorily completed. Principal Project Company shall assure that each Contract contains a clause obligating Principal Project Company or the applicable Contractor to make prompt and full payment of any retention kept by Principal Project Company or the applicable Contractor to the Subcontractor within such time period. For this purpose, a Contractor's work is satisfactorily completed when all the tasks called for in the Contract have been accomplished and documented as required by City.
- (c) When City has made an incremental acceptance of a portion of the D&C Work, the Work of a Contractor covered by that acceptance is deemed to be satisfactorily completed. These requirements shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to Principal Project Company or Contractor in the event of a dispute involving late payment or nonpayment by Principal Project Company, deficient Contractor performance, or noncompliance by a Contractor.
- (d) This Section applies to both DBE and non-DBE Contractors.

**EXHIBIT 16B**

**STATE REQUIREMENTS**

Principal Project Company shall perform its obligations under the Contract Documents in accordance with the following requirements.

**1. LABOR CODE REQUIREMENTS**

**1.1 Worker's Compensation**

Principal Project Company shall comply with the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and to secure the payment of compensation to his or her employees. Before commencing the Work, Principal Project Company and Contractors will sign and file a certification with City under Labor Code Section 1861 stating the following:

*I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of any work or services under the Agreement, any contract or subcontract.*

**1.2 Prevailing Wages**

Pursuant to the provisions of Section 1773 of the State Labor Code, City has obtained the general prevailing rate of wages (which rate includes employer payments for health and welfare, pension, vacation, travel time and subsistence pay as provided for in Section 1773.8 of said Code, apprenticeship or other training programs authorized by Section 3093 of said Code, and similar purposes) applicable to the Work to be done, for straight time, overtime, Saturday, Sunday, and holiday work. The holiday wage rate listed shall be applicable to all holidays recognized in the collective bargaining agreement of the particular craft, classification or type of worker concerned. Said prevailing wage rates are incorporated herein by reference. These prevailing rates of wages will be furnished to Principal Project Company and other interested parties on request and are on file at City's offices. These wage rates are also available through the California State Department of Industrial Relations at <http://www.dir.ca.gov>. For crafts or classifications not shown on the prevailing wage determinations, Principal Project Company may be required to pay the wage rate of the most closely related craft or classification shown in such determinations for the Work. Principal Project Company shall post a copy of the prevailing wage rates at the jobsite or material staging area. Workers employed in the Work must be paid at the rates at least equal to the prevailing wage rates as adopted. This Agreement is also subject to federal requirements for payment of prevailing wages as determined by the Secretary of Labor. Where there are differences in the rates, the higher shall apply.

**1.3 Hours of Work/Overtime Requirements**

Eight hours labor constitutes a legal day's work. Neither Principal Project Company nor any Contractor shall require or permit any worker to work in excess of eight hours in any one

calendar day or in excess of 40 hours in any one calendar week (defined as seven sequential calendar days) unless such worker receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of eight hours in any one calendar day or in excess of 40 hours in any one calendar week, whichever is greater. Failure to comply with the preceding requirements shall subject Principal Project Company to the penalties specified in Labor Code Section 1813.

#### **1.4 Payroll Records**

- (a) Principal Project Company and each Contractor performing any portion of the Work under this Agreement shall keep an accurate payroll record as required by Law (California Labor Code Section 1776), including showing the name, address, social security number, work classification, straight time and overtime hours for each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, professional, salaried, or other employee employed by him or her in connection with the Work.
- (b) The payroll records of Principal Project Company and each Contractor (including payroll records for professional or salaried employees) shall be certified and shall be available for inspection at the principal office of Principal Project Company.
- (c) Principal Project Company shall file a certified copy of the payroll records (including those applicable to professional and salaried employees) with City within 10 days after receipt of a written request from City.
- (d) Principal Project Company shall inform City of the location of said payroll records, including the street address, city and county, and shall, within five days, provide a Notice of change of location and address of said payroll records.
- (e) It shall be the responsibility of Principal Project Company to ensure compliance for itself and the Contractors with the provisions of this section.
- (f) In the event of noncompliance with the requirements of this section, Principal Project Company shall have 10 days in which to comply subsequent to receipt of written Notice specifying in what respect it must comply. Should noncompliance exist after the said 10-day period, Principal Project Company shall be subject to a fee of \$50.00 for each day, or portion thereof, for each worker to whom the noncompliance pertains, until strict compliance is effectuated. Principal Project Company acknowledges that, without limitation as to other remedies of enforcement available to City, upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement of the California Department of Industrial Relations, such penalties shall be withheld from payments due Principal Project Company.
- (g) Certified payroll records shall be submitted to City by Principal Project Company and all Contractors performing work on the Project regardless of dollar amount or type of contract.
- (h) The period covered shall be from the time Work starts until all Work is completed on the Project. Failure to submit said certified payrolls on time may result in the

withholding of payments to Principal Project Company and the assessment of penalties as set forth in the California Labor Code.

## 1.5 Specific Labor Code Provisions

Principal Project Company's attention is directed to the following requirements of the Labor Code. Principal Project Company shall cause Contractors to insert in any Contracts a copy of each such Code section and shall also cause Subcontractors to include these clauses in any lower tier Subcontracts. Principal Project Company shall be responsible for the compliance by any Contractor or Subcontractor with the clauses set forth in this Section 1.5 (Specific Labor Code Provisions), as may be amended and updated from time to time.

### **Labor Code Section 1725.5**

1725.5. A contractor shall be registered pursuant to this section to be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any public work contract that is subject to the requirements of this chapter. For the purposes of this section, "contractor" includes a subcontractor as defined by Section 1722.1.

(a) To qualify for registration under this section, a contractor shall do all of the following:

(1) (A) Register with the Department of Industrial Relations in the manner prescribed by the department and pay an initial nonrefundable application fee of four hundred dollars (\$400) to qualify for registration under this section and an annual renewal fee on or before July 1 of each year thereafter. The annual renewal fee shall be in a uniform amount set by the Director of Industrial Relations, and the initial registration and renewal fees may be adjusted no more than annually by the director to support the costs specified in Section 1771.3.

(B) Beginning June 1, 2019, a contractor may register or renew according to this subdivision in annual increments up to three years from the date of registration. Contractors who wish to do so will be required to prepay the applicable nonrefundable application or renewal fees to qualify for the number of years for which they wish to preregister.

(2) Provide evidence, disclosures, or releases as are necessary to establish all of the following:

(A) Workers' compensation coverage that meets the requirements of Division 4 (commencing with Section 3200) and includes sufficient coverage for any worker whom the contractor employs to perform work that is subject to prevailing wage requirements other than a contractor who is separately registered under this section. Coverage may be evidenced by a current and valid certificate of workers' compensation insurance or certification of self-insurance required under Section 7125 of the Business and Professions Code.

(B) If applicable, the contractor is licensed in accordance with Chapter 9 (commencing with Section 7000) of the Business and Professions Code.

(C) The contractor does not have any delinquent liability to an employee or the state for any assessment of back wages or related damages, interest, fines, or penalties pursuant to any final judgment, order, or determination by a court or any federal, state, or local administrative agency, including a confirmed arbitration award. However, for purposes of this paragraph, the contractor shall not be disqualified for any judgment, order, or determination that is under appeal, provided that the contractor has secured the payment of any amount eventually found due through a bond or other appropriate means.

(D) The contractor is not currently debarred under Section 1777.1 or under any other federal or state law providing for the debarment of contractors from public works.

(E) The contractor has not bid on a public works contract, been listed in a bid proposal, or engaged in the performance of a contract for public works without being lawfully registered in accordance with this section, within the preceding 12 months or since the effective date of the requirements set forth in subdivision (e), whichever is earlier. If a contractor is found to be in violation of the requirements of this paragraph, the period of disqualification shall be waived if both of the following are true:

(i) The contractor has not previously been found to be in violation of the requirements of this paragraph within the preceding 12 months.

(ii) The contractor pays an additional nonrefundable penalty registration fee of two thousand dollars (\$2,000).

(b) Fees received pursuant to this section shall be deposited in the State Public Works Enforcement Fund established by Section 1771.3 and shall be used only for the purposes specified in that section.

(c) A contractor who fails to pay the renewal fee required under paragraph (1) of subdivision (a) on or before the expiration of any prior period of registration shall be prohibited from bidding on or engaging in the performance of any contract for public work until once again registered pursuant to this section. If the failure to pay the renewal fee was inadvertent, the contractor may renew its registration retroactively by paying an additional nonrefundable penalty renewal fee equal to the amount of the renewal fee within 90 days of the due date of the renewal fee.

(d) If, after a body awarding a contract accepts the contractor's bid or awards the contract, the work covered by the bid or contract is determined to be a public work to which Section 1771 applies, either as the result of a determination by the director pursuant to Section 1773.5 or a court decision, the requirements of this section shall not apply, subject to the following requirements:

(1) The body that awarded the contract failed, in the bid specification or in the contract documents, to identify as a public work that portion of the work that the determination or decision subsequently classifies as a public work.

(2) Within 20 days following service of notice on the awarding body of a determination by the Director of Industrial Relations pursuant to Section 1773.5 or a decision by a court that the contract was for public work as defined in this chapter, the contractor and any

subcontractors are registered under this section or are replaced by a contractor or subcontractors who are registered under this section.

(3) The requirements of this section shall apply prospectively only to any subsequent bid, bid proposal, contract, or work performed after the awarding body is served with of the determination or decision referred to in paragraph (2).

(e) The requirements of this section shall apply to any bid proposal submitted on or after March 1, 2015, to any contract for public work, as defined in this chapter, executed on or after April 1, 2015, and to any work performed under a contract for public work on or after January 1, 2018, regardless of when the contract for public work was executed.

(f) This section does not apply to work performed on a public works project of twenty-five thousand dollars (\$25,000) or less when the project is for construction, alteration, demolition, installation, or repair work or to work performed on a public works project of fifteen thousand dollars (\$15,000) or less when the project is for maintenance work.

#### **Labor Code Section 1735**

1735. A contractor shall not discriminate in the employment of persons upon public works on any basis listed in subdivision (a) of Section 12940 of the Government Code, as those bases are defined in Sections 12926 and 12926.1 of the Government Code, except as otherwise provided in Section 12940 of the Government Code. Every contractor for public works who violates this section is subject to all the penalties imposed for a violation of this chapter.

#### **Labor Code Section 1771**

1771. Except for public works projects of one thousand dollars (\$1,000) or less, not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the public work is performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed as provided in this chapter, shall be paid to all workers employed on public works.

This section is applicable only to work performed under contract, and is not applicable to work carried out by a public agency with its own forces. This section is applicable to contracts let for maintenance work.

#### **Labor Code Section 1771.1**

1771.1 (a) A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section

10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

(b) Notice of the requirement described in subdivision (a) shall be included in all bid invitations and public works contracts, and a bid shall not be accepted nor any contract or subcontract entered into without proof of the contractor or subcontractor's current registration to perform public work pursuant to Section 1725.5.

(c) An inadvertent error in listing a subcontractor who is not registered pursuant to Section 1725.5 in a bid proposal shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive, provided that any of the following apply:

(1) The subcontractor is registered prior to the bid opening.

(2) Within 24 hours after the bid opening, the subcontractor is registered and has paid the penalty registration fee specified in subparagraph (E) of paragraph (2) of subdivision (a) of Section 1725.5.

(3) The subcontractor is replaced by another registered subcontractor pursuant to Section 4107 of the Public Contract Code.

(d) Failure by a subcontractor to be registered to perform public work as required by subdivision (a) shall be grounds under Section 4107 of the Public Contract Code for the contractor, with the consent of the awarding authority, to substitute a subcontractor who is registered to perform public work pursuant to Section 1725.5 in place of the unregistered subcontractor.

(e) The department shall maintain on its Internet Web site a list of contractors who are currently registered to perform public work pursuant to Section 1725.5.

(f) A contract entered into with any contractor or subcontractor in violation of subdivision (a) shall be subject to cancellation, provided that a contract for public work shall not be unlawful, void, or voidable solely due to the failure of the awarding body, contractor, or any subcontractor to comply with the requirements of Section 1725.5 or this section.

(g) If the Labor Commissioner or his or her designee determines that a contractor or subcontractor engaged in the performance of any public work contract without having been registered in accordance with this section, the contractor or subcontractor shall forfeit, as a civil penalty to the state, one hundred dollars (\$100) for each day of work performed in violation of the registration requirement, not to exceed an aggregate penalty of eight thousand dollars (\$8,000) in addition to any penalty registration fee assessed pursuant to clause (ii) of subparagraph (E) of paragraph (2) of subdivision (a) of Section 1725.5.

(h) (1) In addition to, or in lieu of, any other penalty or sanction authorized pursuant to this chapter, a higher tiered public works contractor or subcontractor who is found to have entered into a subcontract with an unregistered lower tier subcontractor to perform any public work in violation of the requirements of Section 1725.5 or this section shall be subject to forfeiture, as a civil penalty to the state, of one hundred dollars (\$100) for each

day the unregistered lower tier subcontractor performs work in violation of the registration requirement, not to exceed an aggregate penalty of ten thousand dollars (\$10,000).

(2) The Labor Commissioner shall use the same standards specified in subparagraph (A) of paragraph (2) of subdivision (a) of Section 1775 when determining the severity of the violation and what penalty to assess, and may waive the penalty for a first time violation that was unintentional and did not hinder the Labor Commissioner's ability to monitor and enforce compliance with the requirements of this chapter.

(3) A higher tiered public works contractor or subcontractor shall not be liable for penalties assessed pursuant to paragraph (1) if the lower tier subcontractor's performance is in violation of the requirements of Section 1725.5 due to the revocation of a previously approved registration.

(4) A subcontractor shall not be liable for any penalties assessed against a higher tiered public works contractor or subcontractor pursuant to paragraph (1). A higher tiered public works contractor or subcontractor may not require a lower tiered subcontractor to indemnify or otherwise be liable for any penalties pursuant to paragraph (1).

(i) The Labor Commissioner or his or her designee shall issue a civil wage and penalty assessment, in accordance with the provisions of Section 1741, upon determination of penalties pursuant to subdivision (g) and subparagraph (B) of paragraph (1) of subdivision (h). Review of a civil wage and penalty assessment issued under this subdivision may be requested in accordance with the provisions of Section 1742. The regulations of the Director of Industrial Relations, which govern proceedings for review of civil wage and penalty assessments and the withholding of contract payments under Article 1 (commencing with Section 1720) and Article 2 (commencing with Section 1770), shall apply.

(j) (1) Where a contractor or subcontractor engages in the performance of any public work contract without having been registered in violation of the requirements of Section 1725.5 or this section, the Labor Commissioner shall issue and serve a stop order prohibiting the use of the unregistered contractor or the unregistered subcontractor on all public works until the unregistered contractor or unregistered subcontractor is registered. The stop order shall not apply to work by registered contractors or subcontractors on the public work.

(2) A stop order may be personally served upon the contractor or subcontractor by either of the following methods:

(A) Manual delivery of the order to the contractor or subcontractor personally.

(B) Leaving signed copies of the order with the person who is apparently in charge at the site of the public work and by thereafter mailing copies of the order by first class mail, postage prepaid to the contractor or subcontractor at one of the following:

(i) The address of the contractor or subcontractor on file with either the Secretary of State or the Contractors' State License Board.

(ii) If the contractor or subcontractor has no address on file with the Secretary of State or the Contractors' State License Board, the address of the site of the public work.

(3) The stop order shall be effective immediately upon service and shall be subject to appeal by the party contracting with the unregistered contractor or subcontractor, by the unregistered contractor or subcontractor, or both. The appeal, hearing, and any further review of the hearing decision shall be governed by the procedures, time limits, and other requirements specified in subdivision (a) of Section 238.1.

(4) Any employee of an unregistered contractor or subcontractor who is affected by a work stoppage ordered by the commissioner pursuant to this subdivision shall be paid at his or her regular hourly prevailing wage rate by that employer for any hours the employee would have worked but for the work stoppage, not to exceed 10 days.

(k) Failure of a contractor or subcontractor, owner, director, officer, or managing agent of the contractor or subcontractor to observe a stop order issued and served upon him or her pursuant to subdivision (j) is guilty of a misdemeanor punishable by imprisonment in county jail not exceeding 60 days or by a fine not exceeding ten thousand dollars (\$10,000), or both.

(l) This section shall apply to any bid proposal submitted on or after March 1, 2015, and any contract for public work entered into on or after April 1, 2015. This section shall also apply to the performance of any public work, as defined in this chapter, on or after January 1, 2018, regardless of when the contract for public work was entered.

(m) Penalties received pursuant to this section shall be deposited in the State Public Works Enforcement Fund established by Section 1771.3 and shall be used only for the purposes specified in that section.

(n) This section shall not apply to work performed on a public works project of twenty-five thousand dollars (\$25,000) or less when the project is for construction, alteration, demolition, installation, or repair work or to work performed on a public works project of fifteen thousand dollars (\$15,000) or less when the project is for maintenance work.

#### **Labor Code Section 1771.4**

1771.4 (a) All of the following are applicable to all public works projects that are otherwise subject to the requirements of this chapter:

(1) The call for bids and contract documents shall specify that the project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

(2) The awarding body shall post or require the prime contractor to post job site notices, as prescribed by regulation.

(3) Each contractor and subcontractor shall furnish the records specified in Section 1776 directly to the Labor Commissioner, in the following manner:

(A) At least monthly or more frequently if specified in the contract with the awarding body.

(B) In a format prescribed by the Labor Commissioner.

(4) If the contractor or subcontractor is not registered pursuant to Section 1725.5 and is performing work on a project for which registration is not required because of subdivision (f) of Section 1725.5, the unregistered contractor or subcontractor is not required to furnish the records specified in Section 1776 directly to the Labor Commissioner but shall retain the records specified in Section 1776 for at least three years after completion of the work.

(5) The department shall undertake those activities it deems necessary to monitor and enforce compliance with prevailing wage requirements.

(b) The Labor Commissioner may exempt a public works project from compliance with all or part of the requirements of subdivision (a) if either of the following occurs:

(1) The awarding body has enforced an approved labor compliance program, as defined in Section 1771.5, on all public works projects under its authority, except those deemed exempt pursuant to subdivision (a) of Section 1771.5, continuously since December 31, 2011.

(2) The awarding body has entered into a collective bargaining agreement that binds all contractors performing work on the project and that includes a mechanism for resolving disputes about the payment of wages.

(c) The requirements of paragraph (1) of subdivision (a) shall only apply to contracts for public works projects awarded on or after January 1, 2015.

(d) The requirements of paragraph (3) of subdivision (a) shall apply to all contracts for public work, whether new or ongoing, on or after January 1, 2016.

#### **Labor Code Section 1775**

1775. (a) (1) The contractor and any subcontractor under the contractor shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit not more than two hundred dollars (\$200) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rates as determined by the director for the work or craft in which the worker is employed for any public work done under the contract by the contractor or, except as provided in subdivision (b), by any subcontractor under the contractor.

(2) (A) The amount of the penalty shall be determined by the Labor Commissioner based on consideration of both of the following:

(i) Whether the failure of the contractor or subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected when brought to the attention of the contractor or subcontractor.

(ii) Whether the contractor or subcontractor has a prior record of failing to meet its prevailing wage obligations.

(B) (i) The penalty may not be less than forty dollars (\$40) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, unless the failure of the contractor or subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected when brought to the attention of the contractor or subcontractor.

(ii) The penalty may not be less than eighty dollars (\$80) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, if the contractor or subcontractor has been assessed penalties within the previous three years for failing to meet its prevailing wage obligations on a separate contract, unless those penalties were subsequently withdrawn or overturned.

(iii) The penalty may not be less than one hundred twenty dollars (\$120) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, if the Labor Commissioner determines that the violation was willful, as defined in subdivision (c) of Section 1777.1.

(C) If the amount due under this section is collected from the contractor or subcontractor, any outstanding wage claim under Chapter 1 (commencing with Section 1720) of Part 7 of Division 2 against that contractor or subcontractor shall be satisfied before applying that amount to the penalty imposed on that contractor or subcontractor pursuant to this section.

(D) The determination of the Labor Commissioner as to the amount of the penalty shall be reviewable only for abuse of discretion.

(E) The difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the contractor or subcontractor, and the body awarding the contract shall cause to be inserted in the contract a stipulation that this section will be complied with.

(b) If a worker employed by a subcontractor on a public works project is not paid the general prevailing rate of per diem wages by the subcontractor, the prime contractor of the project is not liable for any penalties under subdivision (a) unless the prime contractor had knowledge of that failure of the subcontractor to pay the specified prevailing rate of wages to those workers or unless the prime contractor fails to comply with all of the following requirements:

(1) The contract executed between the contractor and the subcontractor for the performance of work on the public works project shall include a copy of the provisions of Sections 1771, 1776, 1777.5, 1813, and 1815.

(2) The contractor shall monitor the payment of the specified general prevailing rate of per diem wages by the subcontractor to the employees, by periodic review of the certified payroll records of the subcontractor.

(3) Upon becoming aware of the failure of the subcontractor to pay his or her workers the specified prevailing rate of wages, the contractor shall diligently take corrective action to halt or rectify the failure, including, but not limited to, retaining sufficient funds due the subcontractor for work performed on the public works project.

(4) Prior to making final payment to the subcontractor for work performed on the public works project, the contractor shall obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor has paid the specified general prevailing rate of per diem wages to his or her employees on the public works project and any amounts due pursuant to Section 1813.

(c) The Division of Labor Standards Enforcement shall notify the contractor on a public works project within 15 days of the receipt by the Division of Labor Standards Enforcement of a complaint of the failure of a subcontractor on that public works project to pay workers the general prevailing rate of per diem wages.

#### **Labor Code Section 1777.5**

1777.5. (a) This chapter does not prevent the employment of properly registered apprentices upon public works.

(b) (1) Every apprentice employed upon public works shall be paid the prevailing rate of per diem wages for apprentices in the trade to which he or she is registered and shall be employed only at the work of the craft or trade to which he or she is registered.

(2) Unless otherwise provided by a collective bargaining agreement, when a contractor requests the dispatch of an apprentice pursuant to this section to perform work on a public works project and requires the apprentice to fill out an application or undergo testing, training, an examination, or other preemployment process as a condition of employment, the apprentice shall be paid for the time spent on the required preemployment activity, including travel time to and from the required activity, if any, at the prevailing rate of per diem wages for apprentices in the trade to which he or she is registered. Unless otherwise provided by a collective bargaining agreement, a contractor is not required to compensate an apprentice for the time spent on preemployment activities if the apprentice is required to take a preemployment drug or alcohol test and he or she fails to pass that test.

(c) Only apprentices, as defined in Section 3077, who are in training under apprenticeship standards that have been approved by the Chief of the Division of Apprenticeship Standards and who are parties to written apprentice agreements under Chapter 4 (commencing with Section 3070) of Division 3 are eligible to be employed at the apprentice wage rate on public works. The employment and training of each apprentice shall be in accordance with either of the following:

(1) The apprenticeship standards and apprentice agreements under which he or she is training.

(2) The rules and regulations of the California Apprenticeship Council.

(d) If the contractor to whom the contract is awarded by the state or any political subdivision, in performing any of the work under the contract, employs workers in any apprenticeable craft or trade, the contractor shall employ apprentices in at least the ratio set forth in this section and may apply to any apprenticeship program in the craft or trade that can provide apprentices to the site of the public work for a certificate approving the contractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected. However, the decision of the apprenticeship program to approve or deny a certificate shall be subject to review by the Administrator of Apprenticeship. The apprenticeship program or programs, upon approving the contractor, shall arrange for the dispatch of apprentices to the contractor. A contractor covered by an apprenticeship program's standards shall not be required to submit any additional application in order to include additional public works contracts under that program. "Apprenticeable craft or trade," as used in this section, means a craft or trade determined as an apprenticeable occupation in accordance with rules and regulations prescribed by the California Apprenticeship Council. As used in this section, "contractor" includes any subcontractor under a contractor who performs any public works not excluded by subdivision (o).

(e) Before commencing work on a contract for public works, every contractor shall submit contract award information to an applicable apprenticeship program that can supply apprentices to the site of the public work. The information submitted shall include an estimate of journeyman hours to be performed under the contract, the number of apprentices proposed to be employed, and the approximate dates the apprentices would be employed. A copy of this information shall also be submitted to the awarding body, if requested by the awarding body. Within 60 days after concluding work on the contract, each contractor and subcontractor shall submit to the awarding body, if requested, and to the apprenticeship program a verified statement of the journeyman and apprentice hours performed on the contract. The information under this subdivision shall be public. The apprenticeship programs shall retain this information for 12 months.

(f) The apprenticeship program supplying apprentices to the area of the site of the public work shall ensure equal employment and affirmative action in apprenticeship for women and minorities.

(g) The ratio of work performed by apprentices to journeymen employed in a particular craft or trade on the public work may be no higher than the ratio stipulated in the apprenticeship standards under which the apprenticeship program operates if the contractor agrees to be bound by those standards. However, except as otherwise provided in this section, in no case shall the ratio be less than one hour of apprentice work for every five hours of journeyman work.

(h) This ratio of apprentice work to journeyman work shall apply during any day or portion of a day when any journeyman is employed at the jobsite and shall be computed on the basis of the hours worked during the day by journeymen so employed. Any work performed by a journeyman in excess of eight hours per day or 40 hours per week shall not be used to calculate the ratio. The contractor shall employ apprentices for the number of hours computed as above before the end of the contract or, in the case of a subcontractor, before the end of the subcontract. However, the contractor shall endeavor, to the greatest extent possible, to employ apprentices during the same time period that

the journeymen in the same craft or trade are employed at the jobsite. When an hourly apprenticeship ratio is not feasible for a particular craft or trade, the Administrator of Apprenticeship, upon application of an apprenticeship program, may order a minimum ratio of not less than one apprentice for each five journeymen in a craft or trade classification.

(i) A contractor covered by this section who has agreed to be covered by an apprenticeship program's standards upon the issuance of the approval certificate, or who has been previously approved for an apprenticeship program in the craft or trade, shall employ the number of apprentices or the ratio of apprentices to journeymen stipulated in the applicable apprenticeship standards, but in no event less than the 1-to-5 ratio required by subdivision (g).

(j) Upon proper showing by a contractor that he or she employs apprentices in a particular craft or trade in the state on all of his or her contracts on an annual average of not less than one hour of apprentice work for every five hours of labor performed by journeymen, the Administrator of Apprenticeship may grant a certificate exempting the contractor from the 1-to-5 hourly ratio, as set forth in this section for that craft or trade.

(k) An apprenticeship program has the discretion to grant to a participating contractor or contractor association a certificate, which shall be subject to the approval of the Administrator of Apprenticeship, exempting the contractor from the 1-to-5 ratio set forth in this section when it finds that any one of the following conditions is met:

(1) Unemployment for the previous three-month period in the area exceeds an average of 15 percent.

(2) The number of apprentices in training in the area exceeds a ratio of 1 to 5.

(3) There is a showing that the apprenticeable craft or trade is replacing at least one-thirtieth of its journeymen annually through apprenticeship training, either on a statewide basis or on a local basis.

(4) Assignment of an apprentice to any work performed under a public works contract would create a condition that would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large, or the specific task to which the apprentice is to be assigned is of a nature that training cannot be provided by a journeyman.

(l) If an exemption is granted pursuant to subdivision (k) to an organization that represents contractors in a specific trade from the 1-to-5 ratio on a local or statewide basis, the member contractors shall not be required to submit individual applications for approval to local joint apprenticeship committees, if they are already covered by the local apprenticeship standards.

(m) (1) A contractor to whom a contract is awarded, who, in performing any of the work under the contract, employs journeymen or apprentices in any apprenticeable craft or trade shall contribute to the California Apprenticeship Council the same amount that the director determines is the prevailing amount of apprenticeship training contributions in the area of the public works site. A contractor may take as a credit for payments to the council any amounts paid by the contractor to an approved apprenticeship program that can

supply apprentices to the site of the public works project. The contractor may add the amount of the contributions in computing his or her bid for the contract.

(2) At the conclusion of the 2002–03 fiscal year and each fiscal year thereafter, the California Apprenticeship Council shall distribute training contributions received by the council under this subdivision, less the expenses of the Department of Industrial Relations for administering this subdivision, by making grants to approved apprenticeship programs for the purpose of training apprentices. The funds shall be distributed as follows:

(A) If there is an approved multiemployer apprenticeship program serving the same craft or trade and geographic area for which the training contributions were made to the council, a grant to that program shall be made.

(B) If there are two or more approved multiemployer apprenticeship programs serving the same craft or trade and county for which the training contributions were made to the council, the grant shall be divided among those programs based on the number of apprentices from that county registered in each program.

(C) All training contributions not distributed under subparagraphs (A) and (B) shall be used to defray the future expenses of the Department of Industrial Relations for the administration and enforcement of apprenticeship standards and requirements under this code.

(3) All training contributions received pursuant to this subdivision shall be deposited in the Apprenticeship Training Contribution Fund, which is hereby created in the State Treasury. Upon appropriation by the Legislature, all moneys in the Apprenticeship Training Contribution Fund shall be used for the purpose of carrying out this subdivision and to pay the expenses of the Department of Industrial Relations.

(n) The body awarding the contract shall cause to be inserted in the contract stipulations to effectuate this section. The stipulations shall fix the responsibility of compliance with this section for all apprenticeable occupations with the prime contractor.

(o) This section does not apply to contracts of general contractors or to contracts of specialty contractors not bidding for work through a general or prime contractor when the contracts of general contractors or those specialty contractors involve less than thirty thousand dollars (\$30,000).

(p) An awarding body that implements an approved labor compliance program in accordance with subdivision (b) of Section 1771.5 may, with the approval of the director, assist in the enforcement of this section under the terms and conditions prescribed by the director.

### **Labor Code Section 1813**

1813. The contractor or subcontractor shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25) for each worker employed in the execution of the contract by the respective contractor or subcontractor for each calendar day during which the worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one

calendar week in violation of the provisions of this article. In awarding any contract for public work, the awarding body shall cause to be inserted in the contract a stipulation to this effect. The awarding body shall take cognizance of all violations of this article committed in the course of the execution of the contract, and shall report them to the Division of Labor Standards Enforcement.

### **Labor Code Section 1815**

1815. Notwithstanding the provisions of Sections 1810 to 1814, inclusive, of this code, and notwithstanding any stipulation inserted in any contract pursuant to the requirements of said sections, work performed by employees of contractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon public work upon compensation for all hours worked in excess of 8 hours per day at not less than 11/2 times the basic rate of pay.

## **1.6 Excavation Safety**

Principal Project Company shall comply with Labor Code Section 6705 while excavating. For an excavation five feet or more in depth, submit shop drawings for a protective system.

The drawings must show the design and details for providing worker protection from caving ground during excavation.

Shop drawings of protective systems for which the Construction Safety Orders issued by Cal/OSHA require design by a registered professional engineer must be sealed and signed by an engineer who is registered as a civil engineer in the State.

## **2. PUBLIC CONTRACT CODE REQUIREMENTS**

### **2.1 Ineligible Contractors**

Principal Project Company shall not enter into or permit entering into any Contract with a Contractor who is ineligible to perform work on the Project pursuant to Section 1777.1 or 1777.7 of the Labor Code.

### **2.2 Assignment of Causes of Action**

Principal Project Company's attention is directed to the following requirements in Public Contract Code Section 7103.5:

(b) In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at

the time the awarding body tenders final payment to the contractor, without further acknowledgment by the parties.

### **2.3 [RESERVED]**

### **2.4 Specifications by Brand or Trade Names**

Principal Project Company's attention is directed to the following requirements in Public Contract Code Section 3400:

(b) No agency of the state, nor any political subdivision, municipal corporation, or district, nor any public officer or person charged with the letting of contracts for the construction, alteration, or repair of public works, shall draft or cause to be drafted specifications for bids, in connection with the construction, alteration, or repair of public works, (1) in a manner that limits the bidding, directly or indirectly, to any one specific concern, or (2) calling for a designated material, product, thing, or service by specific brand or trade name unless the specification is followed by the words "or equal" so that bidders may furnish any equal material, product, thing, or service. In applying this section, the specifying agency shall, if aware of an equal product manufactured in this state, name that product in the specification. Specifications shall provide a period of time prior to or after, or prior to and after, the award of the contract for submission of data substantiating a request for a substitution of "an equal" item. If no time period is specified, data may be submitted any time within 35 days after the award of the contract.

(c) Subdivision (b) is not applicable if the awarding authority, or its designee, makes a finding that is described in the invitation for bids or request for proposals that a particular material, product, thing, or service is designated by specific brand or trade name for any of the following purposes:

(1) In order that a field test or experiment may be made to determine the product's suitability for future use.

(2) In order to match other products in use on a particular public improvement either completed or in the course of completion.

(3) In order to obtain a necessary item that is only available from one source.

(4)(A) In order to respond to an emergency declared by a local agency, but only if the declaration is approved by a four-fifths vote of the governing board of the local agency issuing the invitation for bid or request for proposals.

(B) In order to respond to an emergency declared by the state, a state agency, or political subdivision of the state, but only if the facts setting forth the reasons for the finding of the emergency are contained in the public records of the authority issuing the invitation for bid or request for proposals.

---

### 3. GOVERNMENT CODE REQUIREMENTS

#### 3.1 Removal, Relocation or Protection of Existing Utilities

Principal Project Company acknowledges and agrees that the provisions of Article 14 (Compensation and Other Relief for Delay Events and Relief Events) of this Agreement satisfy City's obligations pursuant to Government Code Section 4215. Principal Project Company agrees that to the extent that Government Code Section 4215 may be construed to the contrary, Principal Project Company hereby waives the benefit of such statute.

#### 3.2 Nondiscrimination and Compliance Employment Programs

Principal Project Company shall comply with, and shall require Contractors to comply with, the provisions of:

- (b) the Fair Employment and Housing Act (Government Code section 12900 et seq.), and the applicable regulations promulgated thereunder (California Code of Regulations, Title 2, section 7285 et seq.); and
- (c) the Fair Employment and Housing Commission regulations implementing Government Code section 12990 (a-f) set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations,

which are incorporated into, and made a part of this Agreement as if set forth in full. Principal Project Company shall require each Contractor to include the compliance requirements under this Section 3.2 (Nondiscrimination and Compliance Employment Programs) in its Contract, and give written Notice of such Contractor's obligations under this Section 3.2 (Nondiscrimination and Compliance Employment Programs) to labor organizations with which it has a collective bargaining or other agreement, as appropriate.

### 4. BUSINESS AND PROFESSIONS CODE

Principal Project Company's attention is directed to the following requirements in Business and Professions Code Sections 7030(a) and 7108.5(a) through (d):

**7030.** (a) Except for contractors writing home improvement contracts pursuant to Section 7151.2 and contractors writing service and repair contracts pursuant to Section 7159.10, every person licensed pursuant to this chapter shall include the following statement in at least 10-point type on all written contracts with respect to which the person is a prime contractor:

"Contractors are required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors if a complaint regarding a patent act or omission is filed within four years of the date of the alleged violation. A complaint regarding a latent act or omission pertaining to structural defects must be filed within 10 years of the date of the alleged violation. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, P.O. Box 26000, Sacramento, CA 95826."

**7108.5** (a) A prime contractor or subcontractor shall pay to any subcontractor, not later than seven days after receipt of each progress payment, unless otherwise agreed to in writing, the

respective amounts allowed the contractor on account of the work performed by the subcontractors, to the extent of each subcontractor's interest therein. In the event that there is a good faith dispute over all or any portion of the amount due on a progress payment from the prime contractor or subcontractor to a subcontractor, the prime contractor or subcontractor may withhold no more than 150 percent of the disputed amount.

(b) Any violation of this section shall constitute a cause for disciplinary action and shall subject the licensee to a penalty, payable to the subcontractor, of 2 percent of the amount due per month for every month that payment is not made.

(c) In any action for the collection of funds wrongfully withheld, the prevailing party shall be entitled to his or her attorney's fees and costs.

(d) The sanctions authorized under this section shall be separate from, and in addition to, all other remedies, either civil, administrative, or criminal.

## **EXHIBIT 16C**

### **CITY REQUIREMENTS**

***[NOTE TO PNC: Local Hire, First Source, and SFMTA Training Program requirements to be added]***

#### **1. CITY REQUIREMENTS**

Principal Project Company has reviewed, understands, and is ready, willing, and able to comply with the terms and conditions of this Exhibit 16C (City Requirements), which summarizes special City requirements as of the Effective Date, each of which is fully incorporated by reference. Principal Project Company acknowledges that City requirements in effect when any Contract Documents are executed will be incorporated into the Contract Documents, as applicable, and will apply to all Contractors, Subcontractors, and any other PPC-Related Entities, as applicable. City requirements of general applicability will apply to the Project even if not summarized below.

The following summary is for Principal Project Company's convenience only; Principal Project Company is obligated to become familiar with all applicable requirements and to comply with them fully as they are amended from time to time. City ordinances are currently available on the web at [www.sfgov.org](http://www.sfgov.org) and at [www.amlegal.com/codes/client/san-francisco\\_ca](http://www.amlegal.com/codes/client/san-francisco_ca). References to specific laws in this Exhibit 16C (City Requirements) refer to the San Francisco Municipal Code unless specified otherwise. Capitalized terms used in this Exhibit 16C (City Requirements) and not defined in this Agreement will have the meanings assigned to them in the applicable Section of the San Francisco Municipal Code.

##### **1.1. Nondiscrimination in City Contracts and Benefits Ordinance.**

(a) Non-Discrimination in Contracts. Principal Project Company shall comply with the provisions of Chapters 12B and 12C of the Administrative Code, which are incorporated into this Agreement by this reference. Principal Project Company shall incorporate by reference in all Contractor Documents the provisions of Sections 12B.2(a), 12B.2(c)-(k), and 12C.3 of the Administrative Code and shall require all PPC-Related Entities to comply with such provisions. Principal Project Company is subject to the enforcement and penalty provisions in Chapters 12B and 12C.

(b) Non-Discrimination in the Provision of Employee Benefits. Principal Project Company does not as of Effective Date, and will not during the Term, in any of its operations in San Francisco, on real property owned by San Francisco, or where work is being performed for City elsewhere in the United States, discriminate in the provision of employee benefits between employees with domestic partners and employees with spouses and/or between the domestic partners and spouses of such employees, subject to the conditions set forth in San Francisco Administrative Code Section 12B.2.

**1.2. Requiring Health Benefits for Covered Employees.** All undefined, initially-capitalized terms used in this Section 1.2 (Requiring Health Benefits for Covered Employees) shall have the meanings given to them in Administrative Code Chapter 12Q (the "HCAO"). If the HCAO applies to this Agreement, Principal Project Company shall comply with the requirements of the HCAO. For each Covered Employee, Principal Project Company shall

---

provide the appropriate health benefit set forth in Section 12Q.3 of the HCAO. If Principal Project Company chooses to offer the health plan option, such health plan shall meet the minimum standards set forth by the San Francisco Health Commission. Information about and the text of the HCAO, as well as the Health Commission's minimum standards, is available on the web at <http://sfgov.org/olse/hcao>. Principal Project Company is subject to the enforcement and penalty provisions in the HCAO. Any Contract entered into by Principal Project Company shall require any PPC-Related Entity with 20 or more employees to comply with the requirements of the HCAO and shall contain contractual obligations substantially the same as those set forth in this Section 1.2 (Requiring Health Benefits for Covered Employees).

**1.3. Minimum Compensation Ordinance.** If San Francisco Administrative Code Chapter 12P applies to this Agreement, Principal Project Company shall pay covered employees no less than the minimum compensation required by San Francisco Administrative Code Chapter 12P ("**Chapter 12P**"), including a minimum hourly gross compensation, compensated time off, and uncompensated time off. Principal Project Company is subject to the enforcement and penalty provisions in Chapter 12P. Information about and the text of the Chapter 12P is available on the web at <http://sfgov.org/olse/mco>. Principal Project Company is required to comply with all of the applicable provisions of Chapter 12P, irrespective of the listing of obligations in this Section 1.3 (Minimum Compensation Ordinance). By signing and executing this Agreement, Principal Project Company certifies that it complies with Chapter 12P.

**1.4. Prevailing Rate of Wages and Working Conditions.**

(a) Covered Services. Principal Project Company agrees it will pay, and require the PPC-Related Entities to pay, the Prevailing Rate of Wages for any Work performed by Principal Project Company or the PPC-Related Entities ("**Covered Services**"), including any trade work for the Project performed by or for Principal Project Company during the Term. The provisions of Section 6.22(e) and 21C of the San Francisco Administrative Code are incorporated as provisions of this Agreement as if fully set forth herein and will apply to any Covered Services performed by Principal Project Company and the PPC-Related Entities.

(b) Determining the Prevailing Rate of Wages. The latest Prevailing Rate of Wages for private employment on public contracts as determined by the San Francisco Board of Supervisors and the Director of the California Department of Industrial Relations, as such prevailing wage rates may be changed during the Term, are hereby incorporated as provisions of this Agreement. Copies of the Prevailing Rate of Wages as fixed and determined by the Board of Supervisors are available from the Office of Labor Standards and Enforcement ("**OLSE**") and on the Internet at <http://www.dir.ca.gov/DLSR/PWD> and <http://sfgov.org/olse/prevailing-wage>. Principal Project Company agrees that it and the PPC-Related Entities will pay no less than the Prevailing Rate of Wages, as fixed and determined by the Board of Supervisors, to all workers who perform Covered Services and are employed by Principal Project Company or the PPC-Related Entities.

(c) Subcontract Requirements. As required by Section 6.22(e)(5) of the San Francisco Administrative Code, Principal Project Company shall require each Contractor to insert in every Subcontract or other arrangement, which it may make for the performance of Covered Services under this Agreement, a provision that said Subcontractor shall pay to all Persons performing labor in connection with Covered Services under said Subcontract or other arrangement not less than the highest general the Prevailing Rate of Wages as fixed and determined by the Board of Supervisors for such labor or services.

---

(d) Posted Notices. As required by Section 1771.4 of the California Labor Code, Principal Project Company shall post job site notices prescribed by the California Department of Industrial Relations (“DIR”) at all job sites where Covered Services are to be performed.

(e) Payroll Records. As required by Section 6.22(e)(6) of the San Francisco Administrative Code and Section 1776 of the California Labor Code, Principal Project Company shall keep or cause to be kept complete and accurate payroll records for all trade workers performing Covered Services. Such records shall include the name, address and social security number of each worker who provided Covered Services on the project, including apprentices, his or her classification, a general description of the services each worker performed each day, the rate of pay (including rates of contributions for, or costs assumed to provide fringe benefits), daily and weekly number of hours worked, deductions made and actual wages paid. Every Contractor and Subcontractor who shall undertake the performance of any part of Covered Services shall keep a like record of each person engaged in the execution of Covered Services under the Contract or Subcontract. All such records shall at all times be available for inspection of and examination by City and its authorized representatives and the DIR.

(f) Certified Payrolls. Certified payrolls shall be prepared pursuant to San Francisco Administrative Code Section 6.22(e)(6) and California Labor Code Section 1776 for the period involved for all employees, including those of Subcontractors, who performed labor in connection with Covered Services. Principal Project Company and each Subcontractor performing Covered Services shall submit certified payrolls to City and to the DIR electronically. Principal Project Company shall submit payrolls to City via the reporting system selected by City. The DIR will specify how to submit certified payrolls to it. City will provide basic training in the use of the reporting system at a scheduled training session. Principal Project Company, all Contractors and all Subcontractors that will perform Covered Services must attend the training session. Principal Project Company, Contractors, and Subcontractors shall comply with electronic certified payroll requirements (including training) at no additional cost to City.

(g) Compliance Monitoring. Covered Services to be performed under this Agreement are subject to compliance monitoring and enforcement of prevailing wage requirements by the DIR and/or the OLSE. Principal Project Company, Contractors and Subcontractors performing Covered Services will cooperate fully with the DIR and/or the OLSE and other City employees and agents authorized to assist in the administration and enforcement of the prevailing wage requirements, and agrees to take the specific steps and actions as required by Section 6.22(e)(7) of the San Francisco Administrative Code. Steps and actions include but are not limited to requirements that: (i) Principal Project Company will cooperate fully with the Labor Standards Enforcement Officer and other City employees and agents authorized to assist in the administration and enforcement of the Prevailing Wage requirements and other labor standards imposed on Principal Project Company by the Charter and Chapter 6 of the San Francisco Administrative Code; (ii) Principal Project Company agrees that the Labor Standards Enforcement Officer and his or her designees, in the performance of their duties, shall have the right to engage in random inspections of job sites and to have access to the employees of Principal Project Company, employee time sheets, inspection logs, payroll records and employee paychecks; (iii) Contractors and Subcontractors shall maintain a sign-in and sign-out sheet showing which employees are present on the job site; (iv) Principal Project Company shall prominently post at each job-site a sign informing employees that the project is subject to the City’s Prevailing Wage requirements and that these requirements are enforced by the Labor Standards Enforcement Officer; and (v) that the Labor Standards Enforcement Officer may audit such records of Principal Project Company as he or she reasonably deems necessary to determine compliance with the Prevailing Wage and other labor standards imposed by the

---

Charter and this Chapter and applicable to this Agreement. Failure to comply with these requirements may result in penalties and forfeitures consistent with analogous provisions of the California Labor Code, including Section 1776(g), as amended from time to time.

(h) **Remedies.** Should Principal Project Company, Contractors or Subcontractors who shall undertake the performance of any Covered Services, fail or neglect to pay to the persons who perform Covered Services under this Agreement, Contracts or Subcontracts or other arrangement for the Covered Services, the general prevailing rate of wages as herein specified, Principal Project Company shall forfeit, and in the case of any Subcontractor so failing or neglecting to pay said wage, Principal Project Company and the Subcontractor shall jointly and severally forfeit, back wages due plus the penalties set forth in San Francisco Administrative Code Section 6.22 (e) and/or California Labor Code Section 1775. City, when certifying any payment, which may become due under the terms of this Agreement, shall deduct from the amount that would otherwise be due on such payment the amount of said forfeiture.

**1.5. Prohibition on Use of Public Funds for Political Activity.** In performing the Work, Principal Project Company shall comply with San Francisco Administrative Code Chapter 12G, which prohibits funds appropriated by City for this Agreement from being expended to participate in, support, or attempt to influence any political campaign for a candidate or for a ballot measure. Principal Project Company is subject to the enforcement and penalty provisions in Chapter 12G.

**1.6. Consideration of Salary History.** Principal Project Company shall comply with San Francisco Administrative Code Chapter 12K, the Consideration of Salary History Ordinance or “Pay Parity Act.” Principal Project Company is prohibited from considering current or past salary of an applicant in determining whether to hire the applicant or what salary to offer the applicant to the extent that such applicant is applying for employment to be performed on this Agreement or in furtherance of this Agreement, and whose application, in whole or part, will be solicited, received, processed or considered, whether or not through an interview, in City or on City property. The ordinance also prohibits employers from (1) asking such applicants about their current or past salary or (2) disclosing a current or former employee’s salary history without that employee’s authorization unless the salary history is publicly available. Principal Project Company is subject to the enforcement and penalty provisions in Chapter 12K. Information about and the text of Chapter 12K is available on the web at <https://sfgov.org/olse/consideration-salary-history>. Principal Project Company is required to comply with all of the applicable provisions of 12K, irrespective of the listing of obligations in this Section 1.6 (Consideration of Salary History).

**1.7. Consideration of Criminal History in Hiring and Employment Decisions.**

(a) Principal Project Company agrees to comply fully with and be bound by all of the provisions of Chapter 12T, “City Contractor/Subcontractor Consideration of Criminal History in Hiring and Employment Decisions,” of the San Francisco Administrative Code (“**Chapter 12T**”), including the remedies provided, and implementing regulations, as may be amended from time to time. The provisions of Chapter 12T are incorporated by reference and made a part of this Agreement as though fully set forth herein. The text of the Chapter 12T is available on the web at <http://sfgov.org/olse/fco>. Principal Project Company is required to comply with all of the applicable provisions of 12T, irrespective of the listing of obligations in this Section 1.7 (Consideration of Criminal History in Hiring and Employment Decisions). Capitalized terms used in this Section 1.7 (Consideration of Criminal History in Hiring and Employment

Decisions.) and not defined in this Agreement shall have the meanings assigned to such terms in Chapter 12T.

(b) The requirements of Chapter 12T shall only apply to a Principal Project Company's or its Agent's operations to the extent those operations are in furtherance of the performance of this Agreement, shall apply only to applicants and employees who would be or are performing work in furtherance of this Agreement, and shall apply when the physical location of the employment or prospective employment of an individual is wholly or substantially within the City of San Francisco. Chapter 12T shall not apply when the application in a particular context would conflict with federal or state law or with a requirement of a government agency implementing federal or state law.

**1.8. Resource Efficiency Requirements.** The Project will be subject to Chapter 7 of the San Francisco Environment Code. Accordingly, the Project must meet certain resource efficient requirements. Principal Project Company agrees that it will design the Project to comply with Chapter 7 of the San Francisco Environment Code, as may be amended from time to time, or any similar law.

**1.9. MacBride Principles Northern Ireland.** City urges companies doing business in Northern Ireland to move towards resolving employment inequities, and encourages such companies to abide by the MacBride Principles. City urges San Francisco companies to do business with corporations that abide by the MacBride Principles.

**1.10. Notification of Limitations on Contributions.** Principal Project Company acknowledges its obligations under Section 1.126 of the San Francisco Campaign and Governmental Conduct Code, which prohibits any person who contracts with, or is seeking a contract with, any department of City for the rendition of personal services, for the furnishing of any material, supplies or equipment, for the sale or lease of any land or building, for a grant, loan or loan guarantee, or for a development agreement, from making any campaign contribution to (i) a City elected official if the contract must be approved by that official, a board on which that official serves, or the board of a state agency on which an appointee of that official serves, (ii) a candidate for that City elective office, or (iii) a committee controlled by such elected official or a candidate for that office, at any time from the submission of a proposal for the contract until the later of either the termination of negotiations for such contract or twelve months after the date City approves the contract. The prohibition on contributions applies to (a) each prospective party to the contract, (b) each member of the contractor's board of directors, the contractor's chairperson, chief executive officer, chief financial officer and chief operating officer, (c) any person with an ownership interest of more than ten percent (10%) in the contractor, (d) any Subcontractor listed in the bid or contract, and (e) any committee that is sponsored or controlled by the contractor. Principal Project Company certifies that it has informed each such person of the limitation on contributions imposed by Section 1.126 by the time it submitted the Implementation Proposal, and has provided the names of the persons required to be informed to City.

**1.11. Sunshine Ordinance.** Principal Project Company acknowledges that the Contract Documents and all records related to its formation, Principal Project Company's performance of Work, and City's payment are subject to the California Public Records Act, (California Government Code § 6250 et. seq.), and the San Francisco Sunshine Ordinance, (San Francisco Administrative Code Chapter 67). Such records are subject to public inspection and copying unless exempt from disclosure under federal, state or local law.

**1.12. Conflicts of Interest.** Principal Project Company acknowledges that it is familiar with the provisions of San Francisco Charter, Article III, Chapter 2, Section 15.103 of the City's Campaign and Governmental Conduct Code, and California Government Code Sections 87100 *et seq.* and Sections 1090 *et seq.*, certifies that it does not know of any facts that would constitute a violation of these provisions, and agrees that if Principal Project Company becomes aware of any such fact during the Term, Principal Project Company will provide Notice to City immediately.

**1.13. Certification of Funds.** This Agreement is subject to the fiscal provisions of the City's Charter and the budget decisions of its Mayor and Board of Supervisors, each acting in its sole discretion. No funds will be available hereunder until prior written authorization certified by the City's Controller. The City's Controller cannot authorize payments unless funds have been certified as available in the budget or in a supplemental appropriation. City's obligations hereunder shall never exceed the amount certified by the City's Controller for the purpose and period stated in such certification. City, its employees and officers are not authorized to offer or promise any additional funding without City's Controller certification of such additional funding. Without such lawful approval and certification, City shall not be required to provide such additional funding.

**1.14. Art Commission Design Review; Art Enrichment Allocation.** The Facility will be subject to the requirements of San Francisco Charter Section 5.103 and Administrative Code Section 3.19. Principal Project Company must work with the San Francisco Arts Commission, in consultation with the City, to design and build the Facility in compliance with those requirements.

**1.15. Tropical Hardwoods and Virgin Redwood Ban.** City urges companies not to import, purchase, obtain, or use for any purpose, any tropical hardwood, tropical hardwood wood product, virgin redwood, or virgin redwood wood product, except as expressly permitted by the application of San Francisco Environment Code sections 802(b) and 803(b). Principal Project Company will not, except as permitted by the application of sections 802(b) and 803(b), use or incorporate any tropical hardwood, tropical hardwood wood product, virgin redwood, or virgin redwood wood product in the performance of this Agreement.

**1.16. City Business and Tax Regulations Code.** Principal Project Company acknowledges that under Section 6.10-2 of the San Francisco Business and Tax Regulations Code, the City Treasurer and Tax Collector may require the withholding of payments to any vendor that is delinquent in the payment of any amounts that the vendor is required to pay the City under the San Francisco Business and Tax Regulations Code. If, under that authority, any payment City is required to make to Principal Project Company under this Agreement is withheld, then City will not be in breach or default under this Agreement, and the Treasurer and Tax Collector will authorize release of any payments withheld under this paragraph to Principal Project Company, without interest, late fees, penalties, or other charges, upon Principal Project Company coming back into compliance with its San Francisco Business and Tax Regulations Code obligations.

**1.17. Contracting Requirements.** The following City requirements are incorporated into this Agreement and apply to the Principal Project Company, Contractors and Subcontractors, together with any other applicable City contract requirements that are in effect on the Effective Date.

(a) Tobacco and Alcohol Products Advertising Ban. Principal Project Company acknowledges and agrees that no advertising of cigarettes, tobacco products, or

alcoholic beverages is allowed on any real property owned by or under the control of City. This prohibition includes the placement of the name of a company producing, selling or distributing cigarettes, tobacco products, or alcoholic beverages or the name of any cigarette, tobacco product, or alcoholic beverages in any promotion of any event or product. This prohibition does not apply to any advertisement sponsored by a state, local, nonprofit, or other entity designed to: (a) communicate the health hazards of cigarettes and tobacco products or alcoholic beverages; (b) encourage people not to smoke or to stop smoking, or not to drink alcohol or to stop drinking alcohol; or (c) provide or publicize drug or alcohol treatment or rehabilitation services.

**(b) Alcohol and Drug-Free Workplace.** City reserves the right to deny access to, or require Principal Project Company to remove any PPC-Related Entities from City facilities if City has reasonable grounds to believe that person has engaged in alcohol abuse or illegal drug activity which in any way impairs City's ability to maintain safe work facilities or to protect the health and well-being of City employees and the general public. City shall have the right of final approval for the entry or re-entry of any that person previously denied access to, or removed from, City facilities. Illegal drug activity means possessing, furnishing, selling, offering, purchasing, using or being under the influence of illegal drugs or other controlled substances for which the person lacks a valid prescription. Alcohol abuse means possessing, furnishing, selling, offering, or using alcoholic beverages, or being under the influence of alcohol.

**(c) Drug-Free Workplace.** Principal Project Company acknowledges that pursuant to the Federal Drug-Free Workplace Act of 1988 (41 U.S.C. §§ 8101 et seq.), the unlawful manufacture, distribution, possession or use of a controlled substance is prohibited on City property.

**(d) Food Service Waste Reduction Ordinance.** Principal Project Company agrees to comply fully with and be bound by the Food Service Waste Reduction Ordinance (San Francisco Environment Code Chapter 16), including but not limited to the remedies for noncompliance provided therein.

**(e) Sugar Sweetened Beverages and Packaged Water.** Principal Project Company agrees that it will not sell, provide, or otherwise distribute Sugar-Sweetened Beverages, as defined by San Francisco Administrative Code Chapter 101, as part of its performance of this Agreement. Principal Project Company agrees that it shall not sell, provide, or otherwise distribute Packaged Water, as defined by San Francisco Environment Code Chapter 24, as part of its performance of this Agreement.

**1.18. Preservative Treated Wood Products.** Principal Project Company shall comply with the provisions of San Francisco Environment Code Chapter 13, which requires that anyone purchasing preservative-treated wood products on behalf of the City, shall only purchase such products from the list of alternatives adopted by the Department of the Environment pursuant to Section 1302 of Chapter 13, unless otherwise granted an exemption by the terms of that Chapter.

**1.19. SFMTA Surveillance Technology Policy.** Principal Project Company must comply with the SFMTA's Surveillance Technology Policy, adopted under San Francisco Administrative Code Chapter 19B. A copy of the SFMTA's Surveillance Technology Policy is attached as Exhibit 16D (SFMTA's Surveillance Technology Policy).

**1.20. Clean Construction.** Principal Project Company agrees to comply fully with and be bound by the Clean Construction requirements set forth in Section 6.25 of the San

San Francisco Administrative Code and Chapter 25 of the Environment Code. The provisions of Section 6.25 and Chapter 25 are incorporated into this Agreement by reference. Principal Project Company may seek waivers from the Clean Construction requirements as set forth in Chapter 25 of the Environment Code. By entering into this Agreement, Principal Project Company and City agree that if Principal Project Company uses off-road equipment and/or off-road engines in violation of the Clean Construction requirements set forth in Section 6.25 of the Administrative Code and Chapter 25 of the Environment Code, the City will suffer actual damages that will be impractical or extremely difficult to determine. Accordingly, Principal Project Company and the City agree that Principal Project Company shall pay the City the amount of \$100 per day per each piece of off-road equipment and each off-road engine used to complete work on the Project in violation of the Clean Construction requirements. Such amount shall not be considered a penalty, but rather agreed monetary damages sustained by City because of Principal Project Company's failure to comply with the Clean Construction requirements.

**1.21. Compliance with Americans with Disabilities Act.** Principal Project Company shall provide the Work in a manner that complies with the Americans with Disabilities Act (ADA), including but not limited to Title II's program access requirements, and all other applicable federal, state and local disability rights legislation.

**1.22. Government Code Claim Requirement.** No suit for money or damages may be brought against the City until a written claim therefor has been presented to and rejected by the City in conformity with the provisions of San Francisco Administrative Code Chapter 10 and California Government Code Section 900, et seq. Nothing set forth in this Agreement shall operate to toll, waive or excuse Contractor's compliance with the California Government Code Claim requirements set forth in San Francisco Administrative Code Chapter 10 and California Government Code Section 900, et seq.

**1.23. Restrictions on Use of Pesticides.** Chapter 3 of the San Francisco Environment Code (the Integrated Pest Management Program Ordinance or "IPM Ordinance") describes an integrated pest management ("IPM") policy to be implemented by all City departments. PCC-Related Entities shall not use or apply or allow the use or application of any pesticides on the Project Site or contract with any party to provide pest abatement or control services to the Project Site without first receiving City's written approval of an IPM plan. PCC-Related Entities will comply, and will require all of PCC-Related Entities' contractors to comply, with any IPM plan approved by the City and will comply with the requirements of sections 300(d), 302, 304, 305(f), 305(g), and 306 of the IPM Ordinance, as if PCC-Related Entities were a City department.

**1.24. All-Gender Toilet Facilities.** If applicable, PCC-Related Entities will comply with San Francisco Administrative Code Section 4.1-3 requiring at least one all-gender toilet facility in any new building constructed on City-owned land or that is constructed by or for the City where toilet facilities are required or provided. An "all-gender toilet facility" means a toilet that is not restricted to use by persons of a specific sex or gender identity by means of signage, design, or the installation of fixtures.

**EXHIBIT 16D**

**SFMTA'S SURVEILLANCE TECHNOLOGY POLICY**

See the SFMTA policy at the attached link:

[https://sf.gov/sites/default/files/2022-03/MTA\\_Security%20Camera%20Policy%20Final%20Draft%202-25-21.pdf](https://sf.gov/sites/default/files/2022-03/MTA_Security%20Camera%20Policy%20Final%20Draft%202-25-21.pdf)

**EXHIBIT 17**

**SECTION 3.6 INVOICE**

Reference is made to that certain Design-Build-Finance-Operate-Maintain Agreement dated as of [\_\_\_\_], 2025 (the “**Agreement**”), by and between the City and County of San Francisco (“**City**”), a municipal corporation acting by and through the San Francisco Municipal Transportation Agency (“**SFMTA**”), and [\_\_\_\_] (“**Principal Project Company**”).

Capitalized terms used but not defined herein have the meaning given to them in this Agreement.

Pursuant to Section 3.6 of this Agreement, Principal Project Company hereby requests payment of [\_\_\_\_] U.S. dollars (\$[\_\_\_\_]), based on the following: (a) this Agreement has been terminated under Section 3.6.1 or Section 3.6.2 of this Agreement; (b) this invoice is submitted within 30 days of the termination; and (c) Principal Project Company has submitted to City all work product produced by Principal Project Company related to the Project, as required in Section 3.6.5 of this Agreement.

Principal Project Company represents and warrants to City that: (a) Principal Project Company is eligible for payment pursuant to Section 3.6 of this Agreement; and (b) Principal Project Company has attached documentation reasonably required by City sufficient to support such statement.

Principal Project Company acknowledges that: (a) such payment is the exclusive compensation payable by City to Principal Project Company under this Agreement for a termination under Section 3.6.1 or Section 3.6.2 of this Agreement; and (b) submission of this invoice, and payment by City of any amount in response to this invoice, is in all respects subject to the terms and conditions of this Agreement.

**EXHIBIT 18**

**TECHNICAL REQUIREMENTS**

**[SEE ATTACHED]**

**EXHIBIT 19**

**INITIAL SCHEDULE**

[See attached]

***[Note: Schedule to be attached before Commercial Close. Schedule shall be a critical path schedule, in Primavera 6 software, setting out all the relevant D&C Work activities from Commercial Close through Final Acceptance, with key interim milestones during that period of work, and at a minimum at Level 3 defined in AACE 91R-16 "Schedule Development"]***

**EXHIBIT 20**

**LIST OF KEY PERSONNEL**

1. Project Director
2. Project Manager
3. Deputy Project Manager
4. Equity Member's Project Principal
5. Engineer(s) of Record
6. Architect(s) of Record
7. Design Manager
8. Construction Manager
9. Quality Program Manager
10. Third Party and Utility Coordination Manager
11. Project Safety Representative
12. IFM Manager
13. IFM Quality Manager

**EXHIBIT 5**

**FINANCE DOCUMENTS**

- Exhibit 5A: List of Initial Financing Documents
- Exhibit 5B: Form of Direct Agreement
- Exhibit 5C: Calculation of Refinancing Gain
- Exhibit 5D: Form of Opinion from City's Legal Counsel
- Exhibit 5E: Form of Opinion from Principal Project Company's Legal Counsel
- Exhibit 5F: Base Capital MaxAP Adjustment for Base Interest Rate Fluctuation and Credit Spread Risk Mitigation
- Exhibit 5G: Financing Document Terms

**EXHIBIT 5A**

**LIST OF INITIAL FINANCING DOCUMENTS**

**PART A: INITIAL FINANCING AGREEMENTS**

**PART B: INITIAL SECURITY DOCUMENTS**

**EXHIBIT 5B**

**FORM OF DIRECT AGREEMENT**

**THIS DIRECT AGREEMENT** dated as of [\_\_\_\_], 2025 (“**Direct Agreement**”) among the City and County of San Francisco (“**City**”), a municipal corporation, acting by and through the San Francisco Municipal Transportation Agency (“**SFMTA**”), [\_\_\_\_\_] (“**Principal Project Company or PPC**”), a [\_\_\_\_\_] and [\_\_\_\_], as trustee or collateral agent (in such capacity, together with its successors in such capacity, the “**Collateral Agent**”) for the Lenders (as defined in the IF DBFOM Agreement).

**WHEREAS**

(A) On November 2, 2022, City and Potrero Neighborhood Collective LLC, a limited liability company organized under the laws of the State of Delaware, entered into a Predevelopment Agreement for the Potrero Yard Modernization Project (the “**Predevelopment Agreement**”), which is comprised of a transit operations component (“**Bus Yard Component**”), a mixed-income housing and commercial component (“**Housing and Commercial Component**”), and the common infrastructure shared by the two components (“**Common Infrastructure**”),

(B) Following the processes described in the Predevelopment Agreement, City and Principal Project Company entered into an Infrastructure Facility Design-Build-Finance-Operate-Maintain Agreement dated as of [\_\_\_\_], 2025 (the “**IF DBFOM Agreement**”) for the Bus Yard Component and Common Infrastructure (collectively, the “**Infrastructure Facility**”), and the integration of the Infrastructure Facility, and its interface with, the Housing and Commercial Component (together, the “**Project**”). The IF DBFOM Agreement contemplates Principal Project Company obtaining financing or Refinancing for the Project from third parties. The Housing and Commercial Component will be delivered by [\_\_\_\_], under separate agreements,

(C) In order to enable Principal Project Company to finance certain activities and certain obligations with respect to the Project, the Lenders have agreed to make available debt facilities, on the terms set out in the Financing Agreements and Security Documents, for the purpose of financing the Project, subject to provision of certain assurances from City regarding Lender’s and Collateral Agent’s rights in the event of an Event of Default or PPC Default,

(D) In reliance on such assurances, and on this Direct Agreement, Lenders have agreed to make available such financing or Refinancing facilities for the purpose of financing or Refinancing all or part of the Project, and

(E) The execution of this Direct Agreement by City in favor of the Collateral Agent is a condition precedent to such financing or Refinancing facilities being made available to Principal Project Company by Lender.

**NOW, THEREFORE**, in consideration of the foregoing and the mutual terms and covenants contained herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the parties, each of City, Principal Project Company and Collateral Agent hereby agree as follows:

---

## 1. DEFINITIONS AND INTERPRETATION

### 1.1 Definitions

Capitalized terms used but not otherwise defined in this Direct Agreement and references used but not construed in this Direct Agreement have the respective meanings and constructions assigned to such terms in the IF DBFOM Agreement. In addition, the following terms have the meanings specified below:

**City** has the meaning given to it in the Preamble.

**City Notice** has the meaning given to it in Section 5.1.

**Collateral Agent** has the meaning given to it in the Preamble.

**Control Agreement** means the Control Agreement, dated as of the date hereof, by and among Principal Project Company, City and Custodian, with respect to the Handback Requirements Reserve Account.

**Cure Period** means the period starting on the date of the receipt of the City Notice and ending on the earlier of:

- (a) the Step-in Date; and
- (b) 90 days after the expiration of any cure periods provided to Principal Project Company under the IF DBFOM Agreement, provided that:
  - (i) if the Collateral Agent provides a Notice of Intent to City within 30 days of the date of the receipt of the City Notice indicating that the Lenders' intend to proceed to cure the PPC Default(s) or to exercise step-in rights, then the Cure Period will end on the earlier of the Step-in Date and 120 days after the expiration of any cure periods provided to Principal Project Company under the IF DBFOM Agreement; and
  - (ii) if the Collateral Agent is prohibited from curing any non-monetary default or from substituting Principal Project Company with the Substituted Entity by any process, stay or injunction issued by any Governmental Entity or pursuant to any bankruptcy or insolvency proceeding or other similar proceeding involving Principal Project Company, then the time period specified herein for curing a default shall be extended for the period of such prohibition.

**Custodian** means [\_\_\_\_], as custodian under the Control Agreement.

**Default** means an Event of Default as defined in any Financing Agreement or any event or circumstance specified in any Financing Agreement which would (with the expiration of a grace period, the giving of notice, the lapse of time, the making of any determination under the Financing Documents or any combination of any of the foregoing) be an Event of Default.

**Direct Agreement** has the meaning given to it in the Preamble.

**Discharge Date** means the date on which all of the obligations of Principal Project Company under the Financing Documents have been irrevocably discharged in full to the satisfaction of the Collateral Agent.

**Event of Default** means an Event of Default as defined in any Financing Agreement.

**IF DBFOM Agreement** has the meaning given to it in the Recitals.

**Lender Notice** has the meaning given to it in Section 7.1.

**Notice of Intent** has the meaning given to it in Section 5.4.

**Predevelopment Agreement** has the meaning given to it in the Recitals.

**Principal Project Company** or **PPC** has the meaning given to it in the Preamble.

**Project** has the meaning given to it in the Recitals.

**Property** means any right or interest in or to property of any kind whatsoever, whether real, personal or mixed and whether tangible or intangible.

**Revival Date** has the meaning given to it in Section 14.1.

**Step-in Date** has the meaning given to it in Section 10.1.

**Step-in Notice** has the meaning given to it in Section 9.1.

**Step-in Party** has the meaning given to it in Section 9.2.

**Step-in Period** means the period from and including the Step-in Date until the earliest of:

- (a) the Substitution Effective Date;
- (b) the Step-out Date;
- (c) the date of termination of the IF DBFOM Agreement by City in accordance with this Direct Agreement and the IF DBFOM Agreement;
- (d) the date of the expiration or early termination of the Term under the IF DBFOM Agreement;
- (e) 12 calendar months after the Step-in Date; and
- (f) the Long Stop Date,

provided, however, that if the Collateral Agent is prohibited from curing any nonmonetary default after the Step-in Date or from substituting Principal Project Company with the Substituted Entity by any process, stay or injunction issued by any Governmental Entity or pursuant to any bankruptcy or insolvency proceeding or other similar proceeding involving Principal Project Company, then the time periods specified herein for curing a default shall be extended for the period of such prohibition.

---

**Step-out Date** means the date upon which the notice period set forth in any Step-out Notice expires.

**Step-out Notice** has the meaning given to it in Section 11 (Step-out).

**Substitute Accession Agreement** means the agreement to be entered into by a Substituted Entity pursuant to Section 13.1.

**Substituted Entity** means any Person selected by Lenders and approved by City in accordance with Section 12 (Substitution Entities and Substitution Proposals) to perform all or a portion of Principal Project Company's obligations and succeed to all or a portion of Principal Project Company's rights under the Contract Documents.

**Substitution Effective Date** has the meaning given to it in Section 13.1.

**Substitution Notice** has the meaning given to it in Section 12.2.

## 1.2 Interpretation

Unless the context otherwise clearly requires:

- (a) The definitions of terms herein shall apply equally to the singular and plural forms of the terms defined;
- (b) Whenever the context may require, any pronoun shall include the corresponding masculine, feminine and neuter forms;
- (c) The words "include", "includes" and "including" shall be deemed to be followed by the phrase "without limitation";
- (d) The word "will" shall be construed to have the same meaning and effect as the word "shall";
- (e) Any definition of or reference to any agreement, instrument or other document herein shall be construed as referring to such agreement, instrument or other document as from time to time amended, supplemented or otherwise modified (subject to any restrictions on such amendments, supplements or modifications set forth herein);
- (f) Any reference herein to any Person, or to any Person in a specified capacity, shall be construed to include such Person's successors and assigns or such Person's successors in such capacity, as the case may be;
- (g) The words "herein", "hereof" and "hereunder", and words of similar import, shall be construed to refer to this Direct Agreement in its entirety and not to any particular provision hereof;
- (h) All references herein to Sections and Schedules shall be construed to refer to Sections of and Schedules to this Direct Agreement. Any Schedules to this Direct Agreement are an integral part hereof. The provisions of this Direct Agreement

---

shall prevail over the provisions of any Schedules to the extent of any inconsistency;

- (i) The headings used in this Direct Agreement are for convenience of reference only and are not to affect the construction of or to be taken into consideration in interpreting this Direct Agreement; and
- (j) “Winding-up”, “liquidation”, “dissolution”, “insolvency”, “adjustment” or “reorganization” of a Person and references to the “liquidator”, “assignee”, “administrator”, “receiver”, “custodian”, “conservator”, “sequestrator” or “trustee” of a Person shall be construed so as to include any equivalent or analogous proceedings or, as the case may be, insolvency representatives or officers under the law of the jurisdiction in which such Person is incorporated, organized or constituted or any jurisdiction in which such Person or, as the case may be, insolvency representative or officer carries on business including the seeking of winding up, liquidation, dissolution, reorganization, administration, arrangement, adjustment or relief of debtors.

## 2. REPRESENTATIONS AND WARRANTIES

### 2.1 City represents and warrants that:

- (a) **Organization; Power and Authority.** City is a charter city and municipal corporation duly organized and validly existing under the Constitution of the State of California. City has full power, right and authority to execute and deliver this Direct Agreement and the IF DBFOM Agreement; and City has full power, right and authority to perform its obligations under the provisions hereof and thereof.
- (b) **Authorizations, Enforceability.** This Direct Agreement and the IF DBFOM Agreement have been duly authorized by City, and this Direct Agreement and the IF DBFOM Agreement constitute legal, valid and binding obligations of City, enforceable against City in accordance with their terms, except as such enforceability may be limited by (i) applicable bankruptcy, insolvency, reorganization, moratorium or other similar laws affecting the enforcement of creditors’ rights generally and (ii) general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law).
- (c) **No Default.** As of the date of the execution of this Direct Agreement, there is no City Default. City is not aware of any PPC Default, and there exists no event or condition of which City has Actual Knowledge that would, with the giving of notice or passage of time or both, constitute such a PPC Default or City Default.

### 2.2 Principal Project Company represents and warrants that:

- (a) **Organization; Power and Authority.** Principal Project Company is a [\_\_\_\_], duly organized and validly existing under the laws of [\_\_\_\_] and has the requisite power and all required licenses to carry on its present and proposed activities, and has full power, right and authority to execute and deliver this Direct Agreement and the IF DBFOM Agreement; and

---

Principal Project Company has the power and authority to perform the provisions hereof and thereof.

- (b) **Authorizations, Enforceability.** This Direct Agreement and the IF DBFOM Agreement have been duly authorized by Principal Project Company, and this Direct Agreement and the IF DBFOM Agreement constitute legal, valid, and binding obligations of Principal Project Company, enforceable against Principal Project Company in accordance with their terms, except as such enforceability may be limited by (i) applicable bankruptcy, insolvency, reorganization, moratorium, or other similar laws affecting the enforcement of creditors' rights generally; and (ii) general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law).

**2.3** The Collateral Agent represents and warrants that:

- (a) **Organization; Power and Authority.** The Collateral Agent is a [\_\_\_\_\_], duly organized and validly existing under the laws of [\_\_\_\_\_] and has the requisite power and all required licenses to carry on its present and proposed activities, and has full power, right and authority to execute and deliver this Direct Agreement and to perform each and all of the obligations of the Collateral Agent provided for under this Direct Agreement.
- (b) **Authorizations, Enforceability.** This Direct Agreement has been duly authorized by the Collateral Agent, and this Direct Agreement constitutes a legal, valid and binding obligation of the Collateral Agent, enforceable against the Collateral Agent in accordance with its terms, except as such enforceability may be limited by (i) applicable bankruptcy, insolvency, reorganization, moratorium or other similar laws affecting the enforcement of creditors' rights generally and (ii) general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law). The Collateral Agent is duly authorized by the Lenders to enter into this Direct Agreement on behalf of the Lenders and to validly bind the Lenders to the terms and conditions hereof.

**3. CONDITIONS AND LIMITATIONS RESPECTING LENDERS' RIGHTS**

**3.1** No Lender shall be entitled to the rights, benefits and protections of this Direct Agreement unless and until City has received a copy (certified as true and correct by the Collateral Agent) of the Financing Agreements and Security Documents bearing, if applicable, the date and instrument number or book and page of recordation or filing thereof, including a copy of a specimen bond, note or other obligation (certified as true and correct by the Collateral Agent) secured by such Security Document, together with written notice of the address of the Collateral Agent to which notices may be sent. In the event of an assignment of any such Financing Agreement (excluding any instrument described under subsection (b) of the definition of Financing Agreement) or Security Document, such assignment shall not be subject to the terms of this Direct Agreement unless and until City has received prior written notice and a certified copy thereof, which copy shall, if required to be recorded, bear the date and instrument number or book and page of recordation thereof, together with written notice of the assignee thereof to which notices may be sent. In the event of any change in the identity of the Collateral Agent, such change shall not be binding upon City unless and until City has received a written

notice thereof signed by the replaced and substitute Collateral Agent and setting forth the address of the substitute Collateral Agent to which notices may be sent.

**3.2** Neither the Collateral Agent nor the Lenders shall exercise any right it may have pursuant to any Financing Documents to assign, transfer or otherwise dispose of any right, title or interest it may have in, or obligations it may have pursuant to, the Financing Documents to the extent the exercise of such rights would constitute a Refinancing and Principal Project Company has failed to comply with the requirements of Section 4.4 (Refinancing) of the IF DBFOM Agreement.

**3.3** No Security Document or other instrument purporting to mortgage, pledge, encumber, or create a lien, charge or security interest on or against PPC's Interest shall extend to or affect the fee simple interest of City in the Project or the Site or improvements thereto or City's rights or interests under the Contract Documents.

**3.4** City shall not have any obligation to any Lender pursuant to the IF DBFOM Agreement, except for the express obligations to Lenders set forth in this Direct Agreement or any other instrument or agreement signed by City in favor of such Lender or Collateral Agent, provided that the Collateral Agent has notified City of the existence of its Security Documents.

**3.5** Each Financing Agreement and Security Document shall require that the Collateral Agent deliver to City, concurrently with delivery to Principal Project Company or any other Person, any notice of default or notice of election or enforcement of remedies, including an election to sell or foreclose, notice of sale or foreclosure or other notice required by Law or by the Security Document in connection with the exercise of remedies under the Financing Agreement or Security Document.

**3.6** No Financing Documents shall grant to the Lender any right to apply funds in the Handback Requirements Reserve Account or to apply proceeds from any Handback Requirements Letter of Credit to the repayment of Project Debt, to any other obligation owing the Lender or to any other use except the uses set forth in Section 8.7.3 (Use of Handback Requirements Reserve Account) of the IF DBFOM Agreement, and any provision purporting to grant such right shall be null and void; provided, however, that the foregoing shall not preclude any Lender or Substituted Entity from, following foreclosure or transfer in lieu of foreclosure, automatically succeeding to all rights, claims and interests of Principal Project Company in and to the Handback Requirements Reserve Account.

#### **4. AGREEMENTS, CONSENT TO SECURITY AND SUBORDINATION OF SECURITY**

**4.1** City acknowledges notice and receipt of copies of the Initial Financing Documents and Initial Security Documents. Notwithstanding anything in the IF DBFOM Agreement to the contrary, but subject to Section 3 (Conditions and Limitations Respecting Lenders' Rights), City:

- (a) consents to (i) the assignment by Principal Project Company to the Collateral Agent of all of PPC's Interest, and (ii) the granting by each Equity Member to the Collateral Agent of a security interest in such Equity Member's equity interest in Principal Project Company, in each case pursuant to the terms and provisions of the applicable Initial Security Documents; and

- (b) agrees that such collateral assignment and grant of security interests in and first lien over all of the PPC's Interest pursuant to the Initial Security Documents and the grant of the security interest by each Equity Member in its equity interests in Principal Project Company pursuant to such Security Documents, and the execution by Principal Project Company and City of this Direct Agreement and the performance of their respective obligations hereunder, in each case, does not (i) constitute a PPC Default or any other breach by Principal Project Company of the Contract Documents, (ii) with the giving of notice or lapse of time, or both, constitute a PPC Default or any other breach by Principal Project Company of the IF DBFOM Agreement, or (iii) require the consent of City except as provided herein.

**4.2** Except as expressly contemplated in the IF DBFOM Agreement as of the Effective Date thereof, while any Security Document is in effect, no agreement between City and Principal Project Company for the modification or amendment of the IF DBFOM Agreement that in any way could reasonably be expected to have a material adverse effect on the rights or interests of the Lender(s) shall be binding on the Lender(s) under such Security Document without the Collateral Agent's consent.

**4.3** As long as any Project Debt secured by any Security Document shall remain outstanding, City shall promptly provide the Collateral Agent with a copy of any notice it sends to Principal Project Company concerning an actual or potential PPC Default.

**4.4** Except as set forth in this Direct Agreement, City shall not be precluded from or delayed in exercising any remedies, including termination of the IF DBFOM Agreement due to the accumulation of Noncompliance Points during the Step-in Period and City's rights to cure PPC Default at Principal Project Company's expense; provided, however, City shall not be entitled to exercise its right of termination due to Noncompliance Points accumulated prior to such step in.

**4.5** Neither City nor any officer, employee, agent or representative of City shall have any liability whatsoever for payment of the principal sum of any Project Debt, any other obligations issued or incurred by Principal Project Company or a PPC-Related Entity in connection with the IF DBFOM Agreement or the Project, or any interest accrued thereon or any other sum secured by or accruing under any Financing Document. Except for a violation by City of its express obligations to Lenders under this Direct Agreement, no Lender is entitled to seek any damages or other amounts from City, whether for Project Debt or any other amount. City's review of any Financing Documents or other Project financing documents is not a guarantee or endorsement of the Project Debt, any other obligations issued or incurred by Principal Project Company or a PPC-Related Entity in connection with the IF DBFOM Agreement or the Project, and is not a representation, warranty or other assurance as to the ability of Principal Project Company or a PPC-Related Entity to perform its obligations with respect to the Project Debt or any other obligations issued or incurred by Principal Project Company or a PPC-Related Entity in connection with the IF DBFOM Agreement or the Project, or as to the adequacy of the Payments to provide for payment of the Project Debt or any other obligations issued or incurred by Principal Project Company in connection with the IF DBFOM Agreement or the Project. The foregoing does not affect City's liability to Principal Project Company under Article 17 (Termination) of the IF DBFOM Agreement for Termination Compensation that is measured in whole or in part by outstanding Project Debt.

---

**4.6** The Collateral Agent consents to the grant of security by Principal Project Company to City of a first priority security interest in the Handback Requirements Reserve Account (or in any Handback Requirements Letter of Credit delivered by Principal Project Company in accordance with Section 8.7.5 (Handback Requirements Letters of Credit) of the IF DBFOM Agreement in lieu of establishing a Handback Requirements Reserve Account).

**5. CITY NOTICE OF TERMINATION AND EXERCISE OF REMEDIES; LENDER NOTICE OF INTENT**

**5.1** City shall give the Collateral Agent written notice (a “**City Notice**”):

- (a) promptly upon obtaining Actual Knowledge of the occurrence of any event giving rise to a PPC Default, City’s right to terminate or give notice terminating the IF DBFOM Agreement pursuant to Section 17.3.1 (PPC Defaults Triggering City Termination Rights) of the IF DBFOM Agreement, or exercise any rights under Sections 16.2.4 (Remedies for Failure to Meet Safety Standards or Perform Safety Compliance), 16.2.5 (City Step-in Rights) or 16.2.7.1 of the IF DBFOM Agreement; or
- (b) promptly upon obtaining Actual Knowledge of the occurrence of any event giving rise to City’s right to suspend its performance (including in connection with any insolvency or bankruptcy proceeding in relation to Principal Project Company) under the IF DBFOM Agreement.

**5.2** A City Notice shall specify:

- (a) the unperformed obligations of Principal Project Company under the IF DBFOM Agreement and grounds for termination of, or suspension of performance or the other rights all as referred to in Sections 17.3.1 (PPC Defaults Triggering City Termination Rights), 16.2.4 (Remedies for Failure to Meet Safety Standards or Perform Safety Compliance), 16.2.5 (City Step-in Rights) or 16.2.7.1 under the IF DBFOM Agreement, in detail sufficient to enable the Collateral Agent to assess the scope and amount of any liability of Principal Project Company resulting therefrom;
- (b) any other unperformed obligations of Principal Project Company of which City obtains Actual Knowledge as of the date of such City Notice;
- (c) all amounts due and payable by Principal Project Company to City under the IF DBFOM Agreement on or before the date of such City Notice and which remain unpaid at such date and the nature of Principal Project Company’s obligation to pay such amounts; and
- (d) the amount of Principal Project Company’s payment obligation to City that City reasonably foresees will arise during the applicable Cure Period.

**5.3** City shall update its City Notice to reflect unperformed obligations of Principal Project Company under the IF DBFOM Agreement that have been identified or that have arisen and amounts payable by Principal Project Company to City that become due, in each case, after the date of the City Notice but prior to the proposed Step-in Date.

**5.4** Within 30 days of the date of receipt of the City Notice, the Collateral Agent shall provide City with notice, via written correspondence and email, of the intent of the Lenders' and shall indicate in such notice whether the Lenders' intend to proceed to cure the PPC Default(s) or to exercise step-in rights (a "**Notice of Intent**"). The hardcopy Notice of Intent shall be sent to City via certified or registered mail, return receipt requested.

## **6. PROCEEDS ACCOUNT**

Subject to the Collateral Agent directing otherwise in accordance with this Direct Agreement, Principal Project Company irrevocably directs City to remit all amounts due and owing to Principal Project Company under the IF DBFOM Agreement directly to the Proceeds Account.

## **7. LENDER NOTICE**

**7.1** The Collateral Agent shall give City notice (a "**Lender Notice**") via written correspondence and email, with a hardcopy and electronic copy to Principal Project Company, promptly upon becoming aware of the occurrence of any Default or Event of Default (whether or not a City Notice has been served relating to the same event). The hardcopy Lender Notice shall be sent to City via certified or registered mail, return receipt requested.

**7.2** The Collateral Agent shall specify in any Lender Notice the circumstances and nature of the Default or Event of Default to which Lender Notice relates.

**7.3** Unless directed otherwise by the Collateral Agent pursuant to Section 7.4, City shall, following receipt of a Lender Notice of the occurrence of any Event of Default and until further notice from the Collateral Agent pursuant to Section 7.8, continue to make any payments required to be made by City to Principal Project Company under the IF DBFOM Agreement, including any payment of any termination sum calculated in accordance with Article 17 (Termination) of the IF DBFOM Agreement, to the Proceeds Account.

**7.4** The Collateral Agent may direct City to make the payments described in Section 7.3 to an alternate account designated by the Collateral Agent by providing written notice to City specifying the following information with respect to the account: (a) account details and wiring instructions; and (b) the name, title, mailing address, telephone number, fax number, and email address of the individual responsible for administering the account. City shall have no liability, whatsoever, for any delay in processing any payment request pursuant to this Section 7.4, provided that such delay does not extend 20 days beyond the date of City's certified, return-receipt or registered mail receipt of the Lender Notice.

**7.5** All sums paid as provided in Sections 7.3 and 7.4 shall be deemed paid to Principal Project Company under the IF DBFOM Agreement and shall constitute a complete discharge of City's relevant payment obligations to Principal Project Company.

**7.6** The Collateral Agent shall promptly notify City via written correspondence and email of any decision to accelerate amounts outstanding under the Financing Documents or to exercise any enforcement remedies under the Financing Documents.

**7.7** Neither the Collateral Agent nor the Lender shall exercise any right it may have pursuant to the Security Documents to assign, transfer or otherwise dispose of any right, title or interest it may have in, or obligations it may have pursuant to, the Security Documents to the extent the

---

exercise of such rights would constitute a Refinancing and Principal Project Company has failed to comply with the requirements of Section 4.4 (Refinancing) of the IF DBFOM Agreement.

**7.8** The Collateral Agent shall promptly notify City via written correspondence and email, with a hardcopy and electronic copy to Principal Project Company, of a full cure of an Event of Default that is the subject of a Lender Notice.

**7.9** Following receipt of a Lender Notice of the occurrence of an Event of Default until delivery of a further notice under Section 7.8 with respect to any full cure of such Event of Default, the Collateral Agent shall have the right to deliver to City a Step-in Notice as provided in Section 9 (Step-in Notice).

## **8. NO TERMINATION DURING CURE PERIOD**

**8.1** City agrees not to take any of the following actions prior to the expiration of any applicable Cure Period:

- (a) terminate or give notice terminating the IF DBFOM Agreement or exercise any rights under Sections 10.4 (Letters of Credit), 10.5 (Guarantees), 16.2.4 (Remedies for Failure to Meet Safety Standards or Perform Safety Compliance), 16.2.5 (City Step-in Rights), 16.2.7 (Performance Bond), 16.2.8 (Suspension of Work), 16.2.9 (Other Rights and Remedies) or 17.3.1 (PPC Defaults Triggering City Termination Rights) of the IF DBFOM Agreement or in respect of the IFM Contract or D&C Contract;
- (b) suspend its performance (including with respect to (i) payments required to be made to Principal Project Company to the Proceeds Account or to an alternate account designated by the Collateral Agent in accordance with Section 7.4, or (ii) any insolvency or bankruptcy proceeding in relation to Principal Project Company) under the IF DBFOM Agreement; and
- (c) take or support any action for the liquidation, bankruptcy, administration, receivership, reorganization, dissolution or winding up of Principal Project Company or for the composition or readjustment of Principal Project Company's debts, or any similar insolvency procedure in relation to Principal Project Company, or for the appointment of a receiver, trustee, custodian, sequestrator, conservator, liquidator, administrator or similar official for Principal Project Company or for any part of Principal Project Company's property;

provided that such agreement of City shall not prevent City from taking actions which are permitted under this Direct Agreement on a Revival Date in respect of any other prior PPC Default or other breach by Principal Project Company of the IF DBFOM Agreement which has occurred and has not been remedied or waived.

**8.2** During any Cure Period, without giving a Step-in Notice, the Collateral Agent shall have the right (but shall have no obligation), at its sole option and discretion, to perform or arrange for the performance of any act, duty, or obligation required of Principal Project Company under the IF DBFOM Agreement, or to cure any default of Principal Project Company thereunder, which performance by the Collateral Agent shall be accepted by City in lieu of performance by Principal Project Company and in satisfaction of Principal Project Company's obligations under

the IF DBFOM Agreement. To the extent that any default of Principal Project Company under the IF DBFOM Agreement is cured and/or any payment liabilities or performance obligations of Principal Project Company are performed by the Collateral Agent during the Cure Period, such action shall discharge the relevant liabilities or obligations of Principal Project Company to City. Subject to the terms of this Direct Agreement, the Collateral Agent's right to cure any default of Principal Project Company as provided in this Section 8.2 may be exercised after the expiration of relevant cure period granted to Principal Project Company in Section 16.1.2 (Default Notice and Cure Periods) of the IF DBFOM Agreement, provided that the cure occurs within the Cure Period. Curing of any PPC Default by the Collateral Agent shall not be construed as an assumption by the Collateral Agent of any obligations, covenants or agreements of Principal Project Company under the Contract Documents, except to the extent the Collateral Agent has exercised step-in rights or proposed a Substitute Entity and otherwise as set forth in this Direct Agreement.

## **9. STEP-IN NOTICE**

**9.1** Upon the issuance of a City Notice or a Lender Notice of the occurrence of any Event of Default, the Collateral Agent may give a written notice (a "**Step-in Notice**") under this Section 9 (Step-in Notice) to City at any time during the Cure Period in the case of the issuance of a City Notice or at any time following the receipt by City of a Lender Notice, provided that the Event of Default to which Lender Notice relates is continuing.

**9.2** The Collateral Agent shall nominate, in the Step-in Notice: (a) the Collateral Agent, a Lender or any of their respective Affiliates; or (b) any Person, subject to approval by City in accordance with Section 12 (Substitution Entities and Substitution Proposals), and the person so nominated being referred to as the "**Step-in Party**."

## **10. RIGHTS AND OBLIGATIONS ON STEP-IN**

**10.1** On and from the date of the receipt of the Step-in Notice and the approval of City to the appointment of the Step-in Party if required by Section 9.2 (the "**Step-in Date**") and during the Step-in Period, the Step-in Party shall be:

- (a) entitled to exercise and enjoy the rights and powers expressed to be assumed by or granted to Principal Project Company under the IF DBFOM Agreement and this Direct Agreement;
- (b) entitled to exercise and enjoy the rights and powers expressed to be assumed by or granted to a Step-in Party under this Direct Agreement; and
- (c) liable for the performance of all of Principal Project Company's obligations under the IF DBFOM Agreement and this Direct Agreement arising on or after the Step-in Date.

**10.2** Without prejudice to Section 14 (Revival of Remedies), during the Step-in Period, City shall:

- (a) not terminate or give notice terminating the IF DBFOM Agreement or exercise any rights under Sections 10.4 (Letters of Credit), 10.5 (Guarantees), 16.2.4 (Remedies for Failure to Meet Safety Standards or Perform Safety Compliance),

---

16.2.5 (City Step-in Rights), 16.2.7 (Performance Bond), 16.2.8 (Suspension of Work), 16.2.9 (Other Rights and Remedies), or 17.3.1 (PPC Defaults Triggering City Termination Rights) of the IF DBFOM Agreement or in respect of the IFM Contract or D&C Contract, unless the grounds for termination or giving notice of termination pursuant to Section 17.3.1 (PPC Defaults Triggering City Termination Rights) of the IF DBFOM Agreement or exercising its rights under the above listed sections of the IF DBFOM Agreement are failure by the Step-in Party to perform Principal Project Company's obligations under the IF DBFOM Agreement;

- (b) not suspend its performance (including in connection with any insolvency or bankruptcy proceeding in relation to Principal Project Company) under the IF DBFOM Agreement, unless the grounds for suspension of performance are failure by the Step-in Party to perform Principal Project Company's obligations under the IF DBFOM Agreement;
- (c) not take or support any action for the liquidation, bankruptcy, administration, receivership, reorganization, dissolution or winding up of Principal Project Company or for the composition or readjustment of Principal Project Company's debts, or any similar insolvency procedure in relation to Principal Project Company, or for the appointment of a receiver, trustee, custodian, sequestrator, conservator, liquidator, administrator or similar official for Principal Project Company or for any part of Principal Project Company's property;
- (d) continue to make payments required to be made to Principal Project Company under the IF DBFOM Agreement to the Proceeds Account or to an alternate account designated by the Collateral Agent in accordance with Section 7.4; and
- (e) endorse or pay over, as directed by the Collateral Agent, any checks received by City with respect to, or funds drawn by City under, the Performance Bond; provided that the Collateral Agent reimburses City for any Losses incurred by City in attempting to cure the PPC Default as and to the extent: (i) City is entitled to such reimbursement pursuant to the IF DBFOM Agreement; (ii) City has promptly notified the Collateral Agent of such Losses at or prior to the time of endorsement or payment and (iii) the Collateral Agent's obligation to reimburse City for such Losses does not exceed the proceeds from any such security.

**10.3** City shall owe its obligations under the IF DBFOM Agreement and this Direct Agreement to Principal Project Company and the Step-in Party jointly; provided that:

- (a) the receipt of, or performance by City in favor of, either such Step-in Party or Principal Project Company shall be a good and effective discharge of City's obligations under this Direct Agreement and the IF DBFOM Agreement;
- (b) the Collateral Agent shall be entitled at any time by notice in writing to City to direct (such direction being binding on the Collateral Agent, City and Principal Project Company) that, at all times during the Step-in Period, the Step-in Party shall be solely entitled to make any decisions, to give any directions, approvals or consents, to receive any payments or otherwise to deal with City under the IF DBFOM Agreement and this Direct Agreement; and

- 
- (c) any amount due from Principal Project Company to City under the IF DBFOM Agreement or this Direct Agreement as of the Step-in Date and notified to such Step-in Party prior to the Step-in Date shall be paid to City on the Step-in Date, failing which City shall be entitled to exercise its rights under the IF DBFOM Agreement in respect of the amount so due and unpaid.

**10.4** Principal Project Company shall not be relieved from any of its obligations under the IF DBFOM Agreement or this Direct Agreement, whether arising before or after the Step-in Date, by reason of the Step-in Party exercising the rights provided herein, except to the extent provided in Section 8.2 and Section 11 (Step-out).

## **11. STEP-OUT**

A Step-in Party may, at any time, by giving not less than 30 days' prior written notice ("**Step-out Notice**") to City terminate its obligations to City under this Direct Agreement, in which event such Step-in Party shall be released from all obligations under this Direct Agreement, except for any obligation or liability of the Step-in Party arising during the Step-in Period. The obligations of City to the Step-in Party under this Direct Agreement shall also terminate on the Step-Out Date. Notwithstanding the foregoing, this Direct Agreement shall continue to remain effective according to its terms after the Step-Out Date if the Step-in Party is the Collateral Agent or a Lender.

## **12. SUBSTITUTION ENTITIES AND SUBSTITUTION PROPOSALS**

**12.1** Any payment to be made or action to be taken by the Collateral Agent as a prerequisite to keeping the IF DBFOM Agreement in effect shall be deemed properly to have been made or taken by the Collateral Agent if such payment is made or action is taken by a Substituted Entity proposed by the Collateral Agent and reasonably approved by City. City shall have no obligation to recognize any claim to PPC's Interest by any person or entity that has acquired PPC's Interest by, through, or under any Security Document or whose acquisition shall have been derived immediately from any holder thereof, unless such person or entity is a Substituted Entity reasonably approved by City in accordance with this Section 12 (Substitution Entities and Substitution Proposals).

**12.2** The Collateral Agent may give a notice ("**Substitution Notice**") under this Section 12 (Substitution Entities and Substitution Proposals) in writing to City at any time:

- (a) during any Cure Period;
- (b) during any Step-in Period; or
- (c) after delivery of a Lender Notice of the occurrence of any Event of Default and prior to delivery by the Collateral Agent to City of a further notice under Section 7.9.

**12.3** In any Substitution Notice, the Collateral Agent shall notify City that it intends to designate a Substituted Entity.

**12.4** The Collateral Agent shall, as soon as practicable, provide to City the information regarding the proposed Substituted Entity and any third party entering into a material

---

subcontract with such Substituted Entity as required by this Section 12 (Substitution Entities and Substitution Proposals), including:

- (a) the name and address of the proposed Substituted Entity;
- (b) the names of the proposed Substituted Entity's shareholders or members and the share capital or partnership or membership interests, as the case may be, held by each of them;
- (c) the manner in which the proposed Substituted Entity will be financed and the extent to which such financing is committed;
- (d) copies of the proposed Substituted Entity's most recent financial statements (and if available such financial statements shall be for the last three financial years) or in the case of a newly-formed special purpose company its opening balance sheet;
- (e) a copy of the proposed Substituted Entity's formation documents;
- (f) details of the resources available to the proposed Substituted Entity and the proposed Substituted Entity's appropriate qualifications, experience and technical competence available to the proposed Substituted Entity to enable it to perform the obligations of Principal Project Company under the IF DBFOM Agreement;
- (g) the names of the proposed Substituted Entity's directors and any key personnel who will have responsibility for the day-to-day management of its participation in the Project;
- (h) a rectification plan providing details of the plan to rectify Principal Project Company's breaches with respect to the breaches which are capable of being rectified by the Substituted Entity;
- (i) such other information, evidence and supporting documentation concerning the identity, financial resources, pre-qualifications, experience and potential conflicts of interest of the proposed Substituted Entity and its contractors as City may reasonably request; and
- (j) such evidence of organization, authority, incumbency certificates, certificates regarding debarment or suspension, and other certificates, representations and warranties as City may reasonably request.

**12.5** City will approve or disapprove a proposed Substituted Entity within 45 days after it confirms receipt from the Collateral Agent of a request for approval together with the information required under Section 12.4. City will evaluate the financial resources, qualifications, experience and potential conflicts of interest of the proposed Substituted Entity and its contractors using the same standards and criteria that it is then currently applying, or if there is no current application, then the same standards and criteria it most recently applied, to the evaluation of Persons responding to City's requests for qualifications for concession or similar agreements for comparable projects and facilities.

---

**12.6** City shall have no obligation to approve the proposed Substituted Entity:

- (a) unless the Collateral Agent demonstrates to City's reasonable satisfaction that:
  - (i) the proposed Substituted Entity and its contractors collectively have the financial resources, qualifications and experience to timely perform Principal Project Company's obligations under the Contract Documents and Key Contracts to which Principal Project Company is a party; (ii) the proposed Substituted Entity and its contractors, each of their respective direct and indirect beneficial owners, any proposed key personnel, each of their respective officers and directors and each of their respective affiliates have a good and sound background and reputation (including the absence of criminal, civil or regulatory claims or actions against any such Person, and each such Person's adherence to Good Industry Practice, contract terms and applicable standards regarding past or present performance on comparable projects); and (iii) the proposed Substituted Entity and its contractors are in compliance with City's rules, regulations and adopted written policies regarding pre-qualification and organizational conflicts of interest;
- (b) if there are unremedied breaches under the IF DBFOM Agreement and there is no rectification plan reasonably acceptable to City with respect to the breaches which are capable of being rectified by the Substituted Entity; and
- (c) if any proposed security interests to be granted by the proposed Substituted Entity to the Collateral Agent and/or the Lender in addition to (or substantially different from) the security interests granted to the Collateral Agent and/or the Lender under the Initial Financing Documents materially and adversely affect the ability of the Substituted Entity to perform Principal Project Company's obligations under the Contract Documents or have the effect of increasing any liability of City, whether actual or potential (unless a Rescue Refinancing is concurrently proposed, in which case the Lenders' Liabilities may increase by up to 10%).

**12.7** The Collateral Agent may request approval of more than one Substituted Entity. The Collateral Agent may request approval at any time or times. Any approval by City of a Substituted Entity shall expire (unless otherwise agreed in writing by City) one year after the approval is issued if the Substituted Entity has not succeeded to PPC's Interest within that period of time. City may revoke an approval if at any time prior to succeeding to PPC's Interest the Substituted Entity ceases to be in compliance with City's rules and regulations regarding organizational conflicts of interest. If the Substituted Entity succeeds to PPC's Interest, then City shall not be entitled to terminate due to Noncompliance Points accumulated by Principal Project Company prior to its replacement by the Substituted Entity, provided the Noncompliance Event that resulted in such Noncompliance Points are being cured by the Substituted Entity as quickly as practicable using commercially reasonable efforts. Once all Noncompliance Events have been cured, City shall cancel any Noncompliance Points accrued prior to succession.

**12.8** Notwithstanding the foregoing, any entity that is wholly owned by a Lender or group of Lenders shall be deemed a Substituted Entity, without necessity for City approval, upon delivery to City of documentation proving that the entity is duly formed, validly existing and wholly owned by the Lender, including a certificate signed by a duly authorized officer of each Lender in favor of City certifying, representing and warranting such ownership.

---

### 13. SUBSTITUTION

**13.1** If City approves (or is deemed to have approved) a Substitution Notice pursuant to Section 12 (Substitution Entities and Substitution Proposals), the Substituted Entity named therein shall execute a duly completed Substitute Accession Agreement substantially in the form attached to this Direct Agreement as Schedule A and submit it to City (with a copy thereof to the other parties to this Direct Agreement) and such assignment shall become effective on and from the date on which City countersigns the Substitute Accession Agreement (the “**Substitution Effective Date**”) or the date that is 10 days after the date City receives the completed Substitute Accession Agreement if City fails to sign the Substitute Accession Agreement.

**13.2** As of the Substitution Effective Date:

- (a) such Substituted Entity shall become a party to the IF DBFOM Agreement and this Direct Agreement in place of Principal Project Company who shall be immediately released from its obligations arising under, and cease to be a party to, the IF DBFOM Agreement and this Direct Agreement from and after Substitution Effective Date;
- (b) all of Principal Project Company’s obligations and liabilities under the IF DBFOM Agreement and under this Direct Agreement arising from and after the Substitution Effective Date shall be immediately and automatically transferred to the Substituted Entity;
- (c) such Substituted Entity shall exercise and enjoy the rights and perform the obligations of Principal Project Company under the IF DBFOM Agreement and this Direct Agreement; and
- (d) City shall owe its obligations (including any undischarged liability with respect to any loss or damage suffered or incurred by Principal Project Company prior to the Substitution Effective Date) under the IF DBFOM Agreement and this Direct Agreement to such Substituted Entity in place of Principal Project Company, subject to City’s right to offset any losses or damages suffered or incurred by City as provided under the IF DBFOM Agreement and this Direct Agreement.

**13.3** City shall use its reasonable efforts to facilitate the transfer to the Substituted Entity of Principal Project Company’s obligations under the IF DBFOM Agreement and this Direct Agreement.

**13.4** The Substituted Entity shall pay to City on the Substitution Effective Date any amount due to City under the IF DBFOM Agreement and this Direct Agreement, including City’s reasonable costs and expenses incurred in connection with (a) Principal Project Company’s default and termination, (b) City’s activities with respect to the Project during any period City was in possession of the Project, and (c) the approval of the Substituted Entity, all as of the Substitution Effective Date and notified to such Substituted Entity prior to the Substitution Effective Date. City’s receipt of the payment pursuant to this Section 13.4 shall be a condition precedent to the Substitution Effective Date.

**13.5** As of the Substitution Effective Date:

- 
- (a) any right of termination suspended by virtue of Section 8.1 shall be of no further effect and City shall not be entitled to terminate or suspend performance of the IF DBFOM Agreement and this Direct Agreement by virtue of any act, omission or circumstance that occurred prior to such Substitution Effective Date; and
  - (b) City shall enter into an equivalent direct agreement on substantially the same terms as this Direct Agreement, save that Principal Project Company shall be replaced as a party by the Substituted Entity.

#### 14. REVIVAL OF REMEDIES

14.1 If a City Notice has been given, the grounds for that notice are continuing and have not been remedied or waived and:

- (a) as of the end of the Cure Period, no Step-in Notice has been given and no Substituted Entity becomes a party to the IF DBFOM Agreement and this Direct Agreement; or
- (b) the Step-in Period ends without a Substituted Entity becoming a party thereto,

then, from and after the date such Cure Period or such Step-in Period, as the case may be, expires (the “**Revival Date**”), City shall be entitled to:

- (i) act upon any and all grounds for termination or suspension available to it in relation to the IF DBFOM Agreement in respect of defaults under the IF DBFOM Agreement not remedied or waived;
- (ii) pursue any and all claims and exercise any and all remedies against Principal Project Company; and
- (iii) if and to the extent that it is then entitled to do so under the IF DBFOM Agreement, take or support any action of the type referred to in Section 16.2 (City Remedies for PPC Default) of the IF DBFOM Agreement.

#### 15. NEW PROJECT AGREEMENT

15.1 If:

- (a) the IF DBFOM Agreement is rejected by a trustee or debtor-in-possession in, or terminated as a result of, any bankruptcy or insolvency proceeding involving Principal Project Company, or
- (b) a PPC Default under Section 16.1.1(m) of the IF DBFOM Agreement occurs with respect to any Equity Member with a material financial obligation owing to Principal Project Company for a Committed Investment, and Equity Members’ obligations relating to Principal Project Company or the Project are rejected by a trustee or debtor-in-possession in, or terminated as a result of any bankruptcy or insolvency proceeding involving such Equity Member and, within 90 days after such rejection or termination, the Collateral Agent shall so request and shall

certify in writing to City that it intends to perform the obligations of Principal Project Company as and to the extent required under the IF DBFOM Agreement,

then City will execute and deliver to the Collateral Agent (or any Substituted Entity satisfying the requirements of this Direct Agreement if directed to do so by the Collateral Agent) a new project agreement. Such new project agreement shall contain conditions, agreements, terms, provisions and limitations which are the same as those of the IF DBFOM Agreement, except for any obligations that have been fulfilled by Principal Project Company, any party acting on behalf of or stepping-in for Principal Project Company or City prior to such rejection or termination. References in this Direct Agreement to the "Agreement" shall be deemed also to refer to any such new project agreement.

## **16. RECEIVERS**

**16.1** The appointment of a receiver at the behest of Principal Project Company shall be subject to City's prior written approval in its sole discretion. The appointment of a receiver at the behest of any Lender shall be subject to the following terms and conditions:

- (a) City's prior approval shall not be required for the appointment of the receiver or the selection of the Person to serve as receiver;
- (b) whenever any Lender commences any proceeding for the appointment of a receiver, the Collateral Agent shall serve on City not less than ten (10) days' prior written notice of the hearing for appointment and of the Lender's pleadings and briefs in the proceeding;
- (c) City may appear in any such proceeding to challenge the selection of the Person to serve as receiver, but waives any other right to oppose the appointment of the receiver; and
- (d) City may at any time seek an order for replacement of the receiver by a different receiver.

**16.2** No receiver appointed at the behest of Principal Project Company or any Lender shall have any power or authority to replace the IFM Contractor or D&C Contractor except by reason of default or unless the replacement is a Substituted Entity reasonably approved or deemed approved by City.

## **17. ESTOPPEL CERTIFICATES**

**17.1** At any time and from time to time, within 30 days after written request of any Lender or proposed Lender, City, without charge, shall certify by written instrument duly executed and acknowledged, to any Lender or proposed Lender as follows:

- (a) as to whether the IF DBFOM Agreement has been supplemented or amended, and if so, attaching a copy of such supplement or amendment to such certificate;
- (b) as to the validity and force and effect of the IF DBFOM Agreement against City, in accordance with its terms, subject to applicable bankruptcy, insolvency and

similar laws affecting the enforceability of creditors' rights generally and the general principles of equity;

- (c) as to the existence of any PPC Default of which City has Actual Knowledge;
- (d) as to the existence of events which, by the passage of time or notice or both, would constitute a PPC Default, to City's Actual Knowledge;
- (e) as to the then accumulated amount of Noncompliance Points;
- (f) as to the existence of any Claims by City regarding the IF DBFOM Agreement; and
- (g) as to the Effective Date and the expiration date of the Term.

**17.2** City shall deliver the same certified, written instrument to a Substituted Entity or proposed Substituted Entity within fifteen (15) days after receiving its written request, provided that the request is delivered to City either before the proposed Substituted Entity succeeds to PPC's Interest or within sixty (60) days after the Substituted Entity has succeeded to PPC's Interest.

**17.3** Any such certificate may be relied upon by, and only by, the Lender, proposed Lender, Substituted Entity or proposed Substituted Entity to whom the same may be delivered, and the contents of such certificate shall be binding on City.

## **18. GENERAL**

**18.1** Neither the Lender nor the Collateral Agent shall have any obligation hereunder to extend credit to City or any contractor to City at any time, for any purpose.

**18.2** For so long as any amount under the Financing Documents is outstanding, City shall not, without the prior written consent of the Collateral Agent, consent to any assignment, transfer, pledge or hypothecation of the IF DBFOM Agreement or any interest therein by Principal Project Company, other than as specified in the IF DBFOM Agreement or this Direct Agreement.

**18.3** No Lender holding Equity Member Debt, whether secured or unsecured, shall have any rights, benefits or protections under this Direct Agreement.

## **19. TERMINATION**

This Direct Agreement shall remain in effect until the earlier to occur of (a) the Discharge Date; (b) the time at which all of City's obligations and liabilities have expired or have been satisfied in accordance with the terms of the IF DBFOM Agreement and this Direct Agreement; and (c) any assignment to a Substituted Entity has occurred under Section 13 (Substitution) and City shall have entered into an equivalent direct agreement on substantially the same terms as this Direct Agreement, save that Principal Project Company has been replaced as a party by the Substituted Entity.

## **20. EFFECT OF BREACH**

Without prejudice to any rights a party may otherwise have, a breach of this Direct Agreement shall not of itself give rise to a right to terminate the IF DBFOM Agreement.

## **21. NO PARTNERSHIP**

Nothing contained in this Direct Agreement shall be deemed to constitute a partnership between the parties to this Direct Agreement. None of the parties shall hold itself out contrary to the terms of this Section 21 (No Partnership).

## **22. REMEDIES CUMULATIVE; NO WAIVER**

No failure or delay by City, the Lenders or the Collateral Agent (or their designee) in exercising any right or power hereunder shall operate as a waiver thereof, nor shall any single or partial exercise of any such right or power, or any abandonment or discontinuance of steps to enforce such a right or power, preclude any other or further exercise thereof or the exercise of any other right or power. The remedies provided herein are cumulative and not exclusive of any remedies provided by law and may be exercised by the Lenders, the Collateral Agent or any designee, transferee or assignee thereof from time to time. In no event shall any provision of this Direct Agreement or any consent to any departure by any party therefrom be effective unless such waiver is permitted by Section 23 (Amendment), and then such waiver or consent shall be effective only in the specific instance and for the purpose for which given.

## **23. AMENDMENT**

No amendment, modification or waiver of any provision of this Direct Agreement, or consent to any departure herefrom by any party to this Direct Agreement, shall be effective against any party to this Direct Agreement unless the same shall be in writing and signed by the party against whom enforcement is sought, and then such amendment or waiver shall be effective only in the specific instance and for the specific purpose for which it was given.

## **24. SUCCESSORS AND ASSIGNS**

**24.1** No party to this Direct Agreement may assign or transfer any part of its rights or obligations hereunder without the consent of the other parties, save that the Collateral Agent may assign or transfer its rights and obligations hereunder to a successor Collateral Agent in accordance with the Financing Documents. In connection with any such assignment or transfer, City agrees to enter into a new Direct Agreement with the successor Collateral Agent on terms that are substantially the same as those of this Direct Agreement.

**24.2** This Direct Agreement shall be binding upon and inure to the benefit of the parties to this Direct Agreement and their respective successors and permitted assigns.

## **25. COUNTERPARTS**

This Direct Agreement may be executed in any number of counterparts, each of which shall be identical and all of which, taken together, shall constitute one and the same instrument, and the parties may execute this Direct Agreement by signing any such counterpart. Transmission by facsimile or electronic mail of an executed counterpart of this Direct Agreement shall be deemed

to constitute due and sufficient delivery of such counterpart, to be followed thereafter by an original of such counterpart. The Parties, in the manner specified by City, may sign this Direct Agreement electronically.

**26. SEVERABILITY**

If, at any time, any provision of this Direct Agreement is or becomes illegal, invalid or unenforceable in any respect under any law of any jurisdiction, neither the legality, validity or enforceability of the remaining provisions nor the legality, validity or enforceability of such provision under the law of any other jurisdiction will in any way be affected or impaired.

**27. NOTICES**

**27.1** Any notice, approval, election, demand, direction, consent, designation, request, agreement, instrument, certificate, report or other communication required or permitted to be given or made under this Direct Agreement (each, a notice) to a party must be given via written correspondence and email. All notices will be validly given if given on a Business Day to each party at the following address:

To City: San Francisco Municipal Transportation Agency  
1 South Van Ness, 8th Floor  
San Francisco, CA 94103  
Attn: Chris Lazaro  
Email: [Chris.Lazaro@sfmta.com](mailto:Chris.Lazaro@sfmta.com)

with copies to: Office of the City Attorney  
City Hall, Room 234  
1 Dr. Carlton B. Goodlett Place  
San Francisco, California 94102-4682  
Attn: Real Estate & Finance Group  
Re: Potrero Yard Modernization Project  
[Email: isidro.jimenez@sfcityatty.org](mailto:isidro.jimenez@sfcityatty.org)

To Principal Project Company: [Address]  
Attention: [\_\_\_\_]  
E-Mail: [\_\_\_\_]

with copies to: [Address]  
Attention: [\_\_\_\_]  
E-Mail: [\_\_\_\_]

To the Collateral Agent: [\_\_\_\_]  
[Address]  
Attention: [\_\_\_\_]  
Email: [\_\_\_\_]

**27.2** A notice shall be deemed to have been given on the earliest of:

- (a) date of receipt, if delivered in person;

- 
- (b) date of receipt (confirmed by automatic answer back or equivalent evidence of receipt), if validly transmitted electronically before 3:00 p.m. (local time at the place of receipt) on a Business Day;
  - (c) one Business Day after delivery to the courier properly addressed, if delivered by overnight courier; and
  - (d) four Business Days after deposit with postage prepaid and properly addressed, if delivered by United States certified or registered mail.

**27.3** Each of the parties will notify each other via written correspondence and email of any change of address, such notification to become effective 15 days after notification.

## **28. GOVERNING LAW AND JURISDICTION**

**28.1** The venue for any litigation arising out of, relating to or resulting from any matter relating to this Direct Agreement shall be in San Francisco, California to the extent that a court located in San Francisco has subject matter jurisdiction.

**28.2** This Direct Agreement shall be governed by and construed in accordance with the laws of the State of California, any applicable federal law, the San Francisco City Charter and Municipal Code, and the ordinances, regulations, codes, and Executive Orders enacted and/or promulgated pursuant thereto.

**28.3** Each of Principal Project Company, City and the Collateral Agent irrevocably consents to service of process by personal delivery, certified mail, postage prepaid or overnight courier. Nothing in this Direct Agreement will affect the right of any party to serve process in any other manner permitted by law.

**28.4** Each of City, Principal Project Company and the Collateral Agent (a) certifies that no representative, agent or attorney of another party has represented, expressly or otherwise, that such party would not, in the event of a proceeding, seek to enforce the mutual waivers in this Section 28 (Governing Law and Jurisdiction) and (b) acknowledges that it has been induced to sign, or change its position in reliance upon the benefits of, this Direct Agreement by, among other things, the mutual waivers and certifications in this Section 28 (Governing Law and Jurisdiction).

## **29. CONFLICT WITH PROJECT AGREEMENT**

In the event of any conflict or inconsistency between the provisions of this Direct Agreement and the IF DBFOM Agreement, the provisions of this Direct Agreement shall prevail.

**IN WITNESS WHEREOF**, each of the parties to this Direct Agreement has caused this Direct Agreement to be duly executed by its duly authorized officer as of the date first written above.

**[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]**

**[INSERT COLLATERAL AGENT'S NAME]**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**[INSERT PRINCIPAL PROJECT COMPANY'S NAME]**

CA Contractors License No.: \_\_\_\_\_

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**CITY AND COUNTY OF SAN FRANCISCO**

By: \_\_\_\_\_

Jeffrey Tumlin  
Director of Transportation

**Approved as to Form**  
**David Chiu, City Attorney**

Date: \_\_\_\_\_

By: \_\_\_\_\_  
[ \_\_\_\_\_ ]  
Deputy City Attorney

**Attest:**

By: \_\_\_\_\_  
Secretary (Signature)

Print Name: \_\_\_\_\_

[SEAL]

---

**SCHEDULE A**  
**Form of Substitute Accession Agreement**

[Date]

To: City and County of San Francisco  
For the attention of: Contracting Officer and Chief Counsel  
[Lender and other parties to Financing Agreements to be listed]  
[insert address]  
For the attention of: [\_\_\_\_\_]

From: *[Substituted Entity]*

**POTRERO YARD MODERNIZATION PROJECT: INFRASTRUCTURE FACILITY**  
**SUBSTITUTE ACCESSION AGREEMENT**

Ladies and Gentlemen:

Reference is made to the Design-Build-Finance-Operate-Maintain Agreement, dated as of [\_\_\_\_\_], 2025 (as amended, amended and restated, supplemented or otherwise modified from time to time, the "**IF DBFOM Agreement**") between the City and County of San Francisco ("**City**"), a municipal corporation, acting by order of and through the San Francisco Municipal Transportation Agency, and [\_\_\_\_\_] ("**Principal Project Company**") and the Direct Agreement, dated as of [\_\_\_\_\_], 2025 (as amended, amended and restated, supplemented or otherwise modified from time to time, the "**Direct Agreement**") among City, Principal Project Company and [\_\_\_\_\_], as Collateral Agent. Terms defined in the Direct Agreement and not otherwise defined herein have the respective meanings set forth in or incorporated into in the Direct Agreement.

1. We confirm that we are a Substituted Entity pursuant to Section 13 (Substitution) of the Direct Agreement.
2. We acknowledge and agree that, upon and by reason of our execution of this Substitute Accession Agreement, we will become a party to the IF DBFOM Agreement and the Direct Agreement as a Substituted Entity and, accordingly, shall have the rights, powers and obligations of Principal Project Company under the IF DBFOM Agreement and the Direct Agreement.
3. Our address, telephone number and address for electronic mail for the purpose of receiving notices are as follows:

*[Contact details of Substituted Entity]*

4. This Substitute Accession Agreement is subject to and shall be construed and interpreted in accordance with the laws of the State of California, any applicable federal law, the San Francisco City Charter and Municipal Code, and the ordinances, regulations, codes, and Executive Orders enacted and/or promulgated pursuant thereto.

---

The terms set forth herein are agreed to:

[Substituted Entity]

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_

Agreed for and on behalf of:

**CITY AND COUNTY OF SAN FRANCISCO**

By: \_\_\_\_\_  
Jeffrey Tumlin  
Director of Transportation

**Approved as to Form**  
**David Chiu, City Attorney**

Date: \_\_\_\_\_

By: \_\_\_\_\_  
[ \_\_\_\_\_ ]  
Deputy City Attorney

**Attest:**

By: \_\_\_\_\_  
Secretary (Signature)

Print Name: \_\_\_\_\_

[SEAL]

## **EXHIBIT 5C**

### **CALCULATION OF REFINANCING GAIN**

#### **1. Calculation of the Refinancing Gain**

The total amount of Refinancing Gain equals  $(A - B)$ , as calculated in accordance with this Exhibit 5C (Calculation of the Refinancing Gain), provided that such amount is greater than zero. Each of the variables used to calculate Refinancing Gain shall be determined as follows:

##### **1.1 Create a Pre-Refinancing Financial Model**

Principal Project Company shall create a pre-Refinancing financial model (the “**Pre-Refinancing Financial Model**”) by updating the Financial Model then in effect for actual and projected Project Financial Performance so as to be current immediately prior to the Refinancing, but excluding the impact of the current Refinancing. The Pre-Refinancing Financial Model shall take into account any Refinancing that qualifies as an Exempt Refinancing (under clause (a) of the definition of Exempt Refinancing) exactly as it was reflected in the Base Case Financial Model. In the Pre-Refinancing Financial Model, the resulting net present value of Distributions projected from the anticipated date of the Refinancing through to the end of the Term, discounted at the Original Equity IRR, shall be the value of “B”.

##### **1.2. Create a Post-Refinancing Financial Model**

Principal Project Company shall create a post-Refinancing financial model (the “**Post-Refinancing Financial Model**”) by updating the Pre-Refinancing Financial Model for the impact of the Refinancing, including costs reasonably incurred to achieve the Refinancing. In the Post-Refinancing Financial Model, the resulting net present value of Distributions projected from the anticipated date of the Refinancing through to the end of the Term, discounted at the Original Equity IRR, shall be the value of “A”.

#### **2. Calculating City’s 50% Entitlement**

##### **2.1 Create a Final Refinancing Financial Model**

**2.1.1** Principal Project Company shall create a final refinancing financial model by updating the Post-Refinancing Financial Model to reflect the impact of the amounts and timing of the payment(s) (or credits) to be made to City under Section 4.5 (Refinancing Gain) of the Agreement, such that the net present value of such payments, discounted at the Original Equity IRR, is equal to 50% of the amount equal to  $(A - B)$ . The resulting nominal post-tax equity internal rate of return shall be deemed to be the “**Refinancing Equity IRR.**”

**2.1.2** If the Refinancing Equity IRR is lower than the Original Equity IRR, then Principal Project Company shall adjust the amounts and timing of the payment(s) (or credits) to be made to City under Section 4.5 (Refinancing Gain) of the Agreement, such that the Refinancing Equity IRR would be increased to a level up to, but not in excess of, the Original Equity IRR.

### **3. Mutual Agreement and Financial Model Update**

Subject to the mutual agreement by Principal Project Company and City of the Refinancing Gain calculations and entitlement amount, Principal Project Company shall prepare a Financial Model Update to the Financial Model then in effect in accordance with Section 4.7.2 (Updates to the Financial Model) of the Agreement that incorporates actual and projected Project Financial Performance, the impact of the Refinancing and the sharing of the Refinancing Gain.

**EXHIBIT 5D**

**FORM OF OPINION FROM CITY'S LEGAL COUNSEL**

***[City Attorney's Office Letterhead]***

1. ***[Insert Address of Principal Project Company and Lender(s)]***

\_\_\_\_\_, 2025

Ladies and Gentlemen:

I am a Deputy City Attorney assigned to provide counsel to the City and County of San Francisco ("**City**"), a municipal corporation acting by and through the San Francisco Municipal Transportation Agency ("**SFMTA**"), and as such have advised City in connection with its execution of:

(i) the Infrastructure Facility Design-Build-Finance-Operate-Maintain Agreement for the Potrero Yard Modernization Project dated as of [\_\_\_\_], 2025 by and between the City and [\_\_\_\_], a [\_\_\_\_] (the "**Principal Project Company**"); and

(ii) the Direct Agreement dated as of [\_\_\_\_], 2025 by and between the City, the Principal Project Company and [\_\_\_\_], the collateral agent for the Lenders.

The agreements in clauses (i) – (ii) are collectively referred to hereinafter as the "**City Agreements**".

We have examined executed originals or copies identified to our satisfaction of each of the City Agreements. We have further examined such other documents, certificates and other materials as we have deemed necessary in order to render the opinions expressed herein.

With respect to the various factual matters material to my opinion, we have relied upon certificates and representations of the City and other public officials. We have assumed the due execution and delivery, pursuant to due authorization of the City Agreements by parties other than the City, the validity and binding effect thereof as to such other parties and the genuineness of all signatures (other than those of the City) on all documents seen or reviewed by us, the authenticity of all documents submitted to us as originals and the conformity with the original documents of all documents submitted to us as copies.

Whenever an opinion expressed herein is stated to be to my knowledge, or known to me, it means that, during the course of my representation of the City, I have not acquired information giving me actual knowledge of the existence or absence of the facts forming the basis for such opinion, and that, except to the extent expressly set forth herein I have not conducted an independent investigation to determine the existence or absence of such facts.

Based on the foregoing, I am of the opinion that:

1. Ordinance No. 38-21, adopted by the Board of Supervisors on March 16, 2021, has been duly enacted and is in full force and effect.

2. The City and County of San Francisco is a charter city and municipal corporation duly organized and validly existing under the Constitution of the State of California.
3. The City is duly organized and operating pursuant to the San Francisco Charter and has the full legal capacity, right, power and authority to enter into and deliver the City Agreements. The City has the full legal capacity, right, power and authority to carry out and perform its obligations under the City Agreements.
4. Each of the City Agreements has been duly authorized, executed and delivered by the City, and such documents are legal, valid and binding instruments of the City and are enforceable against the City in accordance with their terms, except as enforceability may be limited or otherwise affected by (a) bankruptcy, insolvency, reorganization, moratorium and other laws affecting the rights of creditors generally, (b) principles of equity, whether considered at law or in equity, (c) the sovereign immunity of the City; provided that sovereign immunity shall not bar the enforcement of claims presented in accordance with the provisions of the applicable City Agreement, City Charter and Administrative Codes and California law, so long as such claims are based on contractual rights, and (d) the limitations and conditions set forth herein.
5. The execution and delivery by the City of the City Agreements and the performance of its obligations under the City Agreements are within its powers and do not and will not conflict with, or constitute a breach or result in a violation of (a) any existing constitutional or statutory provision of the State of California, (b) to my knowledge, any existing agreement or other instrument to which the City is a party or by which it is bound, or (c) to my knowledge, any existing order, rule, regulation, judgment, decree ordinance of any court, government or governmental authority having jurisdiction over the City as applicable or its properties.
6. All official action required to be taken by the City and all consents, approvals, authorizations or orders of or filings with or notice to, any governmental or regulatory authority necessary to authorize and enable the City to execute and deliver the City Agreements or to authorize and enable City to perform its obligations thereunder (other than acts under the City Agreements that may be taken by City in the future) have been taken and obtained.

The opinions expressed in this letter are limited to the opinions expressly stated, and no other opinions should be inferred. The opinions are expressed only as of the date hereof.

Sincerely,

*[Insert Signature]*

**EXHIBIT 5E**

**FORM OF OPINION FROM PRINCIPAL PROJECT COMPANY'S LEGAL COUNSEL**

*[Insert Firm Letterhead]*

*[Insert City Address]*

*[Insert Lender Addressees]*

\_\_\_\_\_, 2025

Ladies and Gentlemen:

We [\_\_\_\_\_] ("**Firm**") have acted as special counsel to [\_\_\_\_\_] a [\_\_\_\_\_] (the "**Principal Project Company**") in connection with the Infrastructure Facility Design-Build-Finance-Operate-Maintain Agreement for the Potrero Yard Modernization Project dated as of [\_\_\_\_], 2025 (the "**Agreement**") between the City and County of San Francisco ("**City**"), a municipal corporation acting by and through the San Francisco Municipal Transportation Agency ("**SFMTA**"), and the Principal Project Company (Contract # \_\_\_\_). This opinion is being furnished pursuant to Section 3.2.4 (Conditions Precedent to Financial Close) of the Agreement. Capitalized terms used herein without definition have the meanings ascribed to such terms in the Agreement.

In connection with the opinions contained herein, we have examined executed counterparts, or copies of such executed counterparts certified or otherwise identified to our satisfaction, of:

- (i) the Agreement;
- (ii) the Direct Agreement, by and between the City, the Principal Project Company and the Collateral Agent;
- (iii) the Equity Members Funding Agreements;
- (iv) the D&C Contract;
- (v) the IFM Contract; and
- (vi) the Financing Documents.

***[add other agreements, if necessary]***

Collectively, (i) through (iv) above shall be hereinafter referred to as the "**Transaction Documents**".

We have further examined and relied upon the accuracy of original, certified, conformed, photocopied or telecopied copies of such records, agreements, certificates and other

documents as we have deemed necessary or appropriate to enable us to render the opinions expressed herein. In all such examinations we have assumed the genuineness of signatures on original documents and the conformity to such original documents of all copies submitted to us as certified, conformed, photocopied or telecopied copies. We have further assumed that none of such documents has been subsequently rescinded, revoked, restated, modified or amended in any way other than by documents that have been submitted to us. We have made no independent inquiry or investigation of any factual matters or circumstances relevant to the opinions herein set forth, but instead have relied solely upon the accuracy of oral or written statements and representations of officers and other representatives of the Principal Project Company, statements, representations and warranties made in the Transaction Documents.

In our examination, we have assumed, without independent investigation, the following:

- (i) the Transaction Documents have been duly authorized, executed and delivered by each party thereto (other than the Principal Project Company);
- (ii) that each party (other than the Principal Project Company) to each Transaction Document is duly organized, validly existing and in good standing under the laws of the jurisdiction of its organization, and has full power and authority to enter into and to carry out its obligations under such Transaction Document;
- (iii) the authorization, execution and delivery by each party (other than the Principal Project Company) of each Transaction Document to which it is a party does not, and such party's performance thereunder will not, breach, conflict with, or constitute a violation of, (A) the organizational documents, bylaws or similar governing documents of such party or (B) any laws or any writ, order, injunction or decree of any court or governmental authority or any provision of any agreement or instrument to which such party or its properties may be bound;
- (iv) that each Transaction Document is the legal, valid and binding obligation of each party thereto (other than the Principal Project Company) enforceable against such party in accordance with the terms of such Transaction Document;
- (v) the legal capacity and competency of all Persons signing the Transaction Documents on behalf of the parties thereto (other than the Principal Project Company); and
- (vi) that each party to the Transaction Documents (other than the Principal Project Company) has all necessary governmental consents, approvals, licenses or permits required in order to execute and deliver the Transaction Documents to which it is a party.

The opinions set forth below that make reference to, or are stated to be qualified by, the expression "to our knowledge" or any expression of similar import are limited to the current actual knowledge of the individual attorneys at this Firm who have devoted substantial attention to the representation of the Principal Project Company in connection with the preparation, negotiation, execution and delivery of the Transaction Documents (but not the knowledge of any other attorney

of this Firm or any constructive or imputed knowledge of any information, whether by reason of our representation of the Principal Project Company or otherwise). We have not undertaken an independent investigation to determine the accuracy of any such statement, and any limited inquiry undertaken by us during the preparation of this letter should not be regarded as such an investigation.

Based upon the foregoing and our examination of such questions of law as we have deemed necessary or appropriate, and subject to limitations and qualifications set forth below, it is our opinion that:

1. The Principal Project Company is a [\_\_\_] validly existing and in good standing under the laws of [\_\_\_] and has all requisite limited liability company power to execute and deliver, and to perform its obligations under, the Transaction Documents.
2. The Principal Project Company is qualified to transact interstate business as a foreign limited liability company in the State of California.
3. The execution and delivery of, and the performance of obligations under, the Transaction Documents by the Principal Project Company, have been duly authorized by all necessary action on the part of the Principal Project Company. Each person executing such Transaction Documents on the Principal Project Company's behalf has been duly authorized to execute and deliver each such document on Principal Project Company's behalf, and such Transaction Documents have been duly executed and delivered by the Principal Project Company.
4. Each of the Transaction Documents constitutes the valid and binding obligation of the Principal Project Company, enforceable against the Principal Project Company in accordance with the terms thereof.
5. The execution and delivery by the Principal Project Company of the Transaction Documents does not, and the consummation by the Principal Project Company of any of the transactions contemplated thereunder will not, result in the violation by Principal Project Company of any United States federal statute, rule or regulation, which in our experience is normally applicable with respect to transactions of the type contemplated by the Transaction Documents (without taking into account the particular nature of the business conducted by the parties to the Transaction Documents). The execution and delivery by the Principal Project Company of the Transaction Documents does not, and the consummation by it of the transactions contemplated thereunder will not, result in a violation by Principal Project Company of any provision of the LLC Agreement (as defined in Annex I) or the Certificate of Formation (as defined in Annex I).
6. The execution and delivery by the Principal Project Company of the Transaction Documents and the performance of its obligations under the Transaction Documents are within its powers and do not and will not conflict with, or constitute a breach or result in a violation of (a) any existing constitutional or statutory provision of the State of California, (b) to my knowledge, any existing agreement or other instrument to which Principal Project Company is a party or by which it is

bound, or (c) to my knowledge, any existing order, rule, regulation, judgment, decree ordinance of any court, government or governmental authority having jurisdiction over Principal Project Company as applicable or its properties.

Our opinions are subject to the following additional assumptions, limitations and qualifications:

A. Our opinions are subject to bankruptcy, insolvency, fraudulent transfer, reorganization, moratorium and similar laws of general applicability relating to or affecting creditors' rights and to general principles of equity. Without limiting the foregoing qualifications, the opinions expressed herein do not purport to cover, and we express no opinion with respect to, the applicability of Section 548 of the federal Bankruptcy Code or any comparable provision of state law, including the provisions relating to fraudulent conveyances.

B. Indemnities, rights of contribution, exculpatory provisions, provisions in respect of rights to liquidated damages, penalties or punitive damages, waivers of rights and provisions requiring arbitration of disputes may be limited on public policy grounds or may be prohibited by law.

C. Certain of the remedies in the Transaction Documents may be limited or rendered unenforceable by applicable law. In our opinion, however, applicable law does not render the remedies afforded by the Financing Documents inadequate for the practical realization by the Lenders of the principal benefits intended to be provided by the Financing Documents.

D. We express no opinion with respect to any provision of the Transaction Documents that purports to require a prevailing party in a dispute to pay attorney's fees and expenses, or other costs, to a non-prevailing party.

E. We express no opinion as to the enforceability of any agreements in any Transaction Document by the parties thereto to agree in the future upon any matter.

This letter speaks only as of the date hereof, and we disclaim any undertaking to update this letter to take into account any future changes of fact or law. The opinions expressed herein are solely for your benefit, and may not be relied on in any manner or for any purposes by any other Person without our written consent, and are not to be used, circulated, quoted, published or otherwise referred to or disseminated for any other purpose.

Very truly yours,

*[Insert Signature]*

**EXHIBIT 5F**

**BASE CAPITAL MaxAP ADJUSTMENT FOR  
BASE INTEREST RATE FLUCTUATION AND CREDIT SPREAD RISK MITIGATION**

To facilitate the adjustment process described in this Exhibit, Principal Project Company and City will collaboratively prepare a Financial Model closing protocols document that will set forth additional details for how the calculations set forth in this Exhibit will be applied to the Base Case Financial Model and the Key Ratios therein.

**1. Base Interest Rate Fluctuations**

**1.1** Promptly following Financial Close, Principal Project Company shall update the Base Case Financial Model in effect as of the Effective Date to:

- (a) reflect 100% of the changes to the Base Interest Rates that have occurred during the Bond Rate Protection Period or Bank Debt Rate Protection Period (as applicable), without changing the coupon structure of any Bond Financing;
- (b) solve for the lowest possible MaxAP;
- (c) maintain the Equity IRR to be equal to the Original Equity IRR; and
- (d) satisfy all Key Ratios in the Base Case Financial Model.

**1.2** The capital portion of the MaxAP resulting from the update to the Base Case Financial Model in accordance with Section 1.1 will be the Base Interest Rate adjusted Base Capital MaxAP (“**MaxAP<sub>BIRBase</sub>**”) and the resulting Financial Model will be referred to herein as “**BIR Financial Model**”).

**2. Credit Spread Fluctuations**

**2.1** If Principal Project Company is not eligible for Credit Spread Risk Mitigation:

- (a) Principal Project Company shall bear 100% of the impact (either positive or negative) on its Original Equity IRR for changes in credit spreads over the Bond Rate Protection Period;
- (b) the remainder of this Section 2 (Credit Spread Fluctuations) and Section 3 (Adjustments to the Base Capital MaxAP for Base Interest Rate fluctuation and Credit Spread Risk Mitigation) of this Exhibit 5F (Base Capital MaxAP Adjustment for Base Interest Rate Fluctuation and Credit Spread Risk Mitigation) do not apply to Principal Project Company; and
- (c) MaxAP<sub>BIRBase</sub> calculated pursuant to Section 1 (Base Interest Rate Fluctuations) will become the interim Base Capital MaxAP (“**MaxAP<sub>INTERIM</sub>**”) used in the final Financial Model solve required under Section 4 (Financial Model Update, Base Capital MaxAP and Base Operating MaxAP Revision).

**2.2** If Principal Project Company is eligible for Credit Spread Risk Mitigation, Principal Project Company shall calculate the following, in each case, to achieve the lowest possible applicable MaxAP and maintain the Original Equity IRR at the same levels reflected in Principal Project Company's Base Case Financial Model while its Key Ratios remain in compliance with the Financing Agreements and consistent with the Base Case Financial Model:

- (a) **"MaxAP<sub>BASELINE</sub>"** representing the Base Capital MaxAP calculated by updating the BIR Financial Model (which was prepared in accordance with Section 1 (Base Interest Rate Fluctuations) of this Exhibit 5F(Base Capital MaxAP Adjustment for Base Interest Rate Fluctuation and Credit Spread Risk Mitigation)) with the applicable Baseline Credit Spreads (if different from those already in BIR Financial Model);
- (b) **"MaxAP<sub>PRICING</sub>"** representing the Base Capital MaxAP calculated by updating the Base Case Financial Model with the actual Bond Financing pricing and the actual net proceeds, coupon and term structure as of the Bond Pricing Date; and
- (c) the upper boundary (**"MaxAP<sub>UPPER</sub>"**) and lower boundary (**"MaxAP<sub>LOWER</sub>"**) between which Principal Project Company shall bear the full impact of changes in credit spreads (the **"No-Mitigation Range"**), calculated as follows:
  - (i)  $\text{MaxAP}_{\text{UPPER}}$  shall be the greater of  $\text{MaxAP}_{\text{BIRBase}}$  and  $\text{MaxAP}_{\text{BASELINE}}$ ,  
 $\text{MaxAP}_{\text{UPPER}} = \text{Maximum} ( \text{MaxAP}_{\text{BIRBase}}, \text{MaxAP}_{\text{BASELINE}} )$and
  - (ii)  $\text{MaxAP}_{\text{LOWER}}$  shall be the lessor of  $\text{MaxAP}_{\text{BIRBase}}$  and  $\text{MaxAP}_{\text{BASELINE}}$   
 $\text{MaxAP}_{\text{LOWER}} = \text{Minimum} ( \text{MaxAP}_{\text{BIRBase}}, \text{MaxAP}_{\text{BASELINE}} )$ .

**3. Adjustments to the Base Capital MaxAP for Base Interest Rate fluctuation and Credit Spread Risk Mitigation**

Principal Project Company shall, subject to City's review and approval, calculate the Base Capital MaxAP (**"MaxAP<sub>INTERIM</sub>"**) to be used in Section 4 (Financial Model Update, Base Capital MaxAP and Base Operating MaxAP Revision), in accordance with one of the following scenarios:

- (a) if  $\text{MaxAP}_{\text{PRICING}}$  is above the No-Mitigation Range, then  $\text{MaxAP}_{\text{INTERIM}}$  shall be  $\text{MaxAP}_{\text{BIRBase}}$  plus 50% of the difference between the  $\text{MaxAP}_{\text{PRICING}}$  and the higher of the  $\text{MaxAP}_{\text{BASELINE}}$  and  $\text{MaxAP}_{\text{BIRBase}}$ :  
  
if  $\text{MaxAP}_{\text{PRICING}} > \text{MaxAP}_{\text{UPPER}}$ , then  
 $\text{MaxAP}_{\text{INTERIM}} = \text{MaxAP}_{\text{BIRBase}} + 50\% \times ( \text{MaxAP}_{\text{PRICING}} - \text{MaxAP}_{\text{UPPER}} )$ ;
- (b) if  $\text{MaxAP}_{\text{PRICING}}$  is below the No-Mitigation Range, then  $\text{MaxAP}_{\text{INTERIM}}$  shall be  $\text{MaxAP}_{\text{BIRBase}}$  reduced by 50% of the difference between the  $\text{MaxAP}_{\text{PRICING}}$  and the lower of the  $\text{MaxAP}_{\text{BASELINE}}$  and  $\text{MaxAP}_{\text{BIRBase}}$ :  
  
if  $\text{MaxAP}_{\text{PRICING}} < \text{MaxAP}_{\text{LOWER}}$ , then  
 $\text{MaxAP}_{\text{INTERIM}} = \text{MaxAP}_{\text{BIRBase}} + 50\% \times ( \text{MaxAP}_{\text{PRICING}} - \text{MaxAP}_{\text{LOWER}} )$ ; and

- (c) if  $\text{MaxAP}_{\text{PRICING}}$  falls on or within the No-Mitigation Range, then there will be no further adjustment to  $\text{MaxAP}_{\text{BIRBase}}$  and  $\text{MaxAP}_{\text{INTERIM}}$  will equal  $\text{MaxAP}_{\text{BIRBase}}$ .
- if (  $\text{MaxAP}_{\text{PRICING}} \leq \text{MaxAP}_{\text{UPPER}}$  AND  $\text{MaxAP}_{\text{PRICING}} \geq \text{MaxAP}_{\text{LOWER}}$  ), then  $\text{MaxAP}_{\text{INTERIM}} = \text{MaxAP}_{\text{BIRBase}}$ .

Tables 3A and 3B below illustrate the scenarios described in Section 3 (Adjustments to the Base Capital MaxAP for Base Interest Rate fluctuation and Credit Spread Risk Mitigation).

**Table 3A - Scenario A**

After adjusting for movements in Base Interest Rates, the Base Capital MaxAP is equal to or lower than the Base Capital MaxAP calculated using the Baseline Credit Spreads (also adjusted for movements in Base Interest Rates).

		<u>Pricing Outcomes:</u>		
		(i) MaxAP <sub>PRICING</sub> is above the No-Mitigation Range	(ii) MaxAP <sub>PRICING</sub> is below the No-Mitigation Range	(iii) MaxAP <sub>PRICING</sub> falls on or within the No-Mitigation Range
		MaxAP <sub>PRICING</sub> ↑		
MaxAP <sub>BASELINE</sub>				↓ MaxAP <sub>PRICING</sub>
MaxAP <sub>BIRBase</sub>				↑
			↓ MaxAP <sub>PRICING</sub>	
		MaxAP <sub>BIRBase</sub> is increased by 50% of the difference between MaxAP <sub>BASELINE</sub> and MaxAP <sub>PRICING</sub>	MaxAP <sub>BIRBase</sub> is decreased by 50% of the difference between MaxAP <sub>BIRBase</sub> and MaxAP <sub>PRICING</sub>	No adjustment made to MaxAP <sub>BIRBase</sub>

**Table 3B - Scenario B**

After adjusting for movements in Base Interest Rates, the Base Capital MaxAP is higher than the Base Capital MaxAP calculated using the Baseline Credit Spreads (also adjusted for

movements in Base Interest Rates).

		<b><u>Pricing Outcomes:</u></b>		
		<b>(i)</b> MaxAP <sub>PRICING</sub> is above the No-Mitigation Range	<b>(ii)</b> MaxAP <sub>PRICING</sub> is below the No-Mitigation Range	<b>(iii)</b> MaxAP <sub>PRICING</sub> falls on or within the No-Mitigation Range
		MaxAP <sub>PRICING</sub> ↑		
MaxAP <sub>BIRBase</sub>				↓ MaxAP <sub>PRICING</sub>
MaxAP <sub>BASELINE</sub>				↑
			↓ MaxAP <sub>PRICING</sub>	
		MaxAP <sub>BIRBase</sub> is increased by 50% of the difference between MaxAP <sub>BIRBase</sub> and MaxAP <sub>PRICING</sub>	MaxAP <sub>BIRBase</sub> is decreased by 50% of the difference between MaxAP <sub>BASELINE</sub> and MaxAP <sub>PRICING</sub>	No adjustment made to MaxAP <sub>BIRBase</sub>

**4. Financial Model Update, Base Capital MaxAP and Base Operating MaxAP Revision**

**4.1** On the date of Financial Close, Principal Project Company shall update and solve the Base Case Financial Model then in effect with the following:

- (a) Base Capital MaxAP set equal to the MaxAP<sub>INTERIM</sub> (as calculated in accordance with Section 2.1 or Section 3 (Adjustments to the Base Capital MaxAP for Base Interest Rate fluctuation and Credit Spread Risk Mitigation), as applicable);
- (b) actual Project Debt pricing, including net proceeds, Base Interest Rates, credit spreads, coupons and term structure as of the Bank Debt Pricing Date or Bond Pricing Date, as applicable;
- (c) all other changes in terms of financing assumed between those indicated in the Bid Financial Model submitted with Principal Project Company’s Financial Proposal and in Principal Project Company’s financial plan as set forth in the Financing Documents as of the Financial Close Date; and
- (d) all other changes required to be reflected in the Financial Model as result of any steps taken under Section 3.4.2 of the Agreement.

**4.2** The financial model resulting from the update to the Base Case Financial Model in accordance with Section 4.1 shall be proposed by Principal Project Company to City as the Financial Model Update described in Section 3.3.1 of the Agreement and, upon execution of the amendment agreement referred to in Section 3.3.2 of the Agreement: (a) the resulting financial model shall become the “**Financial Model**”; (b) the projected Base Capital MaxAP for the first Contract Year (annualized to be a 12-calendar month period) therein will become the new “**Base Capital MaxAP**”; (c) the Base Operating MaxAP shall become the new “**Base Operating MaxAP**”; and (d) the internal rate of return on equity therein shall become the “**Equity IRR.**”

**EXHIBIT 5G**

**FINANCING DOCUMENT TERMS**

(a) The Security Documents may only secure Project Debt, the proceeds of which are obligated to be used exclusively for the purposes of:

- (i) performing the Work;
- (ii) paying interest and principal on other existing Project Debt and any costs and fees in connection with the development and award of the Project, achieving commercial close and closing and administering of any permitted Project Debt;
- (iii) paying reasonable development fees to PPC-Related Entities or to a D&C Contractor or its affiliates for services related to the Project;
- (iv) paying fees and premiums to any Lender of the Project Debt or such Lender's agents;
- (v) paying Taxes;
- (vi) funding reserves required under this Agreement, Financing Documents, applicable securities laws, or Environmental Laws;
- (vii) making Distributions; and
- (viii) Refinancing any Project Debt in accordance with this Agreement.

(b) The Security Documents may only secure Project Debt and Financing Documents issued and executed by (a) Principal Project Company, (b) its permitted successors and permitted assigns, (c) a special purpose entity that owns Principal Project Company but no other assets and has purposes and powers limited to the Project and the Work or (d) any special purpose entity or subsidiary wholly owned by Principal Project Company or such entity.

(c) Project Debt under a Financing Agreement and secured by a Security Document must be issued and held only by Institutional Lenders who qualify as such at the date the Security Document is executed and delivered (or, if later, at the date any such Institutional Lender becomes a party to the Security Document), except that (i) qualified investors, including PABs holders that may purchase the PABs in a public offering, other than Institutional Lenders may acquire and hold interests in Project Debt, but only if an Institutional Lender acts as Collateral Agent for such Project Debt and (ii) Equity Member Debt is not subject to this provision.

(d) The Security Documents, as a whole, securing each separate issuance of debt shall encumber the entire PPC's Interest, provided that the foregoing does not preclude entry by Principal Project Company into subordinate Security Documents (such subordination to be in accordance with the terms set forth in the Financing Documents) or into equipment lease financing.

(e) No Security Document or other instrument purporting to mortgage, pledge, encumber, or create a lien, charge or security interest on or against PPC's Interest shall extend to or affect the

right, title and interest of the City in the Project or the Facility or City's rights or interests under this Agreement.

(f) No Security Document or other instrument purporting to mortgage, pledge, encumber, or create a lien, charge or security interest on or against PPC's Interest shall extend to or affect City's right to access Principal Project Company's funds held in an operating account in the event of a PPC Default and the exercise of remedies by City under Section 16.2 (City Remedies for PPC Default) of the Agreement; provided such right shall not include a security interest in such funds nor shall the exercise of such right by City interfere with the right of the Lenders, if any, under the Security Documents and the Direct Agreement to access such funds. Specifically, with respect to any such operating account (and associated account agreement and account control agreement):

(i) City shall be named as an authorized representative of Principal Project Company for purposes of the account, including specifically under any associated account control agreement, in the event of City's exercise of its Step-In Rights, and

(ii) Any account control agreement shall expressly state the terms, prohibitions, City rights and other provisions in this Exhibit 5G (Financing Document Terms), including specifically those set forth in Sections (g) through (m) of this Exhibit 5G (Financing Document Terms).

(g) Each note, bond or other negotiable or non-negotiable instrument evidencing Project Debt, or evidencing any other obligations issued or incurred by any Person described in this Exhibit 5G (Financing Document Terms) in connection with this Agreement or the Project shall include or refer to a document controlling or relating to the foregoing that includes a conspicuous recital on its face to the effect that payment of the principal thereof and interest thereon is a valid claim only as against the obligor and the security pledged by Principal Project Company or the obligor therefor, is not an obligation, moral or otherwise, of the City, any other agency, instrumentality or political subdivision of the City, or any elected official, member, director, officer, employee, agent or representative of any of them, and neither the full faith and credit nor the taxing power, and no assets, of the City, or any other agency, instrumentality or political subdivision of the City is pledged to the payment of the principal thereof and interest thereon.

(h) Each Financing Document containing provisions regarding default by Principal Project Company shall require that if Principal Project Company is in default thereunder and the Collateral Agent gives notice of such default to Principal Project Company, then the Collateral Agent shall also give concurrent notice of such default to City. Each Financing Document and Security Document that provides Lender remedies for default by Principal Project Company or the borrower shall require that the Collateral Agent deliver to City, concurrently with delivery to Principal Project Company or any other Person, every notice of election or enforcement of remedies, including an election to sell or foreclose, notice of sale or foreclosure or other notice required by Applicable Law or by the Security Document in connection with the exercise of remedies under the Financing Document or Security Document.

(i) No Financing Document that may be in effect during any part of the period that the Handback Requirements apply shall grant to the Lender any right to apply funds in the Handback Requirements Reserve Account or to apply proceeds from any Handback Requirements Letter of Credit in accordance with Section 8.7.5 (Handback Requirements Letters of Credit) of the Agreement to the repayment of Project Debt, to any other obligation owing the Lender or to any

other use except the uses set forth in Section 8.6 (Handback) of the Agreement, and any provision purporting to grant such right shall be null and void, provided, however, that (a) any Lender or Substituted Entity shall, following foreclosure or transfer in lieu of foreclosure, automatically succeed to all rights, claims and interests of Principal Project Company in and to the Handback Requirements Reserve Account and (b) a Financing Document or Security Document may create such rights regarding excess funds described in Section 8.7.2.5 of the Agreement.

Each relevant Financing Document and Security Document that may be in effect during any part of the period that the Handback Requirements apply shall expressly permit, without condition or qualification, Principal Project Company to (a) use and apply funds in the Handback Requirements Reserve Account in the manner contemplated by this Agreement, (b) issue additional Project Debt, secured by the PPC's Interest, for the added limited purposes of funding work pursuant to Handback Requirements in accordance with Section 8.6 (Handback) of the Agreement and (c) otherwise comply with its obligations in this Agreement regarding Handback Renewal Work, the Handback Requirements and the Handback Requirements Reserve Account. Subject to the foregoing, any protocols, procedures, limitations and conditions concerning draws from the Handback Requirements Reserve Account set forth in any Financing Document or the issuance of additional Project Debt as described in clause (b) above shall be consistent with the permitted uses of the Handback Requirements Reserve Account, and shall not constrain Principal Project Company's or City's access thereto for such permitted uses, even during the pendency of a default under the Financing Document.

For the avoidance of doubt:

- (i) The Lenders then holding Project Debt may limit additional Project Debt if other funds are then, in City's determination, readily available to Principal Project Company for the purpose of funding the Work;
  - (ii) No Lender then holding Project Debt is required hereby to grant pari passu lien or payment status to any such additional Project Debt; and
  - (iii) The Lenders then holding Project Debt may impose reasonable and customary requirements as to performance and supervision of the Work that are no more onerous than those set forth in their respective existing Financing Documents or Security Documents.
- (j) Each Financing Document and Security Document shall expressly state that the Lender shall not name or join City, any other agency, instrumentality or political subdivision of the City, or any elected official, member, director, officer, employee, agent or representative of any of them in any legal proceeding seeking collection of the Project Debt or other obligations secured thereby or the foreclosure or other enforcement of the Financing Documents, except as such language may be modified in the Financing Documents approved by City as provided in any Direct Agreement.
- (k) Each Financing Document shall expressly state that the Lender shall not seek any damages or other amounts from City, any other agency, instrumentality or political subdivision of the City, or any elected official, member, director, officer, employee, agent or representative of any of them, whether for Project Debt or any other amount, except (a) damages from City only for a violation by City of its express obligations to Lenders set forth in any Direct Agreement, if applicable, and (b) amounts due from City under this Agreement where the Lender has succeeded

to the rights and interests of Principal Project Company under this Agreement, whether by way of assignment or subrogation.

(l) Each Financing Document shall expressly state that the Lender and the Collateral Agent shall respond to any request from City or Principal Project Company for consent to a modification or amendment of any of this Agreement within a reasonable period of time.

(m) Each Financing Document that addresses the use of insurance proceeds shall expressly state that the Lender and the Collateral Agent shall (a) apply proceeds from Insurance Policies as specified in Exhibit 7 (Insurance Requirements) and (b) remit any amounts due to City from proceeds from Insurance Policies, as set forth in Exhibit 7 (Insurance Requirements), in each case, if any such Lender or Collateral Agent is named as the loss payee for the Insurance Policy.

# **POTRERO YARD MODERNIZATION PROJECT**

## **Exhibit 18: Technical Requirements**

**November 15, 2024**

**FINAL**

## Table of Contents

# Table of Contents

### Division 1: General Provisions

Project Description	1
1. General Provisions	5
1.1. Project Management	5
1.2. Project Controls and Performance Measurement	19
1.3. Submittal Management	28
1.4. Quality Management	29
1.5. Existing Conditions	39
1.6. Information Management	40
1.7. Training	43
1.8. Design Management	44
1.9. Sustainability	53
1.10. Building Information Modeling	54
1.11. Construction Management	58
1.12. Coordination With Third Parties	71
1.13. Coordination With Utility Owners	72
1.14. Enabling And Related Projects	76
1.15. Communications And Public Information	78
Appendix A - IT and Communications Scope Allocation	83
Appendix B – Initial List of Submittals	88

### Division 2: Design Guidelines

1 Introduction	3
1.1 Background	3
1.2 Project Site and Context	4
1.3 Zoning and CEQA	5
2 Overall Design Guidelines	6
2.1 Vision	6
2.2 Design	7
3 Building Design Guidelines	8
3.1 Uses and Building Organization	8
3.2 Height, Bulk, and Open Space	9
3.3 Wall and Roof Treatment	12
3.4 Lighting, Signage, and Public Art	14
3.5 Ground Floor Uses	15

## Table of Contents

4	Streetscape Design Guidelines	16
<b>Division 3: Design Criteria Document</b>		
	Section 1: Introduction	8
	Section 2: Space Needs Program	11
	Section 3: Design Criteria Narrative	27
	Section 4: Performance Requirements	53
	Section 5: Requirements for Bus Yard Component Space Modules	98
	Section 5.1: Office Modules	108
	Section 5.2: Parking	116
	Section 5.3: Bays and Shops	119
	Section 5.4: Fare Box and Clipper Card Reader Repair Shop	148
	Section 5.5: Service and Clean	154
	Section 5.6: Parts	161
	Section 5.7: Maintenance – Administration	170
	Section 5.8: Operations – Administration	180
	Section 5.9: Transit Services (MRO)	192
	Section 5.10: Shared	199
	Section 5.11: Training	212
	Appendix A: 3-Level Maintenance Equipment Manual	229
	Appendix B: SFMTA OCS Design Criteria	404
	Appendix C: SFPUC Application for Electrical Service (For Reference)	430
	Appendix D: Traction Power Feeder Map	469
	Appendix E: Sample Route Schedules	476
	Appendix F: Security Sensitive Information Process Regarding Traction Power Standard Specifications	501
	Appendix G: Design Criteria Paratransit (For Reference)	508
	Appendix H: PG&E System Impact Study Report for Mixed Use Service Application (For Reference)	576
	Appendix I: SDAT Review Letter 1.19.2023 (For Reference)	587
	Appendix J: Geotechnical Baseline Report	597
<b>Division 4: Supplemental Design Criteria</b>		
1	Supplemental Noise and Vibration Requirements	1
1.1	Intent of these Supplemental Noise and Vibration Requirements	1
1.2	Acoustic Consultant Qualifications	2
1.3	Applicable Codes and Standards	2
1.4	Acoustics, Noise, and Vibration Criteria	3
1.5	Proprietary Design Review Deliverables	6
1.6	Special Commentary on Vibration Control Approaches	8
1.7	Special Commentary on Required Engineering Analysis	8

## The SFMTA Potrero Yard Modernization Project

## Table of Contents

2	Seismic Resilience Performance Requirements	9
2.1	Resilience Requirements	10
2.2	Compliance Standard	11
2.3	Seismic Hazard Definition	11
2.4	Structural Analysis Method	12
2.5	Structural and Non-Structural Performance Requirements	12
2.6	Loss and Downtime Assessment	13
2.7	Seismic Resilience Peer Review	14
2.8	Consideration of Joint Development Alternative Scenarios	14
2.9	Deliverables and Timeline for Seismic Resilience Peer Review	16

### Division 5: Battery-Electric Bus Supplemental Criteria

1	Introduction	1
1.1	Background	2
1.2	2021 SFMTA 40-Foot BEB Pilot Program	3
2	BEBs at Potrero Yard	4
2.1	BEB Power Supply Approach	4
2.2	BEB Power and Infrastructure Performance Requirements	5
2.3	BEB Emergency Backup Power Requirements	6
2.4	Reference Design Concept Figures Related to BEBs	7
2.5	Requirements for Facility Conversion Phasing	8
	Exhibit A: Battery-Electric Bus Specifications	9
	Exhibit B: BOD - Section 11 11 36.14 Commercial Electric Vehicle Charging Unit for Transit Depots	10

### Division 6: Testing & Commissioning and Operational readiness

6	TESTING & COMMISSIONING AND OPERATIONAL READINESS	1
6.1	Introduction	1
6.2	Standards and Guidelines	2
6.3	LEED	2
6.4	Commissioned Systems	3
6.5	Commissioning Provider (CxP)	3
6.6	Commissioning Scope	4
6.7	Monitoring-Based Commissioning (MBCx)	14
6.8	Operational Readiness (OR)	15

## **Table of Contents**

### **Division 07: Infrastructure Facility Management (IFM) Specifications**

Definitions	1
Section A: Introduction	2
Section B: General Requirements	6
Section C: Project Site & Infrastructure Facility Operations	34
Section D: Ad Hoc Services	61
Section E: Renewal Work Services	62
Section F: Handback Requirements	64
Section G: Performance Measurements	66
Appendix A: Space Tolerances	77
Appendix B: Summary of Tables	87

### **Division 8: Public Benefit Principles**

#### **Division 9: SFMTA Outreach Requirements**

Introduction	3
Public Outreach and Engagement Requirements	4
Accountability	10
Conclusion	10
Exhibit A: Public Outreach and Engagement Plan Guide	12
Exhibit B: Public Outreach and Engagement Plan Template	29

#### **Division 10: SFPW Div 01 General Requirements for Construction**

SECTION 00 73 20 - EXISTING UTILITIES	1
SECTION 00 73 21 - UTILITY CROSSINGS	3
SECTION 01 12 00 - SPECIAL INSTRUCTIONS	14
SECTION 01 13 00 - AS-NEEDED OVERHEAD CONTACT SYSTEM (OCS) ISOLATION SUPPORT	16
SECTION 01 14 00 - ARTWORK COORDINATION	17
SECTION 01 31 33 - PARTNERING PROCEDURES	26
SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION	30
SECTION 01 35 43 - ENVIRONMENTAL PROCEDURES	32
SECTION 01 35 44 - HAZARDOUS BUILDING MATERIALS SCOPE OF WORK	83
SECTION 01 35 45 - HEALTH AND SAFETY CRITERIA	103
SECTION 01 35 50 - ADDITIONAL ENVIRONMENTAL PROCEDURES	125
SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS	134
SECTION 01 57 26 - TEMPORARY PROTECTION OF CATCH BASINS AND STORM DRAIN INLETS	142
SECTION 01 71 33 - PROTECTION OF EXISTING FACILITIES AND ADJACENT CONSTRUCTION	143
SECTION 01 74 50 - MATERIAL REDUCTION AND RECOVERY PLAN	146

### **The SFMTA Potrero Yard Modernization Project**

**Table of Contents**

SECTION 02 41 16 - STRUCTURE DEMOLITION	156
SECTION 02 80 13 - HAZARDOUS BUILDING MATERIALS – REMEDIATION	163
SECTION 02 81 10 - ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS	204

**Division 11: Make-Ready Requirements for Retail Space at 17th Hampshire**

---

## Division 1: General Provisions

# **POTRERO YARD MODERNIZATION PROJECT**

**Exhibit 18:  
Technical Requirements**

**Division 01:  
General Provisions**

**November 15, 2024**

**FINAL DRAFT**

## TABLE OF CONTENTS

<b>PROJECT DESCRIPTION .....</b>	<b>1</b>
Scope of Common Infrastructure .....	3
<b>1. GENERAL PROVISIONS .....</b>	<b>5</b>
1.1. PROJECT MANAGEMENT .....	5
1.1.1. Project Management Plan .....	5
1.1.2. General Coordination with the City .....	6
1.1.3. Project Meetings.....	6
1.1.4. Key Personnel.....	11
1.1.5. Principal Project Company Services.....	15
1.1.6. Regulatory Approvals Plan .....	16
1.1.7. Design and Construction Management Plans.....	16
1.1.8. IFM Management Plan .....	17
1.2. PROJECT CONTROLS AND PERFORMANCE MEASUREMENT .....	19
1.2.1. Project Schedule .....	19
1.2.2. Schedule Requirements .....	23
1.2.3. Scheduling System.....	25
1.2.4. Performance Reporting .....	25
1.2.5. As-Built Schedules .....	26
1.2.6. Time Impact Analysis for Proposed Extensions of Time .....	26
1.3. SUBMITTAL MANAGEMENT .....	28
1.4. QUALITY MANAGEMENT .....	29
1.4.1. Principal Project Company Quality Program.....	29
1.4.2. Principal Project Company Design Quality .....	35
1.4.3. Principal Project Company Construction Quality.....	36
1.5. EXISTING CONDITIONS.....	39
1.5.1. Pre-Construction Information, Pre- and Post-Construction Surveys.....	39
1.6. INFORMATION MANAGEMENT .....	40
1.6.1. Document Version Control .....	41
1.6.2. Drawing and Engineering Data Changes.....	41
1.6.3. As-Built Documents.....	41
1.7. TRAINING.....	43
1.8. DESIGN MANAGEMENT.....	44

1.8.1.	Design Requirements .....	44
1.8.2.	Integrated Design Process .....	44
1.8.3.	Design Document Organization .....	45
1.8.4.	Design Exceptions and Waivers .....	45
1.8.5.	Proprietary Design Reviews .....	45
1.8.6.	Release for Construction Documents .....	52
1.9.	SUSTAINABILITY .....	53
1.9.1.	Sustainability Management Plan .....	53
1.9.2.	Sustainability through Integrated Design Process.....	53
1.10.	BUILDING INFORMATION MODELING .....	54
1.10.1.	BIM Roles and Responsibilities .....	54
1.10.2.	BIM Project Execution Plan .....	55
1.10.3.	BIM Data Specifications .....	56
1.10.4.	Model Ownership .....	57
1.11.	CONSTRUCTION MANAGEMENT .....	58
1.11.1.	Construction Safety .....	58
1.11.2.	Construction Security .....	58
1.11.3.	Maintenance of Traffic and Work Restrictions .....	60
1.11.4.	Temporary Facilities and Utilities.....	65
1.11.5.	Construction of Laydown, Staging, and Casting Yard.....	68
1.11.6.	Project Site Cleaning.....	69
1.11.7.	City Access Period Make-Ready Requirements .....	69
1.12.	COORDINATION WITH THIRD PARTIES .....	71
1.12.1.	Third Party Coordination.....	71
1.12.2.	Third Party and Agency Coordination Contacts .....	71
1.13.	COORDINATION WITH UTILITY OWNERS .....	72
1.13.1.	Utility Coordination Work Plan .....	72
1.13.2.	Utility Project Execution Plan.....	73
1.13.3.	Utility Tracking Report .....	74
1.14.	ENABLING AND RELATED PROJECTS .....	76
1.14.1.	Enabling Projects .....	76
1.14.2.	Related Projects.....	76
1.15.	COMMUNICATIONS AND PUBLIC INFORMATION.....	78
1.15.1.	Media and Communications .....	78

1.15.2. Public Outreach and Engagement .....80

1.15.3. Project Tours .....82

**APPENDIX A ..... 83**

IT and Communications Scope Allocation .....84

**APPENDIX B ..... 88**

Initial List of Submittals .....89

## PROJECT DESCRIPTION

The Project will demolish the SFMTA's existing, outdated 100+ year old transit facility located on 4.4 acres at 2500 Mariposa Street, between 17th, Bryant, and Hampshire Streets and replace it with a modern, three-story bus maintenance, storage, and training facility to service the SFMTA's all electric trolley bus transit fleet, which may transition in the future to battery-electric buses. The IFM Facility will provide efficient transit-related services to San Francisco, aligning with SFMTA's commitment to safe, equitable, and sustainable transportation. The Project also demonstrates the City's commitment to zero-emission public transit, to delivering modern amenities for SFMTA employees, and to contributing a new building with improved site connectivity and urban design to the Mission and Potrero neighborhoods. As a core facility for the SFMTA's citywide transit operations, the Project represents an operationally critical public infrastructure project for the City.

Additionally, development plans are proposed to build mixed use commercial and residential uses adjacent to and above the Bus Yard Component to help the City towards fulfilling its 2022 Housing Plan. As an alternative, if housing above the Bus Yard Component is not feasible, City may choose to build a Paratransit Facility above the Bus Yard Component as a permanent site for paratransit operations, which are currently located on leased land elsewhere.

The Project consists of a single, integrated facility with a Bus Yard Component and Common Infrastructure, which are generally described as follows. Joint Development Alternative 1 or 2 would be subject to a separate HCC Agreement:

**Bus Yard Component (or BYC).** The BYC shall be a podium structure with four levels for bus storage and maintenance. The BYC includes bus and non-revenue vehicle parking and circulation; bus maintenance service and storage facilities; and administration offices, a bus operator training facility, and other support spaces. The BYC must have the minimum capacity to store at least 213 buses, which is a nearly 50% increase in capacity from the current operation. In addition, for resiliency purposes, the BYC must be built to structural and seismic standards that exceed the minimum code requirements. The BYC will have the required infrastructure to support the SFMTA's future transition to a fully battery electric bus fleet, and shall achieve LEED Gold rating and meet other City sustainability policies. The BYC shall also include a retail space at the corner of 17<sup>th</sup> and Hampshire, provided as a 'warm shell' that is operationally ready for permitted occupancy with electrical and water service metered separately from the Infrastructure Facility, security card access, and a surveillance system.

**Joint Development Alternative 1 Housing and Commercial Component (or HCC):** The potential HCC is the preferred alternative, which is envisioned to be a multi-floor housing project immediately adjacent to and on the perimeter of the Bus Yard Component podium along Bryant Street and one or more multi-floor housing projects on top of the Bus Yard Component podium. This option would also include ground floor uses, appropriate for a diverse neighborhood, to activate street frontages at the perimeter of the podium such as commercial or other uses. HCC development is not part of the Project and is subject to a separate HCC Agreement.

**Joint Development Alternative 2 Paratransit Component (or Paratransit):** Should housing development on top of the Bus Yard Component podium be deemed infeasible, per the terms of the HCC Agreement, then the City may direct the Principal Project Company to develop Paratransit Facility on top of the BYC podium. Paratransit would provide facilities and provisions to enable the SFMTA to service, maintain, and store a fleet of buses and vans. Paratransit will consist of bays and shops, operations areas, maintenance areas, and vehicular ramps extending onto the roof of the BYC providing access to and from the BYC podium roof. Please refer to *Division 3* of the Technical Requirements for a complete definition of and requirements for the

Paratransit Facility. Also, subject to the HCC Agreement, a multi-floor housing project immediately adjacent to and on the perimeter of the Bus Yard Component podium along Bryant Street will be developed as part of this Alternative.

**Common Infrastructure (CI).** The Common Infrastructure is the physical infrastructure shared by the BYC and the Joint Development Alternatives. The scope of the Common Infrastructure generally includes: (a) the BYC's structural system necessary to support either Joint Development Alternative; (b) the complete building envelope of the Facility, including cladding, waterproofing, and insulation; (c) shared vertical circulation elements, such as stairs, emergency egress, and elevators; (d) shared or common areas such as open space (e.g., public or private), shared lobbies, and shared service areas (e.g., loading docks, storage spaces, waste handling facilities, etc.) excluding residential use lobbies and elevators; (e) shared or common utility and building systems (e.g., systems such as mechanical, electrical, plumbing, fire and life safety, communications, etc.) and their corresponding spaces and vertical/horizontal distribution chases; and (f) drainage and stormwater management systems. The scope for the Common Infrastructure is defined below.

Together, the Bus Yard Component and the Common Infrastructure make up the Infrastructure Facility. For an avoidance of doubt, the Infrastructure Facility must fully enable the design, construction, operations and maintenance of either Joint Development Alternative. The entirety of the Infrastructure Facility requirements are provided throughout this Exhibit 18 (Technical Requirements).

## Scope of Common Infrastructure

Table 1 below defines the systems, spaces, and elements considered Common Infrastructure to be delivered by Principal Project Company as part of the Project. Each item is further defined in the Technical Requirements or will be required through the Regulatory Approvals process.

**Table 1: Facility’s Systems, Spaces, and Elements included in the Common Infrastructure**

Common Infrastructure Scope Item	Description
<b>Building Systems</b>	
Structural system	The portions of the vertical and lateral structural system of the BYC needed to support the HCC. This includes: (a) the BYC’s roof structure supporting the HCC over it; (b) the vertical structure and complete foundations system; and (c) the BYC’s complete lateral force resisting system including foundations, collectors, etc.
Building envelope	The complete exterior envelope of the entire Facility, including cladding, waterproofing, and insulation. The building envelope includes the waterproofing system of the roof structure supporting the HCC over the podium.
Demising walls separating the BYC from the HCC	If Principal Project Company’s approach for the Project provides demising walls that are designed and constructed as a single wall assembly, then demising walls will be considered to be part of the Common Infrastructure. If Principal Project Company’s approach for the Project provides demising walls that are designed and constructed as two separate and independent wall assemblies – one facing the BYC and the other facing the HCC –, then each will be considered to be part of the corresponding Project component.
Signage and wayfinding systems	All signage and wayfinding components for the building spaces allocated to the Common Infrastructure.
Building MEP systems and common utility systems	If Principal Project Company’s approach for the Project includes common utility systems for the Facility as a whole, as described in <u>Division 4 (Supplementary Design Criteria)</u> of the Technical Requirements, then the common utility systems will be part of the Common Infrastructure. In this case, they will include the Facility-wide building management system. If Principal Project Company’s approach for the Project provides for separate building mechanical, electrical, and plumbing systems for each Project component, then each such system will be part of the corresponding Project component. In this case, each component will have an independent building automation system (BAS). In all cases each Project component shall have separate metering.

<b>Common Infrastructure Scope Item</b>	<b>Description</b>
Fire and life-safety systems	<p>If Principal Project Company's approach for the Project includes an integrated Facility-wide fire and life-safety system, then the fire and life-safety system will be considered to be part of the Common Infrastructure. In this case, it will include the Facility-wide fire and life-safety control systems.</p> <p>If Principal Project Company's approach for the Project provides for separate fire and life-safety systems for each Project component, then each such system will be considered to be part of the corresponding Project component. In this case, each component will have an independent fire and life-safety control systems</p>
Civil and Site utility systems	<p>The Facility's stormwater drainage systems (including risers, inlets, catch basins, sump pumps, sewer ejector pumps, surge tanks, sub-drains, separators, and piping), water distribution systems (including mains, water treatment equipment, storage, controls, valves, irrigation for common use areas, non-potable/reuse systems, fire suppression systems, and meters), sanitary sewer systems (including sewer lines, lift stations, main connections, underground delivery systems, separators, backflows, and traps), utility connections, and related systems.</p> <p>Each Project component shall have separate metering.</p>
<b>Building Spaces</b>	
Building system spaces	<p>All rooms containing a supportive function for any civil and site utility systems, MEP systems, and/or common utility systems that are allocated to the Common Infrastructure as described above.</p> <p>Includes their associated distribution chases, shafts, or raceways, whether vertical or horizontal.</p>
Vertical circulation	<p>All stairs, emergency egress, escalators, and elevators in the Facility, that have shared uses by the BYC and HCC. This includes all the mechanical and electrical systems for vertical conveyance systems that have shared used by the BYC and the HCC. For avoidance of doubt, vertical circulation elements that are for the exclusive use of either the BYC or the HCC are not included in the scope of the Common Infrastructure.</p>
Common-use spaces	<p>All common use enclosed or open spaces (whether public or private, including the podium roof open space), any shared entrance lobbies, shared restrooms (whether public or private), and shared service areas (e.g., loading docks, storage spaces, waste handling facilities). For avoidance of doubt, entrance lobbies or other spaces that are for the exclusive use of either the BYC or the HCC are not included in the scope of the Common Infrastructure.</p>

BYC = Bus Yard Component

HCC = Housing and Commercial Component

MEP = mechanical, electrical, and plumbing

# 1. GENERAL PROVISIONS

## 1.1. PROJECT MANAGEMENT

- A. Principal Project Company is responsible for all elements of the management of the Project. Principal Project Company shall manage the Project through the application of a defined management approach, procedures, systems and reporting mechanisms, designed to maintain control of scope, schedule, quality, and budget, as further defined herein.
- B. Where submittals to the City are required in this Division 1 and other sections of this Exhibit 18, they shall be made in accordance with the submission dates and for the City action defined in Exhibit 18, Division 1 Appendix B (Initial List of Submittals).
- C. When planning or executing Project management, Principal Project Company shall consider and address all applicable Law, including those in Exhibit 16 (Federal, State, and Local Requirements) and other requirements that may result from the Project receiving Federal funding.

### 1.1.1. Project Management Plan

- A. Principal Project Company shall submit to the City a D&C Project Management Plan (PMP) and incorporating the essential elements of a successor plan for IFM Services (the “IFM Management Plan”) that describes the management approach, procedures, systems and reporting mechanisms, and provides scope, schedule, quality, and cost management for the D&C Period. Principal Project Company shall manage the Project in accordance with the City-approved PMP.
- B. Principal Project Company’s PMP shall, at a minimum:
  - 1. Provide a detailed Project description and summary scope of work.
  - 2. Provide clear, actionable and measurable objectives of the Project.
  - 3. State the purpose of the PMP, which description shall delineate how the Project is going to be managed by Principal Project Company, with support from and through the performance of Principal Project Company-Related Entities, including separate D&C Contractor and IFM Provider.
  - 4. Describe and distinguish between the roles and responsibilities, including the organizational structure, of the Principal Project Company and Principal Project Company-Related Entities to perform their corresponding scope of the Work as well as how the Principal Project Company will manage the interfaces where one entity’s corresponding scope of the Work interfaces with another.
  - 5. An organizational chart that clearly illustrates these roles and responsibilities among Principal Project Company and Principal Project Company-Related Entities.
  - 6. Identify the products and services that the Project will deliver to the City and others.
  - 7. Incorporate the Project Schedule.
  - 8. Identify the key Stakeholders (and their personnel), defining their roles and responsibilities on the Project.
  - 9. Describe the process for managing and reporting on progress status against the baseline requirements in the various plans required by the Technical Requirements.

10. Describe the process for information management, how Principal Project Company will exchange information with the City.
11. Describe change management procedures and protocols to incorporate and accept modifications to the Agreement scope.
12. Explain the development, establishment, and management approach for the Project Schedule, and how progress measured against the planned schedule will be evaluated and reported.
13. Describe (i) the process for developing, implementing, and managing a D&C Quality Management Plan, and (ii) how quality results will be independently observed, measured, reported, and documented for the Project to ensure that the Project deliverables and completed Work meet the minimum required standards of quality.
14. Explain how human and material resources will be applied to the Project.
15. Define the lines of communication and the methods of communication to be used, identifying roles and responsibilities with respect to communications, and defining what each individual role is responsible for communicating and to whom, how frequently they need to communicate, which communications tools and media will be used, and any specific triggers for initiating communication.
16. Coordinate and incorporate all other Project-specific plans, including those supplemental plans defined in Section 1.1.7 (Design and Construction Management Plans), identifying through cross-referencing such plans.
17. Be sufficiently developed and readily updatable to facilitate external audits, including audits performed by the City.
18. Describe how the Principal Project Company plans to utilize Disadvantaged Business Enterprises .

**1.1.2. General Coordination with the City**

- A. Principal Project Company shall establish a comprehensive coordination process with the City to minimize risk impacts to scope and schedule performance associated with contracts for design, construction, and systems integration activities. Refer to separate provisions in Section 1.12 (Coordination with Third Parties) and Section 1.13 (Coordination with Utility Owners).

**1.1.3. Project Meetings**

- A. Principal Project Company shall conduct Project meetings to enable orderly review of the progress of the Work with the City, and to provide for systematic discussion of items and issues affecting the progress and outcome of the Work. The following are initial and ongoing meeting minimum requirements, Principal Project Company shall propose additional meetings as needed to fulfil the Agreement requirements.
- B. Principal Project Company personnel attending and participating in Project meetings as Principal Project Company representatives shall have the required levels of authority to commit Principal Project Company to actions and resolutions agreed upon during such meetings.
- C. Principal Project Company shall electronically manage meeting calendars, notifications and invitations on a real-time basis.

- D. Principal Project Company shall, to the greatest extent possible, provide to the City agendas and meeting materials at least three Business Days in advance of meetings. Principal Project Company shall lead and facilitate meetings and shall prepare and distribute meeting minutes to the City and all attendees for their review and comment within three Business Days after concluding the meeting.
- E. The City may require, with reasonable notice to Principal Project Company, additional meetings at any time, at no additional cost to the City.

**1.1.3.1. Project Work Initiation Meeting**

- A. Principal Project Company shall conduct a Project Work initiation meeting upon receiving the City's notification of Contract award and shall submit to the City the agenda and meeting minutes. Key Personnel shall attend the Project Work initiation meeting and those in attendance shall address:
  - 1. Project Management Plan, including Key Personnel resumes and team organization chart.
  - 2. Initial Schedule.
  - 3. Approach to D&C Work and IFM Services.
  - 4. Information Management Plan.
  - 5. Third Party and Utility Owner Coordination Work and Project Execution Plans, including integration and permits.
  - 6. Quality Program Plan.
  - 7. Plan and status for development of various other required Project Plans.
  - 8. Submittal procedures and document control/records management.
  - 9. Inclusivity, including Small Business Enterprise, Local Business Enterprise, Local Small Business Enterprise and Disabled Veteran Business Enterprise participation.
  - 10. Approach to sustainability.
  - 11. Public Outreach Plan.
  - 12. Insurance certificates and other commercial/financial instruments needed before commencing with the Work.
  - 13. Early Works and other topics deemed necessary by the City or Principal Project Company.

**1.1.3.2. Design Initiation Meeting**

- A. Principal Project Company shall conduct a Design Initiation Meeting upon receiving the City's NTP 1 and shall submit to the City the agenda and meeting minutes. Key Personnel shall attend the Design Initiation Meeting and those in attendance shall address:
  - 1. Design Management Plan, including lead personnel and design team organization chart.
  - 2. Explanation of Design Work locations and logistics.
  - 3. Submittals list and design review procedures.

4. Principal Project Company Design Quality Plan.
5. Design of safety considerations.
6. Design of security considerations.
7. Information Management Plan.
8. Third Party and Utility Owner Coordination Work Plans, including integration and permits.
9. BIM Project Execution Plan.
10. Other topics deemed necessary by the City or Principal Project Company.

**1.1.3.3. Construction Initiation Meeting**

- A. Principal Project Company shall conduct the Construction Initiation Meeting prior to NTP2 and shall submit to the City the agenda and meeting minutes. Key Personnel shall attend the Construction initiation meeting and those in attendance shall address:
1. Major construction and field activities.
  2. Construction Management Plan, including lead personnel and construction team organization chart.
  3. Explanation of construction field offices, storage yards, materials laydown and staging areas, crane locations, etc..
  4. Most current Project Schedule incorporating timing of deliveries, construction phasing plans, and other worksite logistics.
  5. Principal Project Company Construction Quality Plan.
  6. Construction Quality Work Plans.
  7. Information Management Plan.
  8. Third Party and Utility Owner Project Execution Plans, including integration and permits.
  9. Plan to demarcate any restricted zones and within the Project Site.
  10. Construction safety plans in compliance with Division 10 of the Technical Requirements (Exhibit 18)
  11. Site Security Plan.
  12. Health and illness prevention plans.
  13. Transportation Management Plan and Traffic Control Plan.
  14. Environmental permitting, monitoring and mitigation measures compliance plans and reporting.
  15. Project controls processes and procedures for maintaining and retrieving current status documents, and including protocols for archiving and safekeeping Record Documents.
  16. BIM Project Execution Plan.
  17. Other topics deemed necessary by the City or Principal Project Company.

#### **1.1.3.4. Quality Initiation Meeting**

- A. Principal Project Company shall conduct a Quality initiation meeting within 15 Days after concluding the Project Work initiation meeting and shall submit to the City the agenda and meeting minutes. This meeting shall include discussion of all aspects of the Principal Project Company Quality Program (see Section 1.4.1) with a focus on implementing required processes and procedures.
- B. The meeting shall introduce individuals comprising Principal Project Company's quality management staff during the D&C Period, and shall include discussion on testing and inspections, quality program surveillance and audits, and identifying and resolving nonconforming Work and deficiencies in both Design Work and Construction Work.

#### **1.1.3.5. Environmental Compliance Initiation Meeting**

- A. Principal Project Company shall conduct an Environmental Compliance initiation meeting within 60 Days after NTP1 and prior to commencing any D&C Work, and shall submit to the City the agenda and meeting minutes. The meeting shall include discussion of the Sustainability Management Plan, all aspects of the environmental mitigation, protection, and permitting requirements applicable to the D&C Period, and shall address green initiatives associated with sustainable design and construction, including the environmental procedure requirements in Division 10 of the Technical Requirements. Principal Project Company shall show these permitting targets (or milestones) on the Project Schedule and shall explain the work plans and processes to be followed to achieve each requirement.

#### **1.1.3.6. Weekly Project Coordination Meetings**

- A. Weekly Project coordination meetings shall be conducted by Principal Project Company throughout the D&C Period covering a three-week Project Schedule review period (one week back and two weeks forward) of daily activity including schedule activities and sub-activities, interfaces, milestones, deliveries, and other events significant to Project Schedule performance.
- B. Principal Project Company shall prepare and submit to the City the agenda for each Weekly Project coordination meeting and include meeting minutes from the previous week's meeting.
- C. Representatives of Principal Project Company's team responsible for the activities presented in the Three-week Look-ahead Activity Reports, as defined in Section 1.2.1.7 (Look-Ahead Activity Reports), shall be present to discuss activities and coordination with others.
- D. Weekly Project coordination meetings shall include invited representatives of Third Parties, Utility Owners, and specialty engineers and subcontractors as necessary. Principal Project Company shall invite the City to these meetings, who may have representatives attend representing subject matters related to the schedule activities.
- E. Weekly Project coordination meetings shall address, but not be limited to, the following:
  - 1. Precedence and other constraints caused by outside parties that occur during the forthcoming two weeks that may potentially delay the Project Schedule activity or sub-activity.

2. Issues and actions that are needed to maintain these scheduled activities and sub-activities, such as Regulatory Approvals, material deliveries, equipment mobilization and setup. and
3. Actual schedule accomplishment defined in the previous week reflected in the Project Schedule.
4. Progress on Regulatory Approvals and Regulatory Approvals Plan
5. Status and track of Delay Events and Relief Events and
6. Status and tracking of City Changes.

#### **1.1.3.7. Monthly Progress Meetings**

- A. Principal Project Company shall conduct Monthly Progress Meetings and shall submit to the City meeting minutes. Attendees shall include, at a minimum, Key Personnel and the City representatives. Principal Project Company shall commence the first of Monthly Progress Meetings one week after submission of the first Monthly Progress Status Report, and continue these progress meetings throughout the D&C Period. Such meetings shall include, at a minimum, discussion of progress updates and issues for the following topics, as appropriate:
1. Project Schedule, including actual progress during prior 30-day reporting cycle and progress forecasted for next 90 Days.
  2. Design Management Plan and Construction Management Plan updates.
  3. Quality. Quality Program Plan and various quality plan updates.
  4. Safety. Health and Safety Plan update, see Section 01 35 45 of Division 10 of the Technical Requirements.
  5. Security. Site Security Plan update.
  6. Environmental compliance and permitting. Sustainable Management Plan update.
  7. Third Party and Utility coordination. Third Party and Utility Project Execution Plan updates.
  8. Traffic detours and maintenance of traffic. Transportation Management Plan and Traffic Control Plan updates.
  9. Inclusivity.
  10. Public outreach. Public Outreach Plan update.
  11. Submittals and review process.
  12. Design modifications and other changes in scope, coordination on Allowance-related scope, schedule and costs impacting budget and schedule forecasts, along with proposed mitigations and/or corrections. Regulatory Approvals Plan, Design Management Plan and Design Progress Tracking Reports. Substantial Completion planning and coordination.
  13. Other pertinent and timely discussion topics.

#### **1.1.3.8. Ongoing Coordination Meetings**

- A. Principal Project Company shall arrange and minute additional meetings as described herein Division 1, and as needed to fulfil the Agreement, such as:
  - 1. Third Party coordination meetings
  - 2. Utility coordination meetings
  - 3. City outreach meetings
  - 4. Community Stakeholder meetings
  - 5. Potrero Yard Neighborhood Working Group meetings

#### **1.1.3.9. Special Meetings**

- A. Principal Project Company shall conduct special meetings as necessary throughout the D&C Period, including meetings at the City's request. Special meetings may include timely discussions of any issues relevant to the Project.
- B. Principal Project Company shall provide, within the meeting invitation, a brief narrative about the issue or concern and a brief narrative of any suggested solutions to mitigate adverse schedule and cost impacts.
- C. Principal Project Company shall schedule meetings to discuss testing, performance demonstration, and operational readiness with no less than five Business Days' advance notice to invitees, and shall endeavor to enclose briefing materials within the body of the meeting invitation.
- D. Principal Project Company shall schedule other special meetings with not less than five Business Days' notice otherwise it is in the City's sole discretion for participation in the meeting.

#### **1.1.4. Key Personnel**

- A. Principal Project Company shall provide individuals meeting the requirements of each Key Personnel position defined in this Section 1.1.4.
- B. Principal Project Company shall prepare, submit to the City, and maintain a Key Personnel register with name, firm, title, project role, address, email, and phone number for each Key Personnel as well as resumes. Key Personnel shall meet the requirements of Section 9.5 of the Agreement. Key Personnel shall not be changed or replaced without the City's concurrence as evidenced by documented review and acceptance of a replacement in advance.
- C. Principal Project Company shall submit to the City resumes for any proposed replacement of Key Personnel, each a Candidate Key Person Replacement resume with three references, aligned with the requirements of the Agreement. References shall be from previous owners, clients, or employers and include the name, position, company, or agency and current postal and email addresses and phone numbers for each reference. Accordingly, the City will formally respond and reserves the right to interview replacement Key Personnel candidates prior to their acceptance.

- D. Where Key Personnel are required to be located at the Project Site, such requirement is deemed inclusive of location at the offices defined in Section 1.11.4.2 (Project Management Office Requirements) and Section 1.11.4.3 (Construction Management Office Requirements).

**1.1.4.1. Project Director**

- A. The Project Director shall be responsible for managing PPC's day-to-day activities on a full-time basis for the Project, including ongoing communications and coordination with City and acting as the main point of contact between City and PPC.
- B. The Project Director shall have, at a minimum, 20 years of competent experience in a senior position within an organization where his/her principal professional experience has been as an infrastructure developer.

**1.1.4.2. Project Manager**

- A. The Project Manager shall have full responsibility for the execution of the Work on behalf of Principal Project Company.
- B. The Project Manager for the D&C Period shall have, at a minimum, 15 years of competent experience in a senior position within an organization where he/she had responsibility for:
  - 1. At least one P3 project with a capital construction cost of more than \$150 million and a contract duration greater than 15 years; and
  - 2. Integrating design, construction, operations and maintenance on at least one project of similar complexity.
- C. The Project Manager for the IFM Period shall have, at a minimum, 10 years of relevant experience in a senior position within an organization where he/she had responsibility for directing operations and maintenance related activities for projects of similar complexity.

**1.1.4.3. Deputy Project Manager**

- A. The Deputy Project Manager shall provide support to the Project Manager in performing the daily management and coordination of the Work on behalf of PPC.
- B. The Deputy Project Manager for the D&C Period shall have, at a minimum, 8 years of progressive relevant experience where he/she had provided support for:
- C. At least one design-build or P3 project with a capital construction cost of more than \$150 million of similar scale and complexity.
- D. Integrating design, construction, operations and maintenance on at least one project of similar complexity

**1.1.4.4. Equity Member's Project Principal**

- A. The Equity Member's Project Principal is the person each Equity Member proposes as their representative principally responsible for that Equity Member's role on the PPC.
- B. The Equity Member's Project Principal shall have, at a minimum, 15 years of competent professional experience.

- C. If the Equity Member's Project Principal will also serve as the PPC's Project Director, that Equity Member's Project Principal shall have a minimum of 20 years of competent experience in a senior position within an organization where his/her principal professional experience has been as an infrastructure developer.

**1.1.4.5. Engineer(s) of Record**

- A. Each Engineer of Record (EOR) shall have a bachelor's degree or equivalent diploma from an accredited educational institution and shall be a currently licensed professional engineer registered under the laws of the State of California. Engineer(s) of Record shall have experience, in a lead design role, on at least two projects of similar scope and complexity, each with a capital construction cost of not less than \$150 million, completed within the last 10 years.
- B. An EOR may also serve in the role of the Design Manager subject to demonstration of his/her qualifying experience and competence to the City's satisfaction.

**1.1.4.6. Architect(s) of Record**

- A. Every Architect of Record (AOR) shall have a bachelor's degree or equivalent diploma from an accredited education institution and each individual shall be a currently licensed architect registered under the laws of the State of California. AOR(s) shall have experience, in a lead design role, on at least two projects of similar scope and complexity, each with a capital construction cost of not less than \$150 million, completed within the last 10 years.
- B. An AOR may also serve in the role of the Design Manager subject to demonstration of his/her qualifying experience and competence to the City's satisfaction.

**1.1.4.7. Design Manager**

- A. The Design Manager is responsible for managing and overseeing the Project's development and coordination of the integrated design on behalf of Principal Project Company.
- B. The Design Manager shall have relevant experience on at least three design-build projects, each with a capital construction cost of not less than \$100 million. The Design Manager shall have at least 10 years of relevant design, supervisory and management experience.
- C. The Design Manager shall be located in San Francisco bay area, assigned full-time from Financial Close until all major design milestones are completed.

**1.1.4.8. Construction Manager**

- A. The Construction Manager is responsible for managing and overseeing the activities of construction on behalf of Principal Project Company, from pre-construction to the end of construction and turnover of the facility to its end-users.
- B. The Construction Manager shall have previous relevant experience as a project/construction manager on at least three design-build projects, each with a capital construction cost of not less than \$150 million.
- C. The Construction Manager shall be located at the Site, assigned full-time and exclusively for the Project throughout the D&C Period and until Substantial Completion.

#### **1.1.4.9. Quality Program Manager**

- A. The Quality Program Manager shall have the authority and responsibility for managing and overseeing quality-related activities for all aspects of the Work, including the establishment and maintenance of, and compliance with, the Quality Program Plan (PQPP).
- B. The Quality Program Manager's Project-specific responsibilities shall be limited to only quality assurance and quality improvement. The Quality Program Manager shall act independently from Principal Project Company's staff and the duties of such staff associated with the execution of the Work.
- C. The Quality Program Manager's authority shall be independent of the Project Manager and shall be equivalent to the authority of the Project Manager with respect to assuring and controlling quality results. It shall be the duty of the Quality Program Manager to report to superiors above the level of the Project Manager, and to the City, on the performance of, and compliance with, all Project management and quality plans. The Quality Program Manager shall be assigned full-time and exclusively for the Project throughout the D&C Period.
- D. The Quality Program Manager shall have a minimum of 10 years of relevant quality management and supervisory experience on projects of similar scope and complexity. The Quality Program Manager shall have undertaken training in the use and application of internationally recognized quality programs, including the application of ISO 9001.

#### **1.1.4.10. Third Party and Utility Coordination Manager**

- A. The Third Party and Utility Coordination Manager shall serve as the main point of contact for utility owners and the City, overseeing all utility work performed for the mutual benefit of the PPC and the City.
- B. The Third Party and Utility Coordination Manager shall have, at a minimum, 5 years of previous relevant experience in at least two design-build projects, with at least one in the San Francisco area within the last five years.
- C. The Third Party and Utility Coordination Manager shall be located at the Project Site, assigned full-time from Commercial Close until the end of the D&C Period, and upon request by the City, shall remain available until Final Acceptance.

#### **1.1.4.11. Project Safety Representative**

- A. The Project Safety Representative (PSR) shall manage and oversee safety issues related to the Project, working closely with the Design Manager and the Construction Manager during the D&C Period and as specified in Division 10, section 01 35 45 of the Technical Requirements. During the IFM Period, the PSR shall work closely with the IFM Manager to assure safe and secure operation of the IFM Facilities, with required protection for patrons, employees and the public.

#### **1.1.4.12. Infrastructure Facility Maintenance (IFM) Manager**

- A. The IFM Manager shall be responsible and authorized to act on behalf of Principal Project Company in matters pertaining to operations and maintenance of the IFM Facilities. Principal Project Company shall keep the City informed, in writing, of the identity and activities of the IFM Manager.
- B. The IFM Manager shall have overall responsibility for Principal Project Company's IFM Services performed throughout the IFM Period and IFM Manager shall devote their time exclusively to their responsibilities in connection with this duty. City will have the right, using reasonable discretion, to approve or reject any IFM Manager selected by Principal Project Company if the qualifications under 1.1.4.8 are not met.
- C. The IFM Manager shall have at least 10 years of progressive experience in daily maintenance and capital replacement activities for operating facilities of similar scope and complexity. Experience shall include seven or more years in a qualifying management position.
- D. The IFM Manager shall be located in San Francisco assigned to the Project from no later than one year prior to the planned Substantial Completion and for duration of the IFM Period.

#### **1.1.4.13. Infrastructure Facility Maintenance Quality Manager**

- A. The IFM Quality Manager is responsible for effectiveness of Principal Project Company's quality personnel throughout the IFM Period, qualifying and supervising experienced personnel in sufficient numbers to adequately perform the duties and fulfill obligations addressed in the Quality Management Plan or equivalent controlling documents. Such quality personnel shall report directly to the IFM Quality Manager.
- B. The IFM Quality Manager shall hold a bachelor's degree or equivalent. The IFM Quality Manager shall have a minimum of five years of quality management experience on projects of similar scope and complexity and shall have undertaken training in the use and application of nationally recognized quality programs.

#### **1.1.5. Principal Project Company Services**

- A. Principal Project Company shall be responsible for providing the following services during the Term:
  - 1. Project management including cost control and management, schedule control and management, and risk management.
  - 2. Information management.
  - 3. Public information and communications.
  - 4. Utility coordination.
  - 5. Third Party coordination.
  - 6. Interface management.
  - 7. Environmental compliance and mitigation monitoring.
  - 8. Safety and Security.

9. Quality assurance and quality control.
10. Design, design management and design assurance.
11. Develop and manage Allowances for Infrastructure Facility.
12. Develop and manage Provisions required to support the Joint Development Alternatives.
13. Subsurface and Site investigations
14. Surveys and land surveying.
15. Pre-construction.
16. Procurement.
17. Administration of Contractors, Suppliers and Vendors.
18. Construction and construction management.
19. Commissioning, Verification and achieving operational readiness.
20. Infrastructure Facility maintenance services.
21. Asset management and inventory control.
22. Capital asset replacement.
23. Handback.

#### **1.1.6. Regulatory Approvals Plan**

Principal Project Company shall prepare and submit to the City a Regulatory Approvals Plan defining its approach to obtain all Regulatory Approvals including approvals from City departments in their regulatory capacity, and all Authorities Having Jurisdiction. This plan shall specifically address the Principal Project Company's construction permitting plan that is coordinated with the Project Schedule.

#### **1.1.7. Design and Construction Management Plans**

Principal Project Company shall prepare a Design Management Plan and a Construction Management Plans as supplements to the PMP.

##### **1.1.7.1. Design Management Plan**

- A. Principal Project Company shall prepare and submit to the City a Design Management Plan (DMP) describing its approach to undertake and achieve the requirements in Section 1.8 (Design Management).
- B. The DMP shall:
  1. Describe the design organizational structure, design phase management philosophy and staff positions, and descriptions of the organizational relationships within Principal Project Company's design, construction, IFM and quality management organizations;
  2. Describe the planned design packaging scheme and reviews process, including internal, City's proprietary review packages, and permit reviews by all AHJs;
  3. Describe the content and format of each design stage package submission;
  4. Describe process and environment prescriptions to ensure development and coordination of the integrated design progresses reasonably;

5. Address when and how coordination will occur with the City regarding Allowances and any other City-furnished and installed FF&E;
  6. Address provisions for the Joint Development Alternatives required in these Technical Requirements;
  7. Address how the design deliverables will be managed to fulfill their associated deadlines to submit them for reviews and/or approvals;
  8. Address how design reviews by the City will be managed by the Principal Project Company, including resolution and record-keeping of City design review comments;
  9. Address how changes to the Project will be recorded, tracked, and communicated; and
  10. Incorporate the Owner's Information Requirements and the BIM-enabled processes and workflows described in the BIM Project Execution Plan (see Section 1.10)
- C. The Design Management Plan shall include a section that describes the Principal Project Company's procedures to obtain proprietary and regulatory design reviews and, as applicable, approvals of Design Deliverables. All proprietary design reviews shall be consistent with Exhibit 11 (Submittal Review Process) and Section 1.8.5(Proprietary Design Reviews).

#### **1.1.7.2. Construction Management Plan**

- A. Principal Project Company shall prepare and submit to the City a Construction Management Plan (CMP) describing its approach to undertake and achieve the requirements in Section 1.11 (Construction Management).
- B. The CMP shall include:
  1. The construction organizational structure, construction phase management and staff positions, and descriptions of the organizational relationships within Principal Project Company's design, construction, IFM, and quality management organizations;
  2. Principal Project Company's construction packaging plan, and include initial construction phasing and sequencing approach to the Project;
  3. Principal Project Company's process for conducting pre-construction surveys for existing structures, utilities, and other infrastructure, as appropriate for the Work;
  4. Explanation of how Principal Project Company will perform construction planning and logistics, with specific mention of when and how construction coordination will occur with the City regarding any City Furnished Equipment and
  5. Request for Information and Change processes
    - a. Including but not limited to changes during construction that affect the Joint Development Alternatives
    - b. Such changes are subject to the requirements of Exhibit 9 (Change Procedures).

#### **1.1.8. IFM Management Plan**

Principal Project Company shall prepare and submit to the City a revised IFM Management Plan that describes the management approach for delivering the IFM Services. Principal Project Company's preliminary IFM Management Plan shall, at a minimum, among other tasks:

- A. Provide clear description and delineation of the IFM Services and SFMTA O&M Services.

- B. Develop a detailed plan to address customer service and work management support, including the approach to customer interface procedures and protocols through the Help Desk. This will also include the approach to receive, schedule and dispatch work requests.
- C. Prepare a Human Resource plan that outlines the resourcing structure including on-site and off-site qualified personnel to perform the IFM Services. This will include clear roles and responsibilities.
- D. Outline Principal Project Company's approach to maintain, repair, and replace elements of the Infrastructure Facility including Renewal Work, Scheduled Maintenance and Demand Maintenance. This will include:
  - 1. Estimated design life and Useful Life of assets.
  - 2. Criteria for determining whether rehabilitation, refurbishment or replacement will be necessary to meet performance and Handback requirements of assets.
  - 3. Identification of assets that are critical to the successful delivery of the project and require specific Scheduled Maintenance or subcontracting expertise.
  - 4. Process for assessing and reporting on the risk associated with asset failure and supporting mitigation strategies.
  - 5. Processes for ensuring that preventive maintenance is in line with Scheduled Maintenance plans
  - 6. Integration of IFM Services and the CAFM System
- E. Approach to the development of IFM Services procedures intended to guide the on-going service delivery by Principal Project Company across general management and project-specific service areas.
- F. Describe the process for developing a Quality Management Plan to manage and measure the quality of IFM Services
- G. Outline how the Building Information Model will be updated in line with Renewal Work and other IFM Services
- H. Approach to developing and maintaining assets such that they comply with the Handback Requirements

The revised IFM Management Plan shall be developed and submitted per the requirements in Division 7 of the Technical Requirements to approved by the City. Once approved, the final IFM Management Plan will supersede the preliminary IFM Management Plan included in Exhibit 2 (Project Management Plan).

## 1.2. PROJECT CONTROLS AND PERFORMANCE MEASUREMENT

### 1.2.1. Project Schedule

- A. It is expressly understood and agreed that the time of beginning, the rate of progress, and the time of completion of the work are of the essence of the Agreement. The Work shall be executed with such progress as required to prevent any delay to the Project, the Contract Deadlines, and the general completion of the Agreement.
- B. Principal Project Company's Initial Schedule shall be a detailed critical path method schedule, and shall govern all Work from the Effective date until NTP2.
- C. Principal Project Company's Project Schedule shall be a detailed critical path method schedule for the entire Project, applicable from NTP2 to Final Acceptance, and shall incorporate scheduling information details exhibited in the Initial Schedule and subsequently updated and refined through an interactive process defined in Section 1.2.1.1 (Project Schedules).
- D. The Project Schedule shall demonstrate that adequate planning, scheduling, and resource allocations occur to provide a reasonable and executable baseline work plan.
- E. Principal Project Company shall use the applicable Project Schedule for coordinating the various Work sequences, monitoring the progress of completed Work activities, identifying pending Work, and evaluating the effect of scope changes and re-sequencing of Work activities. The Project Schedule and subsequent revisions and updates shall comply with all requirements defined in Section 1.2.2 (Schedule Requirements) and shall be broken down into work packages and deliverables of reasonable duration for all activities, and not exceeding 10 working days for each construction activity for which progress can readily be reported and verified.
- F. The Project Schedule shall include all required City and Third Party activities and/or milestones. At a minimum, these activities and milestones shall include:
  - 1. Availability of right-of-way, reviews of submittals, and special instructions as may be detailed in the Contract Documents; and
  - 2. Adequate time for City to install and test any City-furnished FF&E related to an Allowance or the preliminary equipment list.
- G. The Project Schedule shall comply with all schedule requirements of the Contract Documents. The Project Schedule shall have activities depicting a logical sequence of coordinated work products and deliverables each of reasonable duration, generally of not more than 10 working days duration for construction activities, for which progress can be readily reported and verified.
- H. Design Work, including time-critical preconstruction planning and coordination, may commence immediately after Principal Project Company's receipt of NTP 1, provided however, that such activities are addressed in the Design Management Plan and Principal Project Company's Design Quality Plan, for which submissions have previously been received by the City.

- I. In the event the Contractor fails to define any element of work, activity or logic and the City review does not detect this omission or error, such omission or error, when discovered by the Contractor or City, shall be corrected by the Contractor at the next monthly Schedule Update and shall not affect any Contract Deadline.
- J. Pursuant to float sharing requirements of this Section, use of any float-suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times or durations are prohibited.
- K. The City-Furnished Equipment, if any, are the Principal Project Company's responsibility to identify as separate construction activities. Indicate delivery dates, logic ties to predecessor and successor activities or schedule windows of such items set forth in the Contract or furnished by the City.
- L. The Principal Project Company is responsible to include Project start-up, testing and commissioning activities in the Project Schedule detailing all activities needed to provide a fully functional facility that meets all building management systems, fire-life-safety and City requirements in accordance with Division 6 of the Technical Requirements.

#### **1.2.1.1. Project Schedules**

- A. Several forms of the Project Schedule shall be required, as further defined below:
  - 1. Project Schedule
  - 2. Revised Project Schedule
  - 3. Recovery Schedule(s)
- B. Principal Project Company shall archive each monthly progress report and schedule update, together with all the City-approved Project Schedules.
- C. Principal Project Company shall maintain an up-to-date and validated As-Built Schedule throughout the course of construction.

#### **1.2.1.2. Project Schedule**

- A. Principal Project Company shall submit to the City for review and approve an update to the Initial Schedule detailing all D&C Work activities between NTP2 and Final Acceptance to a Level 4 as defined in AACE 91R-16 "Schedule Development" and following all schedule requirements established in this section 1.2 of Division 1 in accordance with Exhibit 11 to the Agreement (Submittal Review Process). This update of the Initial Schedule shall be submitted no later than 90 Days prior to scheduled NTP2 and conform to all milestones in the Agreement and the Initial Schedule (as applicable). This Project Schedule, once accepted by the City, shall be saved by Principal Project Company as a unique schedule file that, along with its associated reports and back-up documentation, establishes the Project Schedule. A City-approved Project Schedule is a condition precedent to NTP2.
- B. Principal Project Company shall use the Initial Schedule as the basis for the Project Schedule, closely matching key activity sequences and milestones included in the Initial Schedule and conforming with all project schedule milestone requirements set forth in the Agreement.

- C. Prior to NTP 2, Principal Project Company shall provide progress reporting against the Initial Schedule.

#### **1.2.1.3. Revised Project Schedule**

- A. Principal Project Company shall, throughout the D&C Period, update the Project Schedule to reflect actual progress and status of the Work. These updates shall not amend the contractual milestones in this Agreement.
- B. If the Project Schedule needs to be amended as a result of a Change Order or Compensable Delay Event, the revised and City-approved schedule shall replace the previously established Project Schedule and, henceforth, shall be the Revised Project Schedule.

#### **1.2.1.4. Recovery Schedule**

- A. Whenever the Project Schedule shows any schedule activities with a completion date having 15 Days or more negative float, Principal Project Company shall prepare and submit to the City a Proposed Recovery Schedule. Such submittals shall include a list of all activity and resource changes required to eliminate such negative float and an accompanying narrative explaining the nature of such changes. The recovery schedule shall be a separate submittal from the Project Schedule Monthly Update (see Section 1.2.1.5), unless the City elects to waive the separate submittal upon determining that current Project Schedule is acceptable with only minor changes.
- B. If the proposed schedule revisions include sequence changes, Principal Project Company shall provide a fragmentary network (fragnet) schedule diagram that compares the original sequence to the revised sequence.
- C. After obtaining formal acceptance by the City, the approved Recovery Schedule shall replace the previously established Project Schedule and shall be the Project Schedule.
- D. If Principal Project Company's proposed schedule revisions are not acceptable to the City, then the City's comments shall form the basis for resubmission of Principal Project Company's proposed recovery schedule

#### **1.2.1.5. Project Schedule Monthly Updates**

- A. Principal Project Company shall prepare and submit to the City Project Schedule Monthly Updates to reflect actual progress and to define future activities. The last day of each monthly reporting period shall be the data date used to calculate the schedule.
- B. The current Project Schedule shall be the basis for monthly updates, which shall:
1. Show activities that have started, are on-going, or have completed during the reporting period.
  2. Show actual start and finish dates for activities.
  3. Show remaining duration for on-going activities, with remaining duration based on updated determinations of the amount of time required to complete the work activity.
  4. Modify activity relationships or otherwise re-baseline the currently established Project Schedule only as necessary to correct out-of-sequence progress for on-going activities or to accurately reflect Principal Project Company's plan for completing remaining Work.

5. Be accompanied by a narrative report, which shall:
    - a. Identify the Project Schedule version.
    - b. Provide a summary of, and reasons for, revisions and deviations (if any).
    - c. Identify milestones.
    - d. Include started activities for the period.
    - e. Include completed activities for the period.
    - f. Explain missed activity starts for the period.
    - g. Explain missed activity completions for the period.
    - h. Discuss critical resources.
    - i. Describe the critical path.
    - j. Identify near-critical activities (total float less than nine Days).
    - k. Describe any pending Time Impact Analysis (TIA).
    - l. Describe Project issues encountered.
    - m. Identify potential changes from the original accepted Baseline Schedule (and last accepted update thereof).
    - n. Describe impacts to current period activities.
    - o. Highlight upcoming Project-related the City and Third Party activities within the next six months.
  6. Include the following reported schedule data in supporting tables:
    - a. Critical Path.
    - b. Added activities.
    - c. Deleted activities.
    - d. Added predecessors.
    - e. Revised relationship lags.
    - f. Deleted predecessors.
    - g. Revised original durations.
    - h. Revised activity names.
    - i. Changed calendars.
    - j. Activities started during the period.
    - k. Activities completed during the period.
    - l. Near-critical activities (total float less than nine Days).
    - m. Activities scheduled but not started during the period.
    - n. Activities scheduled but not completed during the period. and
    - o. Activities started or completed in the previous period.
- C. Principal Project Company shall submit Project Schedule Monthly Updates properly coordinated with each Monthly Progress Status Report, as defined in Section 1.2.4.1 (Monthly Progress Status Report).

#### **1.2.1.6. Submittal Schedule for D&C Submittals**

- A. Principal Project Company shall prepare and submit to the City a preliminary Submittal Schedule for the D&C Period, identifying design documents and showing dates by when all Submittals (documents, data, , samples, mock-ups, etc.) required by the Contract Documents will be submitted to the City and the appropriate AHJs. This preliminary submittal schedule shall be consistent with the required submittal dates in the Project

Schedule. The required submittal dates in the finalized Submittal Schedule shall be coordinated with the Project Schedule and any updates thereafter.

#### **1.2.1.7. Look-Ahead Activity Reports**

- A. As an integral part of every Weekly Coordination Meeting defined in Section 1.13 (Weekly Coordination Meetings), a one-week look-back and two-week look-ahead schedule (also called a "Three-Week Look-ahead Report") shall be generated from the latest evaluation of actual progress based on each activity in the look-ahead schedule corresponding to an activity in the Project Schedule.
- B. The Three-Week Look-Ahead Report shall show activities that occurred over the previous week and those necessary to meet the schedule over the ensuing two weeks. The report shall include, at a minimum, all activities planned to be performed during the look-ahead period. activities related to Project interfaces, the City-actions, and Third Party and Utility Owner coordination. and time-critical material deliveries.
- C. The Three-Week Look-Ahead Report shall be a spreadsheet containing activity IDs and descriptions from the Project Schedule and include the following information: start and finish dates for these activities as they will be performed on Project Site showing the planned prosecution of the activity (with interruptions and resumptions of work), total float from the schedule current during that month, original duration, remaining duration, percent complete, and pertinent remarks as to activity status. The Three-Week Look-Ahead Report shall be submitted to the Construction Manager at least three days prior to the weekly meeting for review. Submit copies of Three-Week Look-Ahead Report on 11 inch by 17 inch paper. The look-ahead must indicate which activities are on the critical path.
- D. During each Weekly Coordination Meeting, the Three-Week Look-Ahead Report shall guide attendees' discussion and review of activities, whether planned or ongoing.

#### **1.2.2. Schedule Requirements**

- A. The Project Schedule, in all its forms, shall comply with the Contract Documents and shall be consistent with project planning and scheduling best practices. The Project Schedule shall, at a minimum, conform to the requirements in the following subsections:
- B. Include a written narrative that explains the approach for meeting all milestones and Contract Deadlines. The narrative shall include a clear description of the critical path activities from beginning to end. The narrative shall set out the schedule basis and assumptions, including determining activity durations used to develop the critical path network and methodology for resource loading.
- C. Include activities that meet the following minimum requirements:
  - 1. Activity durations shall be the total number of actual days required to perform the activity, including consideration of normal weather impact on completion of the activity.
  - 2. Activity durations shall be based on anticipated production rates for design and preconstruction activities, labor (crafts), equipment and materials required to perform each activity on a normal workday basis.
  - 3. Each activity shall have one predecessor and one successor (excluding the Project start and finish milestones).

4. All activity names shall be clearly and uniquely named with a description of Work readily identifiable to inspection staff. Each activity shall have a descriptive label consisting of at least one action or work function such as submit, form, place, excavate, etc.. an object such as design calculations, slab, concrete, foundation, etc.. and location such as gridline, sector, building, etc..
- D. Include all major activities of the Work in sufficient detail to enable the City to monitor and evaluate design and construction progress from Financial Close through Final Acceptance.
- E. Become the basis for standalone, partially delineated schedules as may be required by Third Party and Utility Owner Agreements.
- F. Utilize the critical path method of network calculation, the most critical path being the longest network path through the Project having the least amount of float.
- G. Utilize the precedence diagram method to establish relationships and interdependencies between the individual activities required to complete the Project, subject to the following:
  1. Total float criteria are not acceptable for identifying or representing the Critical Path; and
  2. The scheduling software shall be configured to show the longest path in any schedule calculation. and graphical representation shall distinguish between the critical path and near-critical paths.
- H. Be resource-loaded, inclusive of labor resources, equipment resources, and any limitations or restrictions on resources.
- I. Ensure that activity identification numbers, textual descriptions, and codes are consistently applied and have unique descriptors for each activity.
- J. Breakdown the D&C Work throughout the D&C Period into measurable performance activities, with appropriate logic ties, to show that:
  1. Overall approach to sequencing is efficient and effective;
  2. Logical relationships between activities reflect the actual intended sequence of Work;
  3. Design activities are appropriately matched to deliverables and completion of the activities, subject to the City approval of those deliverables;
  4. No construction activity is greater than 10 working days in duration (except those activities relating to procurement, manufacturing, fabrication, shipments, submittals, and review cycles), subject to the City pre-approval of any exceptions;
  5. No open-ended activities (i.e. those activities without their predecessors and successors identified) occur other than Early Work Start, Financial Close, NTP 1, Project Start, Substantial Completion, and Final Acceptance; and
  6. No constraint dates begin or complete any activity unless particular constraint dates are specifically required in the Contract Documents or are explicitly accepted by the City.
- K. Use no relationships that cannot be shown to demonstrate a true dependency.
- L. Show any required City, Third Party and/or Utility Owner activities and milestones including, at a minimum, installation of City-furnished FF&E, procurement milestones (such as product delivery dates), right-of-way/right-of-entry availability, and Project elements that interface with Related Projects (see Section 1.14.2).

- M. Show phasing of the Work including procurement, fabrication, delivery, installation, testing of materials and equipment, commissioning of systems, and any long-lead time orders for major or significant materials and equipment.
- N. Identify all required regulatory approvals, allow reasonable durations for acquiring approvals and dates by which such approvals are needed to avert delays.
- O. Incorporate the availability and unavailability of various Rights-of-Way/Rights of Entry and temporary easements necessary to facilitate field construction (“TCEs”).
- P. Minimize use of leads and lags, with any leads and lags subject to the City approval.
- Q. Use retained logic methodology for schedule calculations.
- R. Exhibit no float sequestering or float suppression techniques, as no scheduled activity shall exhibit negatively valued total float.
- S. Include printed calendar report(s) with every schedule submission. The schedule’s global calendar shall reflect workweeks of seven 24-hour days without holidays or non-work days.
- T. Take into consideration potential construction delay due to Adverse Weather and include, at a minimum, 17 days per year for the anticipated number of days of Adverse Weather as stipulated in Section 14.1.8.2 of the Agreement.

### **1.2.3. Scheduling System**

- A. Principal Project Company shall utilize the latest version of Primavera Project Management (P6, or later, for Windows) software running on a hardware system commensurate for the size and complexity of the Project. This hardware and software, working together, shall be called the “Scheduling System”, and shall be capable of handling, processing, printing and plotting data to satisfy requirements set forth in the Contract Documents.
- B. Principal Project Company shall continuously maintain the Scheduling System and the Project Schedule. Principal Project Company shall ensure the scheduling software maintenance agreement(s) remain current until Final Acceptance.
- C. Each schedule submitted by Principal Project Company, or by any person or firm employed by Principal Project Company, shall be in native .xer format with textual schedule reports accompanying each schedule submittal in both hard copy and electronic “.pdf” forms.

### **1.2.4. Performance Reporting**

#### **1.2.4.1. Monthly Progress Status Report**

- A. Principal Project Company shall prepare and submit to the City a Monthly Progress Status Report, from NTP2 to Final Acceptance, with agreed content and formatting, that contains information on Principal Project Company’s performance of Work during the previous calendar month. At a minimum, each such report shall contain:
  - 1. Work-completed reports (and marked-up work-completed reports, as necessary) for the reporting period, description of Work planned for the next reporting period, and a summary of any critical issues or decisions affecting the Work.

2. Report shall have a subsection for each of the following that shall address progress, risks, mitigations and corrections for:
  - a. Project Schedule.
  - b. Quality.
  - c. Safety and security.
  - d. Environmental compliance and permitting.
  - e. Third Party and Utility coordination.
  - f. Traffic detours and maintenance of traffic.
  - g. Inclusivity.
  - h. Public outreach.
  - i. Submittals and review process.
  - j. Design progress tracking, and design modifications and other changes in scope.
  - k. Interface management.
  - l. Operational readiness planning and coordination.
  - m. Other pertinent and timely discussion topics.
3. Description of environmental issues that arose within the Project Site (or work sites relating to the Project) and their resolution or current disposition.
4. Description of safety and security issues that arose within the Project Site (or work sites relating to the Project) and their resolution or current disposition.
5. Description of incremental and cumulative progress made towards the achievement of Disadvantaged Business Enterprises participation compared to planned levels of such Inclusivity participation.
6. Listing of Nonconforming Work, whether self-reported or identified by the City, and/or corrective actions and their resolution or current disposition.
7. Providing a copy of the latest Noncompliance Database, noting any new assessment of Noncompliance Points in the previous month, and generally reporting on the D&C requirements contained in Article 15 (Deductions and Noncompliance Points) of the Agreement.
8. For the Final Monthly Progress Report addressing the D&C Period, Principal Project Company shall update all information and incorporate such information into an As-Built Schedule, as defined in Section 1.2.5, for purposes of closing out the D&C Work.

#### **1.2.5. As-Built Schedules**

- A. Principal Project Company shall prepare and submit to the City for review and comment a Final Schedule Report, which shall provide the last Revised Project Schedule, an overview of the Project Schedule process, the history of changes to the Project Schedule, resulting effects on contractual dates, if any, and any outstanding schedule issues.

#### **1.2.6. Time Impact Analysis for Proposed Extensions of Time**

- A. Principal Project Company shall submit a detailed Time Impact Analysis (TIA) to support all requests of claims for extension to any Contract Deadline.
- B. The date upon which the Relief Event or Force Majeure Event occurred shall serve as the basis for each TIA or, in the event of a proposed Change Order, the implementation date of the proposed Change Order.

- C. Each TIA shall show a current status of the Work using the Project Schedule or Revised Project Schedule, as the case may be, and corresponding Performance Monitoring Report prior to the initiation of the events resulting in the claim for an extension of any Contract Deadline. The TIA shall show all affected activities together with a demonstration of actions deployed by Principal Project Company to mitigate any impacts to a Contract Deadline.
- D. Each TIA shall include a fragmentary network schedule (most commonly called “fragnet”) demonstrating how Principal Project Company proposes to incorporate the quantifiable time impact into the most recent Project Schedule update prior to the initiation of events in-question. The fragnet is subject to the same requirements controlling activities in the Project Schedule, including resource information for added scope and assignment of activity codes and appropriate work breakdown structure, whether existing or amended.
- E. With regard to each fragnet relating to a Relief Event or Force Majeure Event, Principal Project Company shall:
  - 1. Demonstrate that recalculation of an activity or activities duration based on quantities, with resource loading and productivity ratios for the fragnet activities, as well as the scheduled activities that were affected and impacted by delay, are justified.
  - 2. Identify the predecessors to new activities demonstrating the impacts caused to successor activities.
  - 3. Insert fragnet into the most recent Project Schedule update prior to the start date of the alleged Relief Event or Force Majeure Event.
  - 4. Run the schedule calculations and submit the impacted Project Schedule as required by the Contract Documents. and
  - 5. Include a narrative report describing the effects of new activities, resources and relationships to Contract milestones and the applicable Completion Date with each TIA.
- F. A submitted TIA can be accepted when Principal Project Company proves one or more of these conditions justifiable to the City:
  - 1. When a Change Order affects the completion date or sequence of items of the Work.
  - 2. When the City directs a change that affects the milestone date(s) specified in the Contract or alters the length of a critical path.
- G. Principal Project Company, or any person or firm employed by Principal Project Company, shall submit each TIA in .xer file format, to the City for examination, evaluation and consideration.
- H. After obtaining formal acceptance by the City, Principal Project Company shall incorporate the accepted TIA into the next Project Schedule update. Principal Project Company shall incorporate, and include as an attachment to the corresponding Change Order, any TIA related to a Change involving an extension to a Contract Deadline.

### 1.3. SUBMITTAL MANAGEMENT

- A. Each Submittal provided to the City shall include sufficient detail to demonstrate that Principal Project Company understands and is fully responsive to, and compliant with, the specific requirements of the Contract Documents addressed in that Submittal. Submittals shall be logically organized and clearly presented, and shall be compliant with the requirements of Article 5.1 (Submittal Review Terms and Procedures) of, and Exhibit 11 (Submittals Review Process) to, the Agreement.
- B. The content of Submittals to be provided to AHJs, Third Parties, and Utility Owners for their review and/or approval shall be as required by the applicable regulations, codes, Third Party agreements, and Utility Owner agreements, consistent with the respective Project Execution Plans, as applicable.
- C. Exhibit 18, Division 1 Appendix B (Initial List of Submittals) provides the minimum requirements for technical submittals during the Term. Principal Project Company shall expand and submit to the City the List of Technical Submittals as further defined in Exhibit 11 (Submittals Review Process) to the Agreement.

## 1.4. QUALITY MANAGEMENT

- A. Principal Project Company is responsible for effectively managing quality and assuring quality results in each phase and element of the Work.
- B. Principal Project Company's Quality Management processes and procedures shall be independent of its management and oversight of Project scope, schedule, budget, and production activities. Acting independently, Principal Project Company's Quality Management team shall provide status reports on non-compliance actions and results of quality reviews and audits, and documentation related to achieving major schedule milestones.

### 1.4.1. Principal Project Company Quality Program

- A. Principal Project Company shall document, implement, and maintain an effective Principal Project Company Quality Program (PQP) that guides processes to manage, control, document, and ensure that all aspects of the Work comply with requirements of the Contract Documents. The PQP shall apply to all Work performed by Principal Project Company, its Contractors, Suppliers and Vendors, as applicable.
- B. The PQP shall contain processes and procedures necessary to ensure complete quality assurance and quality control for the following major activity categories: design, design and constructability reviews, energy modeling and other sustainability verifications, materials, equipment, inspections, testing, construction, performance demonstration, coordination, workmanship, fabrication, and document control for on-site and off-site Work performed by Principal Project Company. Multiple volumes shall be compiled separately addressing Project Management, Design and Construction, and Operations and Maintenance.
- C. The processes and procedures established under the PQP shall comply with ISO 9001 requirements and, at a minimum, the following elements:

- Element 1: Management Responsibility
- Element 2: Documented Quality Management System
- Element 3: Design Control
- Element 4: Document and Data Control
- Element 5: Purchasing
- Element 6: Control of Third Party Supplied Items
- Element 7: Product Identification, Availability, and Traceability
- Element 8: Process Control
- Element 9: Inspection and Testing
- Element 10: Control of Inspection, Measuring and Test Equipment
- Element 11: Inspection and Test Status
- Element 12: Control of Nonconforming Work
- Element 13: Corrective and Preventive Action
- Element 14: Control of Quality Records

Element 15: Quality Audits

Element 16: Training

- D. Principal Project Company shall require and cause the preparation and adoption of separate, formalized quality programs by each Principal Project Company-Related Entity, coordinated and consistent with requirements in the PQP. The quality assurance and quality control obligations for which Principal Project Company is responsible shall extend to Work performed by Contractors and Subcontractors.
- E. Principal Project Company shall comprehensively document the PQP in the Principal Project Company Quality Program Plan (PQPP). Principal Project Company shall submit to the City for review and acceptance prior to submitting any Design Documents or commencing any field activities. Principal Project Company shall submit to the City all subsequent updates to the PQPP.
- F. The PQPP shall include an organization chart showing names, titles, responsibilities, authority, and the interrelationship between those involved in managing and directing the PQP. Principal Project Company's Quality Program Manager (QPM) shall be responsible for managing and overseeing the overall program and its preparation and implementation, including updates thereof. The PQP shall establish a Quality team that is distinct and independent from Principal Project Company's design and construction production organizations. Members of the Quality team shall inform the City's quality oversight personnel, as appropriate, and shall report directly to the QPM who, in turn, reports directly to Principal Project Company's senior management team.
- G. The PQPP is subject to revision, and both Principal Project Company and the City may identify the need for such revisions. Principal Project Company shall update content to reflect current circumstances and changes in conditions as the Work progresses. Principal Project Company shall submit any such revisions or updates no later than each anniversary of the initial submittal of the PQP. Principal Project Company shall then redistribute a conformed PQPP, with revisions highlighted, in accordance with the requirements herein.
- H. The initial PQPP must address all D&C Work. An updated PQPP must be submitted to the City for review and acceptance

#### **1.4.1.1. Management Responsibility**

- A. Principal Project Company shall define and document a quality policy that includes objectives for the Project and shall communicate, implement, and maintain that policy at every level of its organization.
- B. Principal Project Company shall publish a statement of its commitment to quality and its organization's quality objectives. The stated commitment shall explain Principal Project Company's means to attain quality results in the completed Work, how such commitment extends to all Project staff, and a signed copy of such management commitment shall be included in the PQPP.

#### **1.4.1.2. Documented Quality Management System**

- A. Principal Project Company shall establish, submit necessary documentation to the City, and maintain a highly documented Quality Management System (QMS) to ensure that Project-specific quality goals and objectives are satisfied. The QMS requirements shall extend to Principal Project Company's entire organization and Principal Project Company's management and oversight of quality assurance/quality control shall be independent of Principal Project Company's management and oversight of design and construction production, and subsequent operations and maintenance activities.
- B. The QMS shall define the interface between Principal Project Company's quality organization and its design and construction organization, and subsequent operations and maintenance organization, and shall be in writing to ensure that employees have a full understanding of how the QMS works. Principal Project Company shall fully document and report to the City all Nonconforming Work, as required in Section 1.4.1.9 (Control of Nonconforming Work), and Corrective Actions, as required in Section 1.4.1.10 (Corrective and Preventive Action).
- C. The QMS shall contain a statement of its purpose and scope, and shall include references to appropriate codes, standards, and specifications. The QMS shall identify any inspection equipment, skills, or special quality processes needed to ensure quality performance. The QMS shall contain formats for the quality records and related documentation. .

#### **1.4.1.3. Design Control**

- A. Principal Project Company is solely responsible to provide Design Documents in accordance with the Contract Documents and the approved PDQP, as defined in Section 1.4.2 (Principal Project Company Design Quality). City's review of the Design Documents is proprietary in nature and does not relieve Principal Project Company of the responsibility to meet all obligations and requirements of the Agreement and Authorities Having Jurisdiction.
- B. During development of Design Documents and the PDQP, Principal Project Company shall incorporate respective designers' quality control provisions and references into the PDQP. Principal Project Company shall establish and maintain procedures to ensure conformance with the Contract Documents, and with applicable requirements of AHJs, Third Parties, and Utilities Owners. Principal Project Company shall ensure designers have a clear understanding of the applicable requirements, properly coordinate design interfaces, plan and execute design validation and conformance verification activities, and implement effective design control processes and procedures, to control changes in the design throughout the entire D&C Period.
- C. Design control applies to computer programs, design tables, calculations, graphs, and any other work products used to analyze results in developing or checking proposed designs.
- D. The PDQP shall include procedures on how changes in design are to be initiated, reviewed and approved, implemented, inspected and documented, shall define a process to provide effective configuration management/control, and shall identify those individuals or persons authorized to approve such changes in design. An approved PDQP must be established and followed prior to any submission of Design Documents to the City.

#### **1.4.1.4. Product Identification, Availability, and Traceability**

- A. Principal Project Company shall establish, submit to the City, and implement documented product identification, availability and traceability procedures for identifying and controlling the provision of any items of production (such as batch, materials, parts, and components) for incorporation into the Project. Effective measures shall prevent the use of incorrect or defective items and shall ensure the use or incorporation of only correct and acceptable items. Principal Project Company shall submit to the City, in a complete and timely fashion, formal product identification procedures, for application from receipt through all stages of production, delivery, and installation.

#### **1.4.1.5. Process Control**

- A. Special processes, including welding, nondestructive testing, and heat treatment, the results of which cannot be directly verified by subsequent inspection and testing of the product, shall be continuously monitored by Principal Project Company during the process to ensure required quality results in the final product.

#### **1.4.1.6. Inspection and Testing**

- A. Principal Project Company shall plan and implement inspection and testing procedures as necessary to verify product or production quality. Inspection and testing shall follow formal procedures, with documented results, before receiving incoming products for final inspection, verification, and testing for acceptance. Testing requirements and procedures shall include references to required certifications, testing procedures, frequency and location, requirements for witnessing of tests, and where factory inspection and/or testing is necessary prior to shipping or transporting the finished product.
- B. Principal Project Company is responsible for performing all quality assurance and quality control inspections and tests under the Contract Documents. The PQP shall address the required certifications, inspections, and tests, and the establishment of quality records, in appropriate detail.
- C. Principal Project Company shall provide a means for identifying the inspection and test status of Work during production and installation. Only products or installed Work that has passed the required inspections and tests may be accepted.

#### **1.4.1.7. Control of Inspection, Measuring, and Test Equipment**

- A. Inspection, measuring, and test equipment (including test software) necessary to perform inspection and testing shall be identified, controlled, calibrated, and maintained appropriately, to demonstrate the conformance of work to the specified requirements.
- B. Principal Project Company shall submit to the City a Schedule of Testing Equipment identifying all equipment that needs periodic and regularly scheduled recalibration, including date of initial calibration, schedule for recalibrations, and current calibration status. Principal Project Company's Quality Assurance personnel shall ensure the schedule is current by audit. Principal Project Company shall provide the associated schedule of updates and audit reports to the City's Quality Assurance personnel upon request.

#### **1.4.1.8. Inspection and Testing Status**

- A. Conformance or nonconformance of any Work items shall be identified through inspection and testing by suitable means. Principal Project Company shall ensure all Work items have passed their requisite inspections and tests and shall report such status throughout all production, installation, and servicing processes.

#### **1.4.1.9. Control of Nonconforming Work**

- A. Principal Project Company shall submit to the City and implement procedures to prevent the use, installation, or allowance of Nonconforming Work in the Work.
- B. Principal Project Company shall identify, document in the Noncompliance Database, and evaluate the root cause of every instance of Nonconforming Work as per Section 15.3 of the Agreement.

#### **1.4.1.10. Corrective and Preventive Action**

- A. Principal Project Company implement the corrective actions needed to correct each instance Nonconforming Work, prevent recurrence, and analyses to detect and eliminate potential Nonconforming Work.
- B. Principal Project Company shall verify accomplishment of corrective actions to the City's satisfaction. Principal Project Company shall develop and implement preventive actions to mitigate or eliminate potential Nonconforming Work or otherwise prevent occurrence/recurrence of Nonconforming Work. Such prevention includes implementing and recording changes in procedures resulting from preventive actions, corrective actions, and continual quality improvement initiatives.

#### **1.4.1.11. Control of Quality Records**

- A. Principal Project Company shall establish, submit to the City, and implement effective procedures for organizing, maintaining, and safekeeping Quality Records, both in hard copy and electronic forms. The procedures shall identify those Project-related records for safekeeping, responsibility for production and collection of such records, and responsibility for indexing, filing, storage, retrieving, and other disposition of Quality Records.
- B. Quality Records shall demonstrate conformance to specific requirements and contribute to effective operation of the QMS. Principal Project Company shall maintain, and be able to produce records necessary to provide objective evidence of Agreement review, procedure compliance, design review, training, demonstration, certification, and complete acceptance of inspection and test results, including traceability of equipment or items used in the Work.
- C. Quality Records shall be legible and shall be stored and retained in a manner that is readily retrievable, housed in locally accessible facilities that provide a suitable environment to prevent damage or deterioration, and secured to prevent loss or unauthorized access.
- D. Quality Records shall always be available to the City, for examination or inspection, in accordance with the Contract Documents, in which their retention periods and storage medium shall be as specified, consistent with the PQP and the Contract Documents.

#### **1.4.1.12. Quality Audits**

- A. Principal Project Company shall establish, submit to the City, and follow documented procedures for planning and implementing a comprehensive program of scheduled and unscheduled Quality Audits, the Quality Audit procedures. Quality Audits shall verify compliance with applicable requirements and ensure that all elements of the QMS are functioning effectively.
- B. Quality team personnel shall conduct Quality Audits on a planned and scheduled basis, commensurate with the importance of the activities being performed, but no less frequently than every quarter throughout the Term. The Quality team shall initiate Quality Audits early enough in the life of the activity to assure effective Quality Control throughout the activity's timeframe. Quality Audits shall encompass project management, supervisory and administrative functions, and performance of technical activities of the Work.
- C. The results of Quality Audits shall be fully documented, recorded, and reported to those persons and firms having direct responsibility in the Work area audited. Principal Project Company shall immediately instigate timely corrective action of any deficiencies noted in the Quality Audit.
- D. Principal Project Company's personnel conducting a Quality Audit shall be independent and separate from those directly responsible for performing the activity audited. Qualifying experience and credentials (such as ASQ certification) for an Auditor shall be established and documented by Principal Project Company, with such personnel qualification records kept on file, maintained in the Quality Records, and available to the City.

#### **1.4.1.13. Training**

- A. Consistent with the provisions in Section 1.7 (Training), Principal Project Company shall establish, submit to the City, and follow written procedures for identifying training needs and providing training to all Quality Assurance/Quality Control personnel for activities affecting quality in the Work and in accordance with the Contract Documents.
- B. Records of training and certifications shall be maintained in the Quality Records, and be available to the City, identifying certification of personnel performing specific assigned tasks. Such certification shall be based on appropriate education, training, and experience.
- C. Principal Project Company shall document its training procedures and maintain current training records to ensure only qualified personnel are performing quality related activities and assigned tasks. Principal Project Company shall prepare training procedures through ongoing training efforts and the recorded accumulation of personnel experiences, including systematic reviews of personnel competence at determined levels before any deployment in new quality-related roles. Such training shall focus on improving competency and skill levels for those performing activities affecting quality in the Work.

#### **1.4.2. Principal Project Company Design Quality**

- A. Principal Project Company shall prepare and submit to the City for review and acceptance a Principal Project Company Design Quality Plan (PDQP) addressing Principal Project Company's responsibilities for performance, oversight, and verification of all Design Work. The PDQP shall tier off from the PQPP to specifically address the design process. No Design Work may commence until the City verifies that the submitted PDQP complies with the requirements of Contract Documents and is deemed acceptable to the City.
- B. Principal Project Company shall require and cause the preparation and adoption of separate, formalized design quality plans by each design firm engaged by Principal Project Company, coordinated and consistent with requirements in the PDQP.
- C. The Design Manager and the QPM shall administer the design management and quality oversight responsibilities for which Principal Project Company owes a duty of care to the City.

##### **1.4.2.1. Design Documentation**

- A. Principal Project Company shall prepare, submit to the City, and maintain a Design Progress Tracking Report that includes engineering and design progress against the design activities in Project Schedule and as required by Section 1.8 of this Division 1, as well as any design work related to Changes or Deviations.
- B. The Design Manager shall submit to the City a Monthly PDQP Report for information purposes at the same time as Principal Project Company's Monthly Progress Status Report to, at a minimum, address:
  - 1. Summary of design reviews conducted;
  - 2. Any design activities related to Nonconforming Work; and
  - 3. Updated list of Principal Project Company's internal and external design submittals, for reference (as such documents are cited in the PDQP).
- C. Upon completion of Design Documents per the Proprietary Design Review process (see Section 1.8.5 of this Division 1), the Design Manager or QPM shall notify Principal Project Company's project management and design team members, with a copy to the City, of any outstanding issues or unresolved review comments. Outstanding issues or unresolved review comments shall also be noted in the final Design Progress Tracking Report. Principal Project Company shall revise the final Design Progress Tracking Report to incorporate responses to the City's comments and resubmit to the City within 15 Days of receipt of comments.
- D. To facilitate determination of Quality Assurance sampling and testing needs, Principal Project Company shall quantify key items of the Work subject to sampling and testing, and presented in measurable units that facilitate sampling and testing. Principal Project Company shall submit to the City its quantity estimates prior to commencing the relevant construction activity.
- E. BIM formatting for Design Documents, design submittals, and As-Built Documents shall conform to the BIM requirements herein and the requirements of the applicable AHJ.

#### **1.4.2.2. Design Quality Records**

- A. Principal Project Company shall maintain an auditable record of PDQP procedures, reviews and checks. Notwithstanding the City's right to audit, an auditor independent of Principal Project Company's management and production teams shall be able to determine, and verify by reviewing pertinent documentation, that Principal Project Company is following quality procedures included in the PDQP.
- B. Principal Project Company shall enter instances of Nonconforming Work relating to Design Work into the Noncompliance Database in accordance with Section 15.3 of the Agreement.

#### **1.4.2.3. Design Quality Assurance**

- A. The QPM shall certify to Principal Project Company and to the City that the design process activities and Design Work products comply with the approved PDQP and other Contract Documents..
- B. Performance of design quality assurance shall in no way relieve the Design Manager, EOR(s) or AOR(s), or other design firm(s), from their respective responsibilities to check and review the quality, content, and correctness of Design Work produced for the Project. Each of the responsible design firms and responsible professionals performing these checks and reviews shall document their efforts, forwarding such evidence to the Design Manager and QPM, such that notes of checks and reviews are maintained as Quality Records.

#### **1.4.3. Principal Project Company Construction Quality**

- A. Principal Project Company shall prepare and submit to the City for review and acceptance a Principal Project Company Construction Quality Plan (PCQP) defining the processes and approach that will be implemented to ensure compliance with the requirements herein. The PCQP shall tier off from the PQPP to specifically address the construction process. No permanent Construction Work, except for site demolition, grading, and other preparatory activities, may commence until the City verifies that the submitted PCQP complies with the requirements of Contract Documents and is deemed acceptable to the City.

##### **1.4.3.1. Quality-in-Construction Organization**

- A. Principal Project Company shall organize a Quality-in-Construction (QIC) program to oversee, manage, certify, and perform construction related quality activities including preparation of the PCQP and managing and scheduling all quality assurance/quality control inspections, sampling, and testing of Construction Work items.
- B. The Quality Program Manager shall be responsible for overall management and supervision of Principal Project Company's QIC program, which duties shall include coordinating the daily schedules of the field inspectors, testers, and samplers involved in ongoing design or construction activities.
- C. The PCQP shall include formal training procedures that provides Project-specific quality/safety and security orientation and clearly defines the education, previous experience, and training requirements applicable to all personnel assigned to Principal Project Company's QIC organization. The training procedures shall include evaluating each candidate's knowledge of the PQPP, QMS, PDQP, and PCQP.

- D. QIC staff shall act independently from those responsible for and involved in the production of construction materials or the progress of Construction Work.
- E. Principal Project Company shall utilize independent testing laboratories to conduct all laboratory-based and field-based testing in compliance with statutory requirements for Independent Testing Laboratory (ITL) certification and specific requirements for the City certification for applicable tests. Principal Project Company shall submit to the City candidate ITL credentials and the City reserves the right to reject any candidate ITL proposed by Principal Project Company or revoke prior ITL certifications, in the City's sole discretion, at any time. Recognized ITL accreditations shall include the AASHTO Material Reference Laboratory, the Concrete Cement Reference Laboratory, the National Precast Concrete Association, the Prestressed Concrete Institute, the American Association for Laboratory Accreditation, and/or the National Voluntary Laboratory Accreditation Program, as appropriate and approved by the City.
- F. Principal Project Company's ITL shall provide written policies and procedures to assure portable and satellite laboratories performing testing activities on the Project are capable of providing testing services in compliance with the applicable test methods. These policies and procedures shall address continual inspection and calibration of testing equipment as well as an established correlation-testing program between the accredited ITL and their portable or satellite facilities.

#### **1.4.3.2. Construction Control**

- A. The PCQP shall contain procedures and policies to detect and prevent the reoccurrence of Nonconforming Work or other deficiency.

#### **1.4.3.3. Material/Equipment Certifications**

- A. Principal Project Company shall submit a source of supply and item material/equipment types report, for the City's information, as follows:
  - 1. Initially, within either 30 Days prior to material/equipment use or 60 Days following Financial Close, whichever is the earlier, to the extent that information is known. and
  - 2. For materials/equipment not initially identified, or changes to an initial source provided, the actual source of supply shall be identified as soon as known, but not less than 30 Days prior to delivery of relevant materials/equipment to the Project Site.
- B. Documented evidence that materials and equipment conform to requirements of the Contract Documents shall be available for the City's inspection, at the Project Site, prior to installing or using such materials and equipment. Principal Project Company shall maintain such evidence (the "Material and Equipment Conformance Certifications") at the location of placement or secured storage, with definitive content sufficient to identify these specific requirements and to certify compliance, such as working drawings, codes, standards, or the Technical Provisions. Substitutions of specified materials or equipment shall not occur without prior written approval by the City, notwithstanding a consenting determination of the responsible AOR or EOR. Failure to obtain prior formal approvals of a substitution will result in a finding of Nonconforming Work and the City's rejection of the unsatisfactory work containing such nonconforming material or equipment. City reserves the right to audit and review these certifying documents at any time.

- C. Principal Project Company shall submit to the City, as soon as Principal Project Company receives documented evidence, a Source of Supply Certificate of Compliance, signed by both the Project Manager and CQCM, indicating that sourced materials and permanent equipment incorporated into the Work conform to the requirements of the Contract Documents.

**1.4.3.4. Process Control**

- A. Principal Project Company shall establish and implement policies and procedures, as documented in the PCQP, for controlling key processes associated with construction.
- B. Principal Project Company shall initiate Quality Check Points (QCPs) at appropriate stages of construction progress to ensure that trade Work is being performed in accordance with approved Design Documents, consistent with the PQPP and the PQCP, and satisfying the requirements of the Contract Documents and Good Industry Practice. Principal Project Company shall request Code-mandated structural observations and documentation of each visit by the responsible AOR or EOR (or his/her designee). Concrete pours shall routinely require a “pour card” evidencing that those inspecting the Work on behalf of the permittee and the AHJ have certified by their signature that the Work is correctly prepared and ready to receive placement of concrete.
- C. Throughout the course of Construction Work, the Construction Manager, together with the responsible AOR(s) or EOR(s) shall periodically, but not less than monthly, meet with the City representatives to review quality control documentation and procedures including, at minimum, material certifications, daily inspection records, material testing results, survey results, permits, and material placement records.

## 1.5. EXISTING CONDITIONS

- A. Principal Project Company shall ensure that the physical condition of existing buildings, structures, roadways, sidewalks, paths, trails, lighting and signal equipment, or other property that are to remain in place or are to be modified, are not adversely affected by the performance of the Work. Principal Project Company shall perform appropriate property/pre-construction surveys to document existing conditions in order to establish an adequate mapping of baseline conditions, as well as subsequent monitoring to record any variance in baseline conditions. Principal Project Company is solely responsible to protect in place certain property and shall repair or replace any property damage caused by construction of the Work. Principal Project Company shall submit to the City copies of these surveys prior to commencing any construction activity in the affected worksite location(s).

### 1.5.1. Pre-Construction Information, Pre- and Post-Construction Surveys

- A. At a minimum, Principal Project Company shall perform Pre-Construction and Post-Construction Surveys, detailing the 'before' and 'after' condition of all roadways, site features, above ground utilities, and other relevant information. Surveys shall include written documentation of pre-existing conditions and final conditions supplemented with video or still photographic documentation.
- B. After completing construction of the Project, or portions thereof, Principal Project Company shall perform a post-construction survey for each facility documented in the corresponding preconstruction survey. The post-construction surveys shall highlight any changes in the condition of the facilities surveyed prior to construction, including any new property damage.
- C. Principal Project Company's Project Schedule shall include planned dates and actual dates for these preconstruction and post-construction surveys to ensure that facilities are surveyed prior to starting and after completing any construction activity that could affect a surveyed facility. Principal Project Company shall complete preconstruction surveys no later than 20 Days before commencing fieldwork, and post-construction surveys no later than 120 Days after completing any work located within 200 feet of the existing building, roadway, Utility, or facility.
- D. Principal Project Company shall employ an independent professional services firm specializing in land surveying and mapping practices, with no less than 10 years of qualifying experience in similar work to perform physical damage assessments of buildings and structures. A preliminary assessment of damage potential and possible displacements induced by construction of the Project, including calculations, is applicable to all structures and utilities located within 200 feet from the Project Site. Empirical methods may be used to determine magnitude and directions of ground displacements and construction-induced vibrations. The specialist/firm shall develop risk categories based upon maximum induced settlement, maximum induced slope, and descriptions of probable damage. Each building, roadway, utility, and facility within 200 feet from the D&C Limits shall be so categorized.
- E. Principal Project Company's architects/engineers shall conduct in-depth analyses, by numerical methods, to consider the potential construction effects on all buildings, structures and utilities of which the specialist/firm has categorized "greater than negligible". Principal Project Company shall submit to the City the proposed method of analysis to address damage potential by ground movement, groundwater drawdown, and vibration effects.

## 1.6. INFORMATION MANAGEMENT

- A. Principal Project Company shall establish and submit to the City procedures to produce and control all documentation and relevant information, the Information Management Plan (IMP), including data stored in electronic media.
- B. The IMP shall specify a process for delivery of documents and information to the City, such as use of a sharepoint or central repository that is setup and managed by Principal Project Company.
- C. Principal Project Company shall establish and maintain documented procedures to control the formal process for reviewing and commenting on Submittals, resolving and closing outstanding reviewer comments, and assigning approval authority.
- D. At a minimum, such relevant documents shall include Release for Construction Documents (RFCDs), Current Status Documents (as defined in Section 1.6.3, Item C), and other Record Documents, including:
  - 1. Contracts.
  - 2. Change Orders.
  - 3. Budgets.
  - 4. Work Plans.
  - 5. Procedures.
  - 6. Reports.
  - 7. Registers and Logs.
  - 8. Meeting Agendas and Minutes.
  - 9. Design Deliverables.
  - 10. Drawing plans and specifications; design, current and As-Built Documents.
  - 11. Regulatory Approvals.
  - 12. Submittals.
  - 13. Certifications.
  - 14. Third Party and Utility agreements.
  - 15. Master drawing lists or equivalent documents.
  - 16. Critical procedures and explicit work instructions.
  - 17. Quality, Training, Equipment manuals and records.
  - 18. Design data (e.g. computer databases, computer files, BIM/CAD files, energy model, etc.).
  - 19. As Built Schedule.

### **1.6.1. Document Version Control**

- A. Principal Project Company shall include document version control procedures in the Information Management Plan. Document version control procedures shall be implemented to ensure that current versions of relevant documents are on file and readily available to authorized persons, upon request, and that current versions of Design Documents are available to the City without restriction at all times. Electronic document and hard copy distribution shall be controlled and follow the same protocols.
- B. Principal Project Company shall review and approve for accuracy and adequacy all physical documents and electronic data prior to issue.
- C. Effective document version controls shall ensure that:
  - 1. Pertinent issues (and correct versions) of appropriate documents are available to Principal Project Company, the City, and Third Parties;
  - 2. Invalid and/or obsolete documents are promptly removed from all points of issue or use, or otherwise quarantined against unintended use; and
  - 3. A record of the then-current issue of the RFCD is available to be used.

### **1.6.2. Drawing and Engineering Data Changes**

- A. Principal Project Company shall delineate and establish its formalized workflow process for the initiation, review, and approval of changes to Design Documents prior to issuance of such design changes.
- B. Any change to the Current Status Documents and associated data shall be reviewed and accepted by the same expert or authority (person, entity or AHJ) that performed the prior review and acceptance, unless specifically authorized by the Design Manager and QPM to be reviewed and accepted by another designated expert or authority (person, entity or AHJ). If review by the original authority is not possible, then the alternate reviewer shall have adequate background and experience upon which to base the determination regarding incorporation of the change. The alternate reviewer shall have access to pertinent background information upon which to base his/her pending review and acceptance action.

### **1.6.3. As-Built Documents**

- A. Principal Project Company shall prepare and submit to the City As-Built Documents that accurately and completely reflect the actual conditions and location of elements of the Work as constructed and installed, including drawings, specifications, and related documentation (such as engineering data and reports) that affirm the actual conditions and placement locations.
- B. As-Built Drawings are an integral part of As-Built Documents and Principal Project Company shall produce As-Built Drawings in the same manner, scale and size as the original RFCD set.
- C. Principal Project Company shall, at all times, maintain an up-to-date, marked-up set of RFCD plans, specifications, and pertinent shop drawings for the Work, including all details that vary from original depiction of the Work (“Current Status Documents”). The marked-up set of Current Status Documents shall include all formally issued revisions made after successive releases for construction.

- D. Principal Project Company shall electronically modify the finally updated Current Status Documents to record actual construction where different from the original RFCDs and approved Shop Drawings.
- E. Finally updated Current Status Documents shall not to be construed as official As-Built Documents until the responsible AOR or EOR has generated an updated edition of these final construction documents, each sheet labeled “As-Built Documents” and by incorporating all such markups recorded on all previous editions of RFCDs. Such As-Built Documents shall be prepared consistent with the City’s published CADD standards. The responsible AOR or EOR shall sign and seal the As-Built Documents.

## 1.7. TRAINING

- A. Principal Project Company shall establish and maintain a plan and management procedure for identifying training needs and for providing training to all personnel performing activities affecting safety or quality in the Work. Personnel performing specific assigned tasks shall be qualified based on appropriate education, training and/or experience. Principal Project Company shall maintain appropriate records of training and current certifications.
- B. Principal Project Company shall establish and submit to the City their plan for training procedures, materials, and records to ensure that the skills and professional judgment of their personnel are developed appropriately for their intended roles, through training and/or the recorded accumulation of experience with systematic reviews of their competence at determined levels, and before any deployment of new roles.
- C. Training shall focus on improving individual competency and skill for those performing activities that materially affect safety and quality.
- D. Principal Project Company shall document qualification and training records in the QMS, as part of the Quality Records.
- E. Principal Project Company shall train Project personnel in all the special Project procedures applicable to their work.
- F. Craft journeymen with special skills shall have their competency verified and a record maintained of such verification.
- G. Principal Project Company shall provide Project-specific training for the City personnel as required for the City personnel to perform their designated Work functions. All equipment and systems required for the SFMTA O&M Services require training. Principal Project Company shall notify the City of the Project specific training date(s) and time(s) at least 21 Days prior to the scheduled training session. City will designate all the City personnel who need to receive training no less than 14 Days prior to the scheduled training session, including training required for access to the Project Site or related work sites of the Project.
- H. For any the City personnel training required to support the IFM Period work activities pursuant to Division 7 (Asset Management Program Requirements) of the Technical Requirements, the City will designate such personnel no less than 28 Days prior to the scheduled start of such training.

## **1.8. DESIGN MANAGEMENT**

### **1.8.1. Design Requirements**

- A. Principal Project Company shall produce Design Documents required by the Contract Documents, and as otherwise required, to complete the Project D&C Work, including the Joint Development Alternatives required by these Technical Requirements, and to operate and maintain the Project in accordance with the requirements of the Contract Documents.
- B. Principal Project Company shall:
  - 1. Manage and perform Design Work pursuant to the requirements of the Contract Documents, including provisions for the Joint Development Alternatives required in these Technical Requirements;
  - 2. Manage and perform Quality Assurance and Quality Control for Design Work;
  - 3. Manage, coordinate, and obtain necessary approvals and permits from Utility Owners, Third Parties, governmental authorities and regulatory agencies, and the City in their proprietary, not regulatory, capacity;
  - 4. Ensure and certify that Design Documents are prepared by duly licensed design professionals working under the direct supervision of the Lead Designer;
  - 5. Verify pertinent dimensions and other relevant existing field conditions prior to submission of any design document; and
  - 6. Incorporate information regarding Allowances into the Design Documents and give the City time to review and comment and approve the final design pertaining to Allowance-related scope.
- C. Design Documents are subject to review by the City, in their proprietary capacity, as well as Utility Owners, Third Parties, and AHJs in accordance with regulations, Governmental Approvals, and the applicable controlling documents, namely requirements set forth in Third Party Agreements, Utility Owner Agreements, Project Execution Plans, and the Contract Documents.
- D. The Design Documents shall:
  - 1. provide information customarily necessary in documents for projects of similar size, complexity, and quality; and
  - 2. include all information required by the building trades to complete the construction of the Project, other than such details customarily developed by others during construction.

### **1.8.2. Integrated Design Process**

- A. Principal Project Company shall utilize an integrated process to design all elements of the Project in a synchronized, well-coordinated manner so that the Project is designed as an integrated whole and will function effectively and efficiently for its intended purposes, as well as supporting the Joint Development Alternatives required by these Technical Requirements.
- B. Principal Project Company shall identify all requirements, including design, construction, operations and maintenance that apply to every element and component of the Project.

- C. Principal Project Company shall address the highest-level performance requirements as matters of priority to determine their impact upon specified requirements for individual Project elements (or components).
- D. Principal Project Company shall provide coordinated design management services inclusive of reviews and permitting by the City, Utility Owners, Third Parties, and AHJs. Principal Project Company shall demonstrate to the City that, through an integrated design process and each design submission, individual elements have been designed to integrate with the Project as a whole and support the Project's overall intended purposes.
- E. Principal Project Company shall conduct independent design checks, workshops and over-the-shoulder meetings, consistent with the requirements of Section 1.8.1 (Design Quality Assurance Manager Review), to review individual design packages. Principal Project Company shall include in these reviews those individuals responsible for due consideration of Project interfaces, configuration control, safety and security, construction, operations, maintenance, and quality issues and concerns. City reserves its right to attend such design review meetings and may participate in discussions.

### **1.8.3. Design Document Organization**

- A. Principal Project Company shall organize the Design Documents, arranging them into a systematic order and identifying them with alpha/numeric designations based on discipline designations, locations, and sequential numbering of sheets and pages. Principal Project Company shall provide appropriate design certifications by the responsible AOR(s) or EOR(s).

### **1.8.4. Design Exceptions and Waivers**

- A. Through a formal evaluation process defined in Article 12.4 (Deviations) of the Agreement, the City will consider any reasonable request for design exception or design waiver meeting the criteria of being a minor change to the Technical Requirements, and shall, in accordance with the stated process, either grant or reject the Deviation.
- B. Principal Project Company shall be solely responsible for obtaining approvals from the City, Utility Owners, Third Parties, and AHJs for Deviations, as may be required.
- C. Principal Project Company shall obtain any necessary Deviation approval before submission of any final Design Documents for a particular design package that incorporates such related design exception or waiver, and shall include such Deviation approval in its submission to the City.

### **1.8.5. Proprietary Design Reviews**

- A. Principal Project Company shall prepare and submit Design Documents to the City, in its proprietary capacity as owner, for review and comment according to the process described below in this Section 1.8.5 ("Design Deliverables") and required by Exhibit 11 (Submittal Review Process). These Design Deliverables are independent of any submittals required by any AHJ, Third Party and Utility Owner.

- B. The Design Deliverables shall be developed to ensure that the Project is designed and presented at each stage of design as an architecturally- and functionally-integrated development, including Design Documents that indicate how Principal Project Company can achieve the Joint Development Alternatives, Division 3 (Design Criteria Document) and Appendix G of Division 3 (Design Criteria Paratransit), Division 4 (Supplemental Design Criteria), and Division 5 (Battery-Electric Bus Supplemental Criteria).
- C. Principal Project Company shall include adequate time for City review of the Design Deliverables at each stage of design, which shall be no less than [14] days, in its submittal schedule and Project Schedule.

#### **1.8.5.1. Proprietary Design Review Process**

- A. Principal Project Company shall propose a process to produce and present Design Deliverables and facilitate the documentation and resolution of City review comments, provided such process is consistent with this Agreement and Exhibit 11 (Submittals Review Process). Principal Project Company shall submit the proposed process to the City for review and approval before NTP 1. Principal Project Company is solely responsible for implementation of the approved process. Principal Project Company can proceed with advancing Design Documents when a resubmittal is not required under Exhibit 11 (Submittals Review Process) however, Principal Project Company does so at their own risk.
- B. Principal Project Company's process shall include the following as a minimum:
  - 1. Develop and provide deliverables to the City at stages specified below in Section 1.8.5.2 or as mutually agreed.
  - 2. Schedule, conduct and document design review meetings at each stage to present design progress and status of Design Deliverables. Minutes from these meetings shall be distributed within a week of occurrence.
- C. Develop and implement a process to capture, track status and confirm resolution or other action regarding City comments. Principal Project Company shall, unless otherwise mutually agreed by Principal Project Company and City, provide progressively developed and detailed Design Deliverables to the City at each of the following stages of design:
  - 1. 50% Design Development (50% DD)
  - 2. 100% Design Development (100% DD)
  - 3. 50% Construction Documents (50% CD)
  - 4. 90% Construction Documents (90% CD)

#### **1.8.5.2. Design Deliverables Content**

- A. Design Deliverables submitted at each stage of design shall, at a minimum, must meet the requirements set forth below.

##### **1.8.5.2.1. 50% and 100% Design Development (50% DD / 100% DD)**

- A. In this phase Design Deliverables will include, at a minimum, a site plan, elevations and sections, together with a written project brief detailing area calculations, building systems, and specifications, to fully describe the size and character of the entire Infrastructure Facility, including the architectural, building enclosure, roofing, waterproofing, site work,

landscaping, civil, structural, mechanical, process mechanical, electrical, and electrical trolley systems, IT/AV requirements materials and other elements. The 50% DD Design Deliverables will be an *'in progress'* set of Design Documents and the 100% DD Design Deliverables shall include Design Documents that generally adhere to the AIA Design Development Quality Management Checklist.

B. At a minimum the following items will be addressed for the Infrastructure Facility:

1. 1:100 scale drawings incorporating comments from the Schematic Design Phase and illustrating the design development of each of the following areas:
  - a. architectural;
  - b. site plan including site layout, grading, and utilities;
  - c. structural;
  - d. mechanical and plumbing;
  - e. electrical;
  - f. municipal infrastructure and storm water retention; and
  - g. landscaping;
2. 1:50 plans showing all dimensions: interior elevations and reflected ceiling plans, including main component drawings that relate to the bus maintenance equipment, and IT.
3. developed exterior elevations of the buildings and major cross-sections;
4. integration of exterior spaces, vehicle access/egress (including drop-off and pick-up access to parking, etc.);
5. a full lighting layout for each floor;
6. efficient integration of major equipment for optimal operations;
7. review of door controls and hardware concepts/strategies;
8. review of security strategies;
9. interior finish concepts (flooring, walls and ceiling finishes) for all spaces and key elevations including a review of standard millwork types and details;
10. development of the circulation routes and way-finding strategy including:
  - a. verification of the impact of the layout of the premises on the flow of personnel and material both internal and external to the Infrastructure Facility;
  - b. review of way-finding strategies from the Proposal stage and demonstration of how they are incorporated with details in the current design;
  - c. room numbering plan for City use (public and staff way-finding); and
  - d. signage, orientation, etc.; and
  - e. provide preliminary electrical load redundancy and spare capacity calculations for all branches of power identifying loads of different types, such as individual mechanical equipment, lighting, general receptacles, equipment, communications and security equipment and elevators.

#### **1.8.5.2.2. Construction Documents (50% CD & 90% CD)**

- A. During these stages the Design Documents shall describe in detail the requirements for the construction of all components, systems and equipment of the Infrastructure Facility. The Design Deliverables for 50% CD and 90% CD stages of design shall include all the requirements in this Section 1.8.5.2.2:
1. at 50% completion;
  2. at 90% completion,
  3. and, despite any later dates set out in the Project Schedule, in a timely way in advance of construction with sufficient detail to allow the City to understand and assess the design of the Infrastructure Facility.
- B. If Principal Project Company intends to proceed with construction of an element of the Infrastructure Facility in advance of the completion of the design of the entire Infrastructure Facility then Principal Project Company will deliver the Design Deliverables for 50% CD and 90% CD for that element, coordinated with all disciplines with sufficient accompanying detail to allow the City to understand and assess the design of that element, in advance of the Design Deliverables for other elements of the Facility.
- C. Regardless of how Principal Project Company packages or otherwise chooses to advance construction documents for certain elements of the Infrastructure Facility, Principal Project Company shall provide to the City, at a level of detail and documentation that the City would customarily receive or expect to receive for a facility similar to the Infrastructure Facility at 50% CD and 90% CD stages in accordance with Good Industry Practice, Design Deliverables addressing all requirements in Section 1.8.5.2.1 developed to the associated CD stage, as well as:
1. dimensioned floor plans and elevations showing all millwork, furniture and equipment as well as a roof plan showing layout, materials, and details;
  2. interior elevations for all rooms and spaces, including all interior finishes, millwork, mechanical and electrical;
  3. exterior elevations including openings, closure details, materials and finishes, and color boards;
  4. completed site and landscaping plans;
  5. room finish schedules including material finishes and color boards;
  6. door hardware schedules;
  7. reflected ceiling plans coordinating architectural, lighting, electrical, low-voltage, and mechanical features;
  8. interior finishes;
  9. Room Data Sheets;
  10. a written report detailing and describing the manner in which the following have been taken into account in the Design:
    - a. validation and confirmation of meeting the program requirements
    - b. program operations and delivery;

- c. LEED Gold certification, including energy efficiency/sustainability and the relevant LEED project checklist and points;
  - d. material selection;
  - e. constructability;
  - f. life cycle and renewal requirements;
  - g. any risk assessments;
  - h. building operating services; and
  - i. clearly identifying sections for:
    - 1) architectural design;
    - 2) site development and landscaping;
    - 3) structural design;
    - 4) mechanical design;
    - 5) electrical design; and
    - 6) sustainable design.
- D. Principal Project Company will only issue drawings and specifications for construction purposes based on Design Deliverables previously reviewed by the City in accordance with this Section 1.8.5.
- E. This Section does not limit Principal Project Company's obligation to comply with any requirements set out in the Agreement in relation to the stages and requirements for Design Work.

#### **1.8.5.2.3. Basis of Design Report**

- A. Principal Project Company shall prepare, submit to the City, and maintain a comprehensive Basis of Design Report (BODR) for the Project that is submitted with the Design Deliverables at each stage of design. The BODR shall demonstrate how the design conforms to the Agreement, including how Principal Project Company can achieve the Joint Development Alternatives required in these Technical Requirements. The BODR shall provide an update on development and status of Allowances in the design of the Infrastructure Facility defined over the course of design development and construction.
- B. The BODR shall contain descriptions or otherwise reference the design criteria in these Technical Requirements, see Divisions 2 through 5, outlining Principal Project Company's interpretation of, and compliance with, the Project requirements with respect to configuration, performance, functionality, sustainability, operational, and maintainability requirements for the Project.
- C. The BODR shall be logically organized, including at a minimum:
  - 1. Table of Contents.
  - 2. Executive Summary.
  - 3. Design Work.
  - 4. Allowances.
  - 5. Provisions (including provisions for Joint Development).

- D. The BODR shall address the following at a minimum:
1. Project-wide design methodology and approach.
  2. Applicable design criteria, considerations, influences, and factors. This shall include the LEED scorecard, GS6 form, and energy model for the Project.
  3. System selections and element designs.
  4. Third Party integration, where applicable.
  5. Development and status of Allowances for the Infrastructure Facility including:
    - a. Furniture, fixtures and equipment for the Project's office/admin and training spaces
    - b. Information technology/communications equipment for the Project
  6. Demonstration by all disciplines that adequate provisions are included in the Infrastructure Facility design in order to support the delivery of either Joint Development Alternative. At a minimum, the BODR this shall include the following elements for each Joint Development Alternative:
    - a. Architectural layouts for the Joint Development Alternatives requiring minimal if any alterations, such as the addition of vehicular ramps and modifications to roofing materials, including waterproofing systems.
    - b. Strength and stiffness of the structure support any additional or modified loads and layouts for the Joint Development Alternatives, such as temporary construction loads, permanent additional loads and masses, the addition of vehicular ramps, and vibrations from vehicles on the roof.
    - c. Demonstration of compliance with the design criteria for airborne noise, vibration and structure borne noise.
    - d. Utilities and utility rooms, shafts, and other infrastructure are sized to support the Joint Development Alternatives and located to minimize disruption from the Joint Development Alternatives.
    - e. HVAC, electrical, low voltage and plumbing equipment, and routes through the Project, are located to minimize disruption from the Joint Development Alternatives, including consideration of maintenance requirements.
    - f. Rainwater and storm drain system is designed and located to minimize disruption from the Joint Development Alternatives.
    - g. Exiting and circulation layouts, including vertical transportation, require minimal if any alterations from the Joint Development Alternatives.
    - h. Building use re-classification is not required.
    - i. Logistics and traffic changes to support the Joint Development Alternatives are acceptable, such as additional bus movements.
    - j. Demonstration of minimal disruptions to operations, if any, from the Joint Development Alternatives. See Division 4, Section 2.8 (Consideration of Joint Development Alternative Scenarios) for additional specific requirements.

#### **1.8.5.2.4. Provision Documents for Joint Development Alternatives**

- A. With each proprietary Design Deliverable, Principal Project Company shall advance Design Documents and coordinate all disciplines for the entire Project to demonstrate that adequate provisions are included in the Infrastructure Facility design in order to support the Joint Development Alternatives required in these Technical Requirements ("Provision Documents"). At a minimum, every proprietary Design Deliverable must be designed and

coordinated with the BODR drawings and materials for each Joint Development Alternative to ensure that each Joint Development Alternative can be implemented in the future, by providing the following materials at a minimum as part of the Provision Documents:

1. Architectural layout plans, sections and elevations for areas and levels affected, including access and exiting.
  2. Structural, mechanical, electrical and plumbing plans, sections and elevations to accommodate architectural layout plans for areas and levels affected.
- B. Provision Documents shall communicate, with images and narrative, potential modifications and modification process required of the Infrastructure Facility to accommodate the Joint Development Alternatives.
- C. For an avoidance of doubt, drawings at each stage of the Proprietary Design Review process indicated in Section 1.8.5.2 shall be verified and updated throughout design to explicitly demonstrate that each Joint Development Alternative can be delivered.
- D. Changes to the Release for Construction Documents, see Section 1.8.5.3, during construction are subject to the requirements in Section 1.8.5.2.4. A and B.

#### **1.8.5.3. Design Changes**

- A. Revisions to the Design Deliverables are expected during and as a result of the Proprietary Design Review process and shall not be considered City Changes.
- B. Principal Project Company is responsible for implementing and managing a comment and resolution log to track City comments. This log shall be used in design meetings and Monthly Progress Meetings to ensure Principal Project Company and City are clear on design progress.
- C. City review and comment on Design Deliverables will primarily focus on compliance with the Technical Requirements but may also include minor refinements or clarifications that do not constitute a material change to the Technical Requirements. City review and comment on Design Deliverables will not constitute regulatory review.
- D. In the case where, as a result of a City comment, a revision is required that Principal Project Company believes qualifies as a City Change per Article 12 of the Agreement, Principal Project Company shall raise the concern with the City and the parties shall, acting reasonably, determine if a City Change is required. Principal Project Company shall be responsible for any Change Proposal per Exhibit 9 (Change Procedures) unless the City determines, in its sole discretion, that a City Change Order is appropriate.

#### **1.8.5.4. City Approval of Allowance-related Scope**

- A. City shall approve the final design of Allowance-related scope prior to any applicable order or purchase made by Principal Project Company or City.

**1.8.6. Release for Construction Documents**

- A. Principal Project Company shall use Release for Construction Documents (RFCDs) to construct the Project. RFCDs shall include, as applicable, plan sheets, specifications, shop drawings, working drawings, and other pertinent information. Principal Project Company shall only use a particular RFCD for construction after all previous comments related to the design elements, whether or not contained or depicted in the subject Submittal, have been correctly resolved and closed, and having obtained appropriate AHJ approvals and permits.
- B. Prior to delivering any RFCD, either to the City or to any of Principal Project Company's Contractors, the contents of the RFCD shall be individually signed and sealed by the responsible licensed design professional under the laws of the State of California for the specific content included in the documents. The certifying AOR(s) or EOR(s) shall affix their signature and seal upon the title sheet, that is, on the first cover sheet, and every sheet in a set of several plan sheets per design discipline, on the title sheet and first page of calculations or written reports, and the first page of every separate specification section.
- C. Principal Project Company shall not commence Construction Work prior to approval from the appropriate AHJ's.
- D. Principal Project Company shall diligently track subsequent design changes and, consequently, drawing revisions by keeping a detailed log and maintaining record copies of Current Status Documents defined in Section 1.6 (Record Documents), which reproduced copies and log shall be available to the City at all times. Changes to the RFCDs are subject to the conditions described in Section 1.8.5.2.4. A and B.

## **1.9. SUSTAINABILITY**

### **1.9.1. Sustainability Management Plan**

- A. Principal Project Company shall prepare and submit to the City a Sustainability Management Plan that details approaches it will implement throughout the Term to ensure achievement of the sustainability requirements of the Contract Documents. Annual plan updates during the IFM Period shall document sustainability achievements.
- B. The Project, and all facilities therein, shall comply with the current San Francisco Environmental Code, including but not limited to Chapter 7, Green Building Requirements for City Buildings, and including LEED Gold certification.

### **1.9.2. Sustainability through Integrated Design Process**

- A. Principal Project Company shall follow an integrated design process, incorporating industry leading conservation practices for energy, water and materials, to optimize design decisions relative to sustainability.
- B. Principal Project Company shall engage the major design disciplines, including planning, architecture, structural engineering, landscape design, mechanical, electrical, plumbing, and fire protection as well as other applicable specializations to collaborate on accomplishing sustainability measures.

## **1.10. BUILDING INFORMATION MODELING**

- A. Principal Project Company shall utilize building information modeling (BIM) techniques and successor integrated facilities management systems/software throughout the D&C and IFM Periods of the Project. Principal Project Company shall maximize object intelligence and ensure easy integration with other components of the facilities with which the Project will interface or those facilities adjacent to the Project.

### **1.10.1. BIM Roles and Responsibilities**

#### **1.10.1.1. The City Coordination**

- A. Principal Project Company's BIM Models shall be in accordance with the BIM Project Execution Plan (PxP), as defined in Section 1.10.2 (BIM Project Execution Plan). All models must be compatible with the version of Revit-based applications in use by the City at the Setting Date.
- B. Principal Project Company shall collaborate with the City in developing and incorporating into future iterations of the BIM PxP more highly detailed model requirements and drafting standards as part of modeling efforts.
- C. Principal Project Company shall provide, for quality assurance purposes, access by the City to the Project's model database storage.

#### **1.10.1.2. Principal Project Company BIM Responsibilities**

- A. Principal Project Company shall assume the following BIM roles and responsibilities:
  - 1. Develop Project's BIM PxP describing the BIM implementation approach to be followed by Principal Project Company's BIM team during all Project phases;
  - 2. Produce 3-dimensional (3D) design models of the major Project elements to an appropriate Level of Development (LOD) and as defined in the approved BIM PxP;
  - 3. Combine 3D design model elements into an integrated model for construction planning and facilities management purposes;
  - 4. Perform BIM activities as defined in the approved BIM PxP;
  - 5. Generate properly formatted 2-dimensional plan sheets (drawings) from the finalized 3D design model;
  - 6. Use 3D model to generate a construction sequence planning model (3D/4D model) for further evaluation and optimization of design;
  - 7. Deliver an integrated design model to the City with each Design Deliverable, with successive Design Deliverable submittal exhibiting further refinement of key details; and
  - 8. Update 3D model as construction progresses and provide LOD 500 As-Built Model at Final Acceptance.

### **1.10.1.3. BIM Manager**

- A. Principal Project Company shall appoint a full-time, project-dedicated BIM Manager to manage and oversee the implementation of the program- and/or Project-level BIM program. The BIM Manager serves as the Project Teams' point-of-contact on matters including, but not limited to, compliance with BIM PxB, data exchange, shared coordinates, and multidisciplinary design coordination. The BIM Manager's role and responsibilities include:
1. Ensuring that models are geospatially located and are consistent with the City's geospatial coordinate system;
  2. Ensuring that all Design team members are delivering and updating their respective information models according to the currently accepted Project Schedule version;
  3. Ensuring that submitted building information models comply with all requirements as defined in the applicable controlling documents;
  4. Reviewing integrated design model for trade coordination purposes and perform clash detection;
  5. Providing design coordination and constructability feedback to all disciplines regarding their uploaded information;
  6. Facilitating design and trade coordination meetings; and
  7. Serving as point-of-contact for BIM coordination with the City .

### **1.10.2. BIM Project Execution Plan**

- A. The BIM Execution Plan shall describe the Principal Project Company's BIM-enabled workflows and systems to successfully deliver, operate, and maintain the Project, principally as a Level-2 BIM and in accordance with the BIM objectives and other parameters to be established in the Owner's Information Requirements (OIR).
- B. Principal Project Company shall prepare and submit to the City a BIM Project Execution Plan (BIM PxB) pursuant to the template included in the Reference Documents and shall include master information and data management, and assignment of individual roles and responsibilities for well-coordinated model generation and data integration. The BIM Execution Plan shall set forth the processes and requirements for progressive development of an integrated BIM 3D-4D (schedule)-5D (cost)-6D (asset management) model for the Project.
- C. At a minimum, the BIM Execution Plan shall describe:
1. BIM objectives and uses;
  2. Roles and responsibilities of the Parties;
  3. BIM requirements and processes;
  4. Methods and protocols / standards;
  5. Schedule for progressive development of the BIM model according to the Project's anticipated development;
  6. Supporting software requirements; and
  7. Development of (a) as-built drawings from the BIM model and (b) the as-built BIM model.

- D. The BIM Execution Plan shall be consistent with and reference, as applicable, the relevant design review, project management, and or quality management processes and requirements set forth in this Division 1.
- E. The BIM Execution Plan shall include a section that describes how the Principal Project Company will work with the City to develop the OIR, including workshops and a BIM strategy for the Project. At a minimum, the OIR shall include:
1. **BIM objectives:** the BIM objectives for the Project, which shall align with this Section 1.10 and the DMP;
  2. **BIM uses:** the application of BIM methodologies and tools the Principal Project Company and City will use to achieve the BIM objectives;
  3. **Level of detail:** the types of information and level of detail used to specify the datasets that the model entities shall contain, and the depth of such information. The level of detail refers to the depth of geometric and non-geometric information for each dataset (“**level of detail**”);
  4. **BIM deliverables:** any document or information developed by the Principal Project Company that is necessary for the creation of the BIM models and the products resulting from the implementation of BIM tools and processes—at a minimum, these BIM deliverables shall include the BIM Execution Plan (BIM PxP), the BIM models, and other supporting documents;
  5. **Collaboration strategy:** the strategy for the City and Principal Project Company to collaborate within the BIM environment, which shall incorporate known methods for management and information exchanges throughout the lifecycle Project. At a minimum, the collaboration strategy shall describe how the City and the Principal Project Company will access, review, and approve information throughout the lifecycle of the Project; the collaboration strategy shall address the common data environment(s) (“**CDE(s)**”) that the Principal Project Company will deploy to achieve the BIM objectives and the collaboration strategy;
  6. **Model structure / organization to share structured, unambiguous information as part of the BIM environment:** the strategy for the City and the Principal Project Company to agree on the minimum standardization requirements to guarantee the availability and quality of information throughout the lifecycle of the Project—examples of requirements for which Principal Project Company must obtain City’s mutual agreement upfront (before developing the BIM) include the BIM units, naming, and model sizes; and
  7. **Integration with Asset Management:** the City and Principal Project Company shall agree on the asset data management for the Project’s Asset Management Plan, which shall be developed in accordance and coordination with the SFMTA’s current asset structure and hierarchy in accordance with SFMTA’s Infor CloudSuite EAM platform

### 1.10.3. BIM Data Specifications

- A. Principal Project Company shall utilize the ASTM UNIFORMAT II Classification System and the OmniClass Construction Classification System (OCCS), or equivalent.

**1.10.4. Model Ownership**

- A. Principal Project Company shall turn over to the City the finalized BIM model for each SFMTA O&M Facility within 30 Days after the City's Final Acceptance of the SFMTA O&M Facility.

## **1.11. CONSTRUCTION MANAGEMENT**

### **1.11.1. Construction Safety**

- A. Principal Project Company shall be solely and fully responsible for the health and safety of persons during the performance of the Work as specified in Division 10 of the Technical Requirements.

### **1.11.2. Construction Security**

#### **1.11.2.1. Overview**

- A. Principal Project Company shall secure the Project Site and maintain it in a secure manner at all times. Security of the Project Site, equipment, construction materials and all other items contained on the Project Site shall be Principal Project Company's sole responsibility at all times. Principal Project Company shall be solely responsible for all damage and the restoration of damaged property resulting from illegal trespass or unauthorized entry.

#### **1.11.2.2. Project Site Security Plan**

- A. Principal Project Company shall develop, submit to the City, and maintain a Project-specific Site Security Plan (SSP). The document shall define the oversight management program, team organization, and operating strategy to provide and maintain work site security. The SSP shall define the personnel responsible for developing and implementing enhanced security work practices. The SSP requirements shall be strictly enforced by Principal Project Company's field-based security personnel.

##### **1.11.2.2.1. SSP Content**

- A. The SSP shall be organized into indexed sections containing, at minimum, the following information:
1. Table of contents.
  2. Intent and purpose policy statement with approving official's name and signature.
  3. Sensitive security information.
  4. Project security organization chart.
  5. References.
  6. Emergency action plan and personnel contact information.
  7. Security risk analysis of Project Site, including crime data for proximity areas of Project Site.
  8. Work zone/site diagram of construction site boundaries.
  9. Project Site working hours.
  10. Project Site access control.
  11. Procedures for controlling delivery vehicles.
  12. Physical security, where provided, including at a minimum:
    - a. Perimeter, including fencing and lighting.
    - b. Project site signage, including language to deter trespassers. and

- c. On-site and boundary lighting.
  - 13. Equipment security (inventory, controls).
  - 14. Incident reporting.
  - 15. Evacuation plan, route, and rally points.
  - 16. Police department protocols.
  - 17. Explosives handling, storage and transport policy.
  - 18. Trash / recycling removal.
  - 19. Trailers and temporary buildings.
  - 20. Storage containers.
  - 21. Motorized equipment security, including fuel tanks, fuel storage, and batteries.
  - 22. Surveillance, where provided, to include video surveillance and security guard service.
  - 23. Security awareness training.
  - 24. Security progress reporting.
  - 25. Project site audits, reporting and follow-up. and
  - 26. Graffiti and vandalism control.
- B. The SSP shall be applicable to all personnel, visitors, guests, delivery personnel, and Contractors engaged by Principal Project Company on the Project.
- C. The SSP shall comply with applicable Federal, State and local laws, regulations, codes and requirements.

#### **1.11.2.3. Security Requirements**

- A. Principal Project Company shall manage and maintain the secure perimeter of the construction site inclusive of temporary office facilities pursuant to the approved SSP.
- B. Principal Project Company shall prepare and update a Personnel Site Access Roster annotated with time/location and/or particular personnel restrictions. The Personnel Site Access Roster shall be updated when changes in personnel having restricted site access occur. Principal Project Company shall submit the Personnel Site Access Roster within 24 hours after receiving a written request from the City.
- C. The City personnel generally shall, at all times but subject to Project-specific safety and security requirements, have unrestricted access to the Project construction site, to be exercised at the City's discretion.

#### **1.11.2.4. Coordination Requirements**

- A. Principal Project Company shall coordinate Emergency services protocols and procedures, and provide accurate and current personnel contact information sheets. Principal Project Company shall provide and maintain similar information with respect to all appropriate agencies and Utility Owners to ensure:
  - 1. Provisions for documented procedures in response to emergencies, incident reports, and assistance calls.

2. Appropriate patrol of environment external to the Project Site, including storage and laydown yards. and
  3. Provision of criminal investigative support.
- B. In the event of a security incident, Principal Project Company shall contact Emergency services for immediate response and then promptly inform the City, followed by appropriately describing and documenting the incident in a written report.

#### **1.11.2.5. Security Identification**

- A. Principal Project Company's security personnel shall at all times when on duty, carry and clearly display a visible photo ID badge identifying them as such.
- B. Principal Project Company's field-based personnel shall be obligated to report immediately any suspicious activity and unknown or unidentified individual(s) to the designated Site Security Supervisor when observed within or around the context of secured construction worksite perimeter.

#### **1.11.3. Maintenance of Traffic and Work Restrictions**

- A. Principal Project Company shall organize its construction activities to ensure that the surrounding community function with minimal disruption or inconvenience to the public, whether pedestrians or motorists. Close coordination with the City and other Stakeholders shall be provided at all times.
- B. Principal Project Company shall implement controls to ensure transportation principles and standards governing the design, application, and maintenance of the various types of traffic control measures and associated devices required for street construction and maintenance of traffic work are utilized. These principles and standards shall promote safe and expeditious movement of the public through construction and maintenance zones, to ensure the safety of workers performing these activities. Minimum standards of application shall include controlling traffic moving through Work areas, including traffic devices, markings, barricades, channelizing, and hand-signaling devices.
- C. Construction within any public right-of-way shall conform to the safety standards and operating guidelines promulgated by the "Regulations for Working in San Francisco Streets (Blue Book)" by SFMTA, latest edition.
- D. No area within the public right-of-way (from property line to property line and including streets, parking strips, bicycle lanes, gutters, curbs, paths and sidewalks) shall have restricted public access for more than five (5) Days, with the exceptions of areas of new curb ramp and bus pad construction. Principal Project Company shall restore and reopen to the public any and all areas of the public right-of-way within these specified time limits.
- E. Principal Project Company shall coordinate the Work such that it does not prevent pedestrians from entering operating businesses.
- F. Principal Project Company shall coordinate the Work such that any time that the Work occupies the sidewalk along any block, the Principal Project Company shall coordinate with the businesses that are located on or require access through occupied area to maintain daily delivery access and access to garbage/recycling removal services. If the Principal Project Company's activities prevent a business from placing its garbage or recycling on the

curb for pickup, Principal Project Company shall at its expense assist the business with handling and transport of garbage and recycling refuse to nearby designated garbage/recycling collection locations.

- G. See Division 10, Section 01 35 50 (Additional Environmental Procedures), Sections 2.5 and 2.6, for additional instructions and requirements related to minimizing disruptions of pedestrians, bicyclists, transit vehicles, and emergency vehicles.

#### **1.11.3.1. Transportation Management Plan**

- A. Prior to construction, Principal Project Company shall prepare and submit to the City a Transportation Management Plan (TMP) describing how safe traffic operations will be managed and maintained during each phase of construction and in every work zone of the Project.
- B. All traffic control measures shall be sufficient to maintain traffic and pedestrian circulation on streets affected by construction of the Project. The measures will also, at a minimum, be consistent with the requirements of the San Francisco Municipal Transportation Agency (SFMTA)'s Blue Book. Traffic control measures may include but not be limited to, flaggers and/or construction warning signage of work ahead; scheduling truck trips during non-peak hours to the extent feasible; maintaining access to driveways, private roads, and off-street commercial loading facilities by using steel trench plates or other such method; and coordination with local emergency responders to maintain emergency access. Any temporary rerouting of transit vehicles or relocation of transit facilities shall be coordinated with SFTMA Muni Operations.
- C. At a minimum, the TMP shall address traffic management requirements in Division 10 of these Technical Requirements and include the following items:
1. Processes to produce Maintenance of Traffic (MOT) plans, including development, dissemination, implementation, monitoring, refinement, and maintenance of MOT plans.
  2. Names, roles and responsibilities, and qualifying experience and credentials of key personnel, with traffic control expertise, who plan, design, direct, implement, and maintain the TMP.
  3. Procedures to design, plan, schedule, and coordinate construction activities to reduce disruptions to vehicular and pedestrian movements in the vicinity of the Project. The TMP shall especially consider existing vehicular and pedestrian movements prior to construction and take appropriate steps to minimize the disruption of these movements during construction.
  4. Procedures to coordinate with Emergency services, including local enforcement agencies and first responders for the City of San Francisco Police and Fire Departments as appropriate, including preparation of an Emergency Services Plan outlining how Emergency services access will be maintained at all times and conditions regularly communicated to the proper authorities.
  5. Procedures to identify and incorporate the needs of various Utility Owners, governmental entities, local officials, business owners, and other Third Parties in the Project areas.

6. Procedures for obtaining acceptance of detours, road and lane closures and other traffic pattern modifications from SFMTA, and implementing and maintaining those modifications.
7. Procedures for maintenance and replacement of traffic control devices, including pavement markings and traffic barriers.
8. Procedures to regularly evaluate and modify, if necessary, traffic signal timings, and the procedures for the development, approval, implementation, testing, and maintenance of all affected signals.
9. Procedures to coordinate with SFMTA routes to provide temporary system compatibility, establish responsibilities for temporary signal installation, maintenance, operation and removal, and coordinate traffic signal timing with local signal networks.
10. Procedures and process for the establishment of haul routes and the safe ingress and egress of construction vehicles in the designated work zones, including a full description of the haul route to and from any staging area to construction and/or disposal sites.
11. Procedures to modify plans as needed to adapt to current Project circumstances including a contingency plan to alleviate unreasonable construction-related back-ups that can be implemented immediately upon notification from the City.
12. Procedures to communicate TMP information to Project public information personnel and notify the public of reportable MOT issues.
13. Descriptions of contact methods, personnel available, and response times for any deficiencies or critical conditions requiring special attention during off-work hours.
14. Procedures for coordinating with affected neighboring property owners and all businesses directly adjacent to the construction work-zones to address mitigating impacts to access. and
15. Traffic analysis of current traffic conditions and projected traffic conditions for each construction phase or Work activity that affects traffic around the Project site. The traffic analysis shall evaluate level of service, calculate trip delays, and analyze sight distances.

### **1.11.3.2. MOT Design Requirements**

#### **1.11.3.2.1. Traffic Control Plan**

- A. Principal Project Company shall follow procedures set out in the TMP and the SFMTA Blue Book, latest edition, to develop and submit to the City detailed Traffic Control Plans (TCPs) , which provide for all construction phases, as well as all required traffic switching procedures. Principal Project Company is solely responsible for the installation, maintenance, and removal of all elements of the TCPs.
- B. Principal Project Company shall produce a TCP for each phase of Work that affects traffic and involves traffic control details, and shall coordinate with the City on developing the TCP. Principal Project Company is responsible for obtaining all necessary permits from AHJs to implement the plans.

- C. The TCP shall include details for all detours, traffic control devices, striping, and signage applicable to each phase of construction. Information included in the TCPs shall be of sufficient detail to allow verification of design criteria and safety requirements including typical sections, alignment, striping layout, and pavement drop off conditions. TCPs shall clearly designate all temporary reductions in speed limits. Changes to posted speed limits will not be allowed unless specific prior approval is granted by SFMTA in its regulatory capacity.
  - 1. Principal Project Company shall maintain signing continuity on all active roadways within or intersecting the Project at all times.
- D. Throughout the D&C Period, Principal Project Company shall keep all streets and intersections open to traffic by constructing work in systematic stages or segments. Principal Project Company shall maintain access to all streets adjacent to construction activity and shall provide for ingress and egress to public and private properties at all times. Principal Project Company shall assist in preparing and broadcasting public information notices, in accordance with Section 1.15, (Communications and Public Information), well in advance of the implementation of lane closures or traffic detours.

#### **1.11.3.3. Control of Pedestrian Activities**

- A. Principal Project Company is required to provide safe passage of pedestrians in a manner that provides for safety and convenience to the public. Pedestrian and circulation plans describing any restrictions, closures and alternative routings to those properties adjacent to the Work area shall be included in the TCP's for all construction activities that affect pedestrian movements.
- B. Pedestrian and circulation plans shall comply with the following standards:
  - 1. All access to and egress from public facilities must be serviced with pedestrian accommodations.
  - 2. Provisions of appropriate walkways, crosswalks, signage and signalization, pushbutton "Walk/Don't Walk" signals, and other devices are required during all stages of construction. (Principal Project Company may be required to relocate said facilities or to cover facilities and provide temporary facilities of a similar type and magnitude.)
  - 3. Where pedestrian activities are located parallel to and in the vicinity of any vehicular roadway or travel path without a curb section, continuous concrete barrier protection and its related crash attenuators must be provided. Concrete barrier or construction fencing shall be continuously used to segregate pedestrians from construction areas.
  - 4. Pedestrian detour routes must comply with accessibility law.

#### **1.11.3.4. Construction Requirements**

- A. Principal Project Company shall maintain safe traffic operations and control at all times. Principal Project Company shall keep a copy of the approved permit, digital or hard copy, readily available on-site. If at any time the City or other jurisdictional agency's public safety officer determines that the traffic control is not safe to the public or does not meet the intent of the TMP or any specific traffic control plan, Principal Project Company shall take immediate steps to correct the situation as directed. Principal Project Company's

construction operations shall maintain access for the City personnel, and Emergency Services vehicles to areas requiring access at all times.

- B. At the end of each work-shift during which lane(s) have been closed, components of the traffic control system (except portable delineators placed along open trenches or excavations adjacent to the traveled way) shall be removed from the traveled way. Traffic signs and signal equipment must be removed or covered when not in use.
  - 1. All traffic control devices shall be kept in their proper position at all times and shall be repaired, replaced or cleaned as necessary to preserve their appearance and continuity as manufactured.
- C. Principal Project Company shall provide portable changeable message signs, flashing arrow boards, and cones/barricades as field conditions warrant and as deemed necessary by SFMTA, in its regulatory capacity, even if they are not shown on the traffic control plans.
- D. All temporary traffic control devices shall be removed following completion of each construction stage and the normal operation of permanent traffic control devices shall be restored and/or provided by Principal Project Company.
- E. Any damage to traffic signal detector loops, conduits, interconnect, or fiber optic cable shall be immediately reported to the City or its authorized representative, and repaired immediately by Principal Project Company at Principal Project Company's sole expense. Principal Project Company shall take immediate, necessary steps to rectify the situation, including providing a flag person, temporary stop signs, or other devices as the City may direct.
- F. Haul Routes shall be submitted to and are subject to approval by SFMTA and other AHJs as required. Submittals shall comply with the requirements of Division 10 (SFPW General Requirements for Construction). Construction deliveries requiring lane closures shall receive prior approval from SFMTA. Notifications of deliveries shall be made with sufficient time to allow for sufficient review and incorporation of SFMTA comments.

#### **1.11.3.4.1. Detours**

- A. Principal Project Company shall provide motorists with guidance on diverting around the construction, detouring around specific construction sites, and traveling through the construction areas. This shall include the installation and maintenance of temporary regional signs to divert traffic to alternate routes, as appropriate. Motorist guidance to and along detour routes shall be provided, together with regional guidance.

#### **1.11.3.4.2. Temporary Maintenance of Pavement**

- A. Temporary pavement shall be engineered to handle traffic loads while the detour is in place without cracking, rutting, raveling, spalling, bleeding, reduction in the coefficient of friction, or faulting that may affect the safety and comfort of the travelling public. Any pavement defects that may compromise the safety of the traveling public shall be corrected immediately.
- B. Temporary pavement placed for detour purposes shall be removed prior to Final Acceptance. Existing pavements used as detour or haul roads shall be restored to their original condition.

#### **1.11.3.4.3. Pavement Markings**

- A. Principal Project Company shall completely remove existing pavement markings that conflict with temporary or permanent pavement markings. These pavement markings shall be removed by any method that does not materially damage the surface or texture of the pavement. Pavement marking removal by over-painting is prohibited.

#### **1.11.3.4.4. Reinstatement of Utility Cuts**

- A. After installation of drainage structures, storm sewers, or any other public or private utility facility by open cut beneath existing pavements carrying traffic during construction, the pavement shall be restored by Principal Project Company to the satisfaction of SFMTA to provide a normal satisfactory riding surface.

#### **1.11.3.4.5. Hauling Equipment**

- A. Principal Project Company shall keep traveled surfaces used in its hauling operations clear and free of dirt or other debris that would hinder the safe operation of roadway traffic. Rubber-tired equipment shall be used for moving dirt or other materials along or across paved surfaces.
- B. Where Principal Project Company moves any equipment not licensed for operation on public highways on or across any pavement Principal Project Company shall protect the pavement from all damage caused by such movement. Any damage caused by Principal Project Company's operations shall be repaired at Principal Project Company's sole expense.

#### **1.11.3.4.6. Final Clean-Up**

- A. Principal Project Company shall clear and remove from the Project Site all surplus and discarded materials and debris of every kind and leave the entire work zone in a smooth and neat condition after completing any construction process.

#### **1.11.3.4.7. Traffic Control Plan Field Redlines**

- A. In the event that approved traffic control plans require modification during their implementation, due to unexpected field conditions, Principal Project Company shall implement such modifications on a temporary basis.
- B. Principal Project Company shall review such modifications with the EOR and generate a design solution for the remainder of the construction stage in the form of a redline Traffic Control Plan, stamped by the EOR and submitted to SFMTA within 72 hours of implementing the temporary field modification.
- C. Any related plans, including temporary traffic signal plans and temporary street lighting plans shall be similarly updated and submitted to SFMTA for information.

### **1.11.4. Temporary Facilities and Utilities**

#### **1.11.4.1. Temporary Utilities**

- A. Principal Project Company shall provide all temporary utility systems, services, connections and disconnections necessary to perform the Work, including maintenance of utility service to adjacent properties and utility service necessary for the City staff to perform Project-related functions.

- B. Principal Project Company shall obtain and pay for any required temporary services and associated permits.
- C. Principal Project Company shall provide to the City temporary utility designs and engineered drawings as necessary per the specific requirements of the AHJ and respective Utility Owner. Principal Project Company shall coordinate with all parties as necessary to provide temporary utilities, subject to the restrictions of Third Party and Owner Utility agreements.
- D. Principal Project Company shall disconnect and remove these temporary utilities connections that become unnecessary as the Work progresses, including restoration of existing improvements disturbed by the temporary utility connection, as applies, to the AHJ's satisfaction.
- E. Upon disconnection of temporary systems, Principal Project Company shall restore to original condition all disturbed areas and facilities (street improvements) not otherwise being improved as part of the Project.

#### **1.11.4.2. Project Management Office Requirements**

- A. Principal Project Company shall establish a local area Project Management Office from which to manage, direct and administer the design and construction of the Project. In addition, Principal Project Company shall establish no less than one other temporary, field office (the Project Construction Management Office) for purposes of housing onsite construction administration and inspection services.
- B. The City's personnel will co-locate with Principal Project Company and its Contractors at the on-site construction management office for the duration of the D&C Period. Principal Project Company shall provide temporary facilities for the City's needs in accordance with the Contract Documents.
- C. Principal Project Company shall obtain and pay for any required Regulatory Approvals, including temporary facility permits.

#### **1.11.4.3. Construction Management Offices Requirements**

- A. Principal Project Company shall provide and manage fully outfitted, furnished and sufficiently networked office spaces for accommodating both Principal Project Company's and the City's personnel including, at a minimum, the provision of required insurance, lease agreements, utility connections, utility service, internet service, maintenance, janitorial, security and other services necessary to provide lighting, heating, power, water and sanitation in these required temporary facilities. All office furnishings shall be new when the office is first equipped, and shall be maintained in good working order.
- B. Principal Project Company shall provide temporary, offsite parking facilities, sufficient for the number of individuals assigned to this temporary facility plus accommodation for visitor parking.
- C. Fixtures, equipment, systems, and appurtenances furnished by Principal Project Company for use by the City shall remain intact and be returned to Principal Project Company as Principal Project Company's property no more than 45 Days after Final Acceptance.

- D. Heating and air conditioning of sufficient capacity and zoning shall be provided to adequately control room temperatures at all times. In the event that temperature is not within an acceptable range, regardless of cause, for more than two hours, Principal Project Company shall take necessary measures (including temporary heating or cooling) to restore temperature within two hours to an acceptable range of room temperatures as the City may determine.
- E. Principal Project Company shall provide integral sanitary facilities within these temporary offices exclusively for the use of office personnel. Such sanitary facilities shall include a flushing water closet and lavatory with hot and cold potable water. Principal Project Company shall obtain sanitary sewer permit and provide connection to public sanitary sewer if the permitting agency so requires. Each restroom shall be suitably equipped with liquid soap dispensers, toilet paper dispensers, toilet seat cover dispenser, paper towel dispensers, paper waste receptacles, industrial-grade first aid kits with eyewash stations, all furnished with continuous, ongoing supply of associated consumable restroom and janitorial products. Separate restrooms shall be provided for each gender. Principal Project Company shall provide cleaning of the restrooms and employee break room wet counters daily.
- F. Principal Project Company shall provide kitchen facilities in these temporary offices, including microwave oven, refrigerators that produce ice cubes, a source of purified cold and hot drinking water, coffee / tea machines, and paper towels, cups and plates.
- G. The space for the City shall be furnished and equipped in good and serviceable condition, at least of the same quality as Principal Project Company's counterpart staff space.
- H. Principal Project Company shall be responsible for disposal or removal of all the City office facilities and any Project Site restoration following closure of the offices.
- I. Principal Project Company shall provide a temporary facility at the Project Site for housing Construction Management Offices, as follows:
  - 1. Principal Project Company's space may be as determined by Principal Project Company. Jointly shared space and space for the City's exclusive use shall include elements defined in **Table 2** (CM Office Space Requirements for the City). The quantity and size of spaces shall be coordinated and determined with the City.
  - 2. Principal Project Company shall ensure City has continuous access to site and office facility via keys or card keys/fobs.
  - 3. Separate, secured, storage suitable for the City-provided portable equipment.
  - 4. Hard-surfaced (paved) parking, sufficient for City Project vehicles and visitor spaces dedicated to the City, quantity to be discussed and established with the City.
  - 5. At least one conference room large enough to facilitate all-hands meetings with Principal Project Company and the City.
- J. Principal Project Company shall provide to the City Construction Management Office site and floor plans prior to planned occupancy.

**Table 2: CM OFFICE SPACE REQUIREMENTS FOR THE CITY**

<b>Space</b>	<b>Quantity</b>	<b>Minimum Size (SF)</b>
Office (City)	1	200
Workstation Cubicle (City)	2	100 per workstation
Conference Room (Shared)	1	500

K. Principal Project Company shall commence its occupancy and the City shall have ability to commence occupancy of the temporary facilities no later than 14 calendar days from NTP 2, which the City occupancy shall continue without interruption until Substantial Completion

**1.11.4.4. Office Systems and Equipment**

A. Principal Project Company shall provide the City with continuous access to and shall maintain, at a minimum, trouble-free operation of the following systems and equipment at this temporary office:

1. Electrical infrastructure adequate for office use.
2. High-speed internet connection, hard wired and wireless network. DSL Internet Service, 50 Mbps minimum and wireless router, exclusive to the City’s office.
3. Computer network wiring for workstation to support all networked devices.
4. 4-drawer steel file case with lock and key.
5. Plan rack and hangers.
6. 4’x4’x1’ deep metal bookcase.
7. Waste paper basket
8. Clothes hangers and rack on wheels.
9. Network connected laser printer, dry copying type using bond paper - scanner and fax capable; able to copy 8½ x 11 and 11 x 17 size paper at 45 page per minute (ppm); features to include color, b&w, auto doc feeder, duplex copying/printing, collate, staple, hole punch and sort options.
10. Computers, monitors and cables.
11. HDTV with wall mounting bracket and white board in each conference room.
12. Consumables such as paper, pads, sticky notes, writing utensils, erasers, rulers, staplers, paper and binder clips etc. as needed and requested by the City.

**1.11.5. Construction of Laydown, Staging, and Casting Yard**

A. Principal Project Company shall utilize the Project Site and provide any additional support areas required.

### **1.11.6. Project Site Cleaning**

#### **1.11.6.1.1. Waste Material**

- A. Principal Project Company shall, at all times, maintain the Project Site in a clean and neat condition, clear and free of waste, trash, rubbish and debris. Waste management shall comply with requirements herein as well as those in Division 10 of the Technical Requirements.
- B. No construction waste material shall accumulate or remain on the Project Site or adjoining streets and public right-of-way, and any remnants or traces must be removed immediately, without additional cost to the City. Principal Project Company shall clean and continue to keep clean all roadways, sidewalks, and other public areas in which the Work is to be done. Such adjoining areas shall be protected against unauthorized dumping of waste material by others, which is Principal Project Company's sole responsibility to remove, and shall be left in a clean and neat condition.
- C. Concrete mixing trucks shall not be washed on local City streets, nor shall the waste material from the washing out of concrete mixing trucks and grouting operations be discharged to any sewer manhole, catch basin, sewer or storm drain. Principal Project Company is solely responsible to prevent waste or debris from entering into storm or sanitary systems.
- D. All trash, litter, vegetation material, recycling, and similar waste generated in the course of construction shall be placed into rodent-proof, tightly covered, plastic-lined rubbish containers or trash/recycling receptacles located in each construction work-zone.
- E. All construction work-zones shall be protected against unauthorized dumping of waste materials by others, which is Principal Project Company's sole responsibility to remove, and shall be left in a clean and neat condition.
- F. Any refuse or debris that spills or blows from a rubbish container or trash receptacle shall be cleaned up immediately.

#### **1.11.6.1.2. Public Roadway Cleaning**

- A. Principal Project Company shall prevent dirt and debris transfer from the leaving the Project Site and from spilling onto public roadways, sidewalks, paths, and trails adjoining the Project Site. Maintenance of the work area and debris/spill control shall comply with the requirements in Division 10 of the Technical Requirements. Dirt and debris transferred to paved surfaces shall be cleaned up immediately.
- B. All public roadways and walkways with adjacency and near adjacency to the Project, including public ways and roadway approaches within the Project Site limits, shall be cleaned daily. All haul routes shall be cleaned daily. Dry sweeping of streets is prohibited.

### **1.11.7. City Access Period Make-Ready Requirements**

- A. Principal Project Company shall prepare the IT/Comms Site prior to the City Access Period so that the IT/Comms Site is:
  - 1. Thoroughly cleaned and dust free;
  - 2. All molding and finish work is completed;
  - 3. Final coat of paint is applied and dry; and

4. All power and data cabling is installed and functioning.
- B. For the MDF and all IDFs, Principal Project Company shall ensure the following additional conditions are met prior to the City Access Period:
1. Spaces are conditioned with required temperature controls; and
  2. Door installed is lockable.

## **1.12. COORDINATION WITH THIRD PARTIES**

### **1.12.1. Third Party Coordination**

- A. Except as otherwise prescribed in the Contract Documents, Principal Project Company shall coordinate directly with each Third Party entity to identify, collaborate and resolve all items and issues that impact the Project. Principal Project Company shall invite the City's designated representative to participate in Third Party coordination efforts, which includes responsibility to arrange meetings, obtain permits and approvals from AHJs, and to design, purchase / acquire equipment and materials, construction and inspection. City and/or the Third Party (agency or utility) will be inspecting and/or providing oversight of Principal Project Company's construction and resulting compliance with quality assurance/quality control requirements, accepted implementation plans and testing.
- B. Principal Project Company shall coordinate and resolve all Third-Party items and issues throughout the D&C Period of this Agreement, whether or not:
  - 1. The City has had previous discussion with a Third Party;
  - 2. The City has executed a separate agreement and/or signed a memorandum of understanding with a Third Party; or
  - 3. The City has or has not identified a Third Party.
- C. Principal Project Company shall engage a Third Party and Utility Coordination Manager (TPUCM) assigned exclusively to the Project to serve as the main point of contact for Third Parties until the end of the D&C Period. Such TPUCM shall have previous relevant experience on at least two design-build projects, with at least one in the San Francisco area within the last five years.

### **1.12.2. Third Party and Agency Coordination Contacts**

- A. For relations with Third Parties and Utility Owners not covered by separate agreements, Principal Project Company shall be responsible for all coordination activities, including identifying and maintaining updated contacts lists.

### **1.13. COORDINATION WITH UTILITY OWNERS**

- A. Principal Project Company shall coordinate directly with respective Utility Owners to identify and confirm utility locations, potential conflicts and relocations necessary for the Project.
- B. Principal Project Company shall take all actions necessary and reasonably practicable to identify and confirm the existence and exact location, size and type of all Utilities within the Project Site or otherwise potentially affected by the Project construction, including all potentially impacted service lines.
- C. Principal Project Company is responsible for Utility investigations, conflict resolution, design, design approvals, construction permits, construction, inspection, commissioning and coordination of all new and existing utility line adjustments and protection.
- D. Principal Project Company's obligation to coordinate is applicable to all Utilities in any way impacted by the Project, whether or not:
  - 1. The City has had previous discussions with a Utility Owner.
  - 2. The City has entered into a utility agreement with the affected Utility Owner.
  - 3. The City has reliably represented the existing utility on mapping and
  - 4. The utility was installed before, during or after construction and during the Term of this Agreement.
- E. Principal Project Company may enter into separate agreements with one or more Utility Owners. Principal Project Company shall submit to the City all such utility agreements before executing.
- F. Regarding Utility Coordination and Utility Work, the TPUCM shall be the main point of contact for Utility Owners and the City until the end of the D&C Work, overseeing all Utility Work performed for the mutual benefit of the Principal Project Company and the City.

#### **1.13.1. Utility Coordination Work Plan**

- A. For each Utility, Principal Project Company shall prepare, submit to the City, and implement a Utility Coordination Work Plan (UCWP), which shall include:
  - 1. Preliminary identification of Utility Work necessary for the Project.
  - 2. Identification of the party responsible for the design, construction, inspection, acceptance, and cost of the specific Utility Work in accordance with the Contract Documents.
  - 3. Verification that all post-construction utility facilities are capable of providing service at least equal to that offered by the pre-construction utility facilities, unless Utility Owner has specified otherwise.
  - 4. Submittal, Review, and Approval processes for the City and Utility Owner, as required, in accordance with the Contract Documents and respective Utility Agreements and Utility Owner standards.

5. Regularly-scheduled utility coordination meetings, beginning 30 Days after concluding the Project Work initiation meeting and continuing until the end of the D&C Period. Meetings shall be attended by designated representatives of Principal Project Company, Utility Owners, affected Stakeholder(s) and the City. Principal Project Company shall record and distribute meeting agendas, minutes, and attendance records.
6. Creation, maintenance and update on a monthly basis the Project Utility Plans showing existing, proposed, and As-Built utility alignments, including temporary relocations and abandonments.
7. Establishing design and construction procedures, processes and schedule for adjusting utilities.
8. Establishing a process and protocols for emergency work that includes timely status updates and coordination with the affected Utility Owner and the City, for issue resolution.
9. Ensuring that Utility Work is completed in accordance with the particular utility coordination work plan. and
10. Creation, maintenance, submittal to the City, and monthly update of a Utility Coordination Work Plan Status Updates, as further defined in Section (Utility Matrix and Utility Work Status Plan).

#### **1.13.2. Utility Project Execution Plan**

- A. Principal Project Company shall prepare and submit to the City a Utility Project Execution Plan for each Utility Owner and Third Party. City and Principal Project Company, along with relevant Utility Owner or Third Party shall mutually agree upon a Final Project Execution Plan with respect to the particular UCWP. For purposes of this Section 1.13.2, “Utility Coordination Work” includes Principal Project Company’s performance of any Betterment for benefit of a Utility Owner and “Principal Project Company’s Third Party Work” includes Principal Project Company’s performance of any additional improvement for the benefit of a Third Party.
- B. Principal Project Company shall submit a sample Project Execution Plan in accordance with a schedule that comports with Principal Project Company’s construction schedule. Principal Project Company shall elicit and incorporate Utility Owner’s engagement/consultation efforts in the planning, design and construction processes as early as possible. An initial Draft Project Execution Plan shall be submitted no later than 60 Days following NTP 1. The Project Execution Plan shall include division of responsibilities between Utility Owner and Principal Project Company as it pertains to design, procurement / provider of material and equipment, construction, testing and acceptance.
- C. Each initial Draft Project Execution Plan will be reviewed only by the City and not necessarily by the Third Party or Utility Owner. Principal Project Company shall promptly address review comments to the Draft Project Execution Plan.
- D. Upon resolution of outstanding comments, Principal Project Company shall submit each finalized Project Execution Plan, concurrently, for review and acceptance by the City and Utility Owner.

- E. The Project Execution Plan shall provide detail of and understanding of the work to be performed and shall contain, at a minimum:
1. Detailed procedures not otherwise enumerated in the Utility Agreement or Third Party agreement for the Utility Work, Principal Project Company's Third Party Work, inspection, and acceptance of facilities or other work to be owned by the Utility Owner or Third Party upon completion.
  2. Detailed procedures for Submittals in accordance with the Third Party Agreement, Utility agreement, and other submittal requirements of the Contract Documents.
  3. The Submittal List as relates to the Third Party or Utility Owner, which shall be coordinated and updated.
  4. Principal Project Company's approved Project Schedule relevant to scope of Utility Work or Principal Project Company's Third Party Work.
  5. Standards, responsibilities and procedures for design and review of the Utility Work or Third Party Work.
  6. Standards, responsibilities and procedures for performance of the Utility Work or Third Party Work.
  7. Standards, responsibilities and procedures for any inspection, testing and acceptance of facilities or other work required prior to acceptance (including, with respect to Utility Owners, placing facilities into service).
  8. Standards, responsibilities and procedures for quality assurance and quality control of the Utility Work or Third Party Work.
  9. The scope and timeline for development of operations and maintenance procedures necessary for Utility Work or Principal Project Company's Third Party Work, if any. and
  10. Any information, plan or procedure specifically called for in the Utility agreement or Third Party agreement, as applicable.
- F. The Project Execution Plan may neither expand nor diminish Principal Project Company's rights and privileges under this Agreement and remainder of the Contract Documents, or under the Utility Agreement or Third Party Agreement, as applies.
- G. The Project Execution Plan may neither expand nor diminish Principal Project Company's rights and privileges under this Agreement and remainder of the Contract Documents, or under the Utility Agreement or Third Party Agreement, as applies. Refer to Article 7.6.11 (Utility Betterments) of the Agreement for provisions with respect to Betterments.

### **1.13.3. Utility Tracking Report**

- A. Principal Project Company shall, at least monthly and otherwise upon the City's reasonable request, deliver to the City and the applicable Utility Owners, a report, the Utility Tracking Report, which shall include the following information (unless otherwise agreed between the Parties):
1. Design interface dates for each Owner Adjusted Utility.
  2. The relevant number and execution date of each executed Utility Work Order.
  3. Each design agreement execution date.

4. Each construction agreement execution date.
5. The date on which any completed as-built plans were delivered to or by the Principal Project Company, as applicable. and
6. Identification of all changes made since the immediately prior Utility Tracking Report.

**1.14. ENABLING AND RELATED PROJECTS**

**1.14.1. Enabling Projects**

A. Table 3 Enabling Projects/Tasks identifies enabling projects associated with the Project. Principal Project Company shall address the timing of these projects in the Project Schedule.

**Table 3: ENABLING PROJECTS/TASKS**

LULEP Task #	Project Name	Scope of Work	Start of Work	End of Work
		TABLE IS INTENTIONALLY LEFT BLANK		

**1.14.2. Related Projects**

A. Principal Project Company shall coordinate and be aware of Related Projects that are occurring on or around the Project Site during the D&C Period that will directly interface with Principal Project Company’s Work, including those listed in Table 4 Related Projects. Construction logistics as well as sharing of haul routes and equipment will need to be coordinated with the City and the other contractors. Principal Project Company shall make itself aware of the status and progress of Related Projects and shall coordinate interface requirements with each Related Project.

**Table 4: RELATED PROJECTS**

Interface Obligation	Project Name	Scope of Work	Responsible Party
Coordination	WD-2801 8- and 12-Inch Ductile Iron Water Main Replacement, 16-Inch Earthquake Resistant Ductile Iron Water Main Installation, Sewer Replacement, and Pavement Renovation, from Mariposa Street to Cesar Chavez on York and Hampshire Streets	Replace and provide redundancy to the aging pipelines of San Francisco’s water distribution system, replace aging sewer facilities, and renovate pavement. The work to be performed under this contract includes the installation of 8-, 12- and 16-inch ductile iron and 16-inch earthquake resistant ductile iron water pipe, installation of 12-inch vitrified clay sewer pipe, construction of curb ramps, and pavement renovation.	SFPUC (June 2023 - Oct 2025*)  * Scope near Project Site is anticipated to be completed prior to Spring 2025

<b>Interface Obligation</b>	<b>Project Name</b>	<b>Scope of Work</b>	<b>Responsible Party</b>
Coordination	WW-726 Various Locations Sewer Replacement No. 15	Sewer rehabilitation from Potrero Avenue to Hampshire Street on Mariposa Street.1	SFPUC (July 2024 - Jan 2026*) * Scope on Mariposa ~2 months
Coordination	WW-741 Various Locations Spot Main Sewer Replacement No. 1	Partial sewer replacement from Hampshire Street to Bryant Street on 17th Street.	SFPUC (Nov 2024 - Aug 2025*) * Confirming with SFPUC that this scope along 17th Street is still included in their construction contract
Coordination	1850 Bryant Street	New construction of 6-story life sciences facility.	Lighthouse Real Estate (TBD*) * Construction timeline TBD; currently pulling building permits

## **1.15. COMMUNICATIONS AND PUBLIC INFORMATION**

- A. The City and Principal Project Company shall jointly maintain an open dialogue with the public, businesses, community groups and organizations, Emergency services, affected Third Parties, and Utility Owners with facilities potentially impacted by Principal Project Company's means and methods in delivering the Project during the D&C Period. Such communication shall support building a long-term relationship between Principal Project Company and Stakeholders based on mutual trust and respect.
- B. All public information and communication materials shall meet ADA requirements. All public information and communication materials shall be provided in both English and Spanish.
- C. Principal Project Company shall obtain permission from trademark owner for all uses of all trademarks.

### **1.15.1. Media and Communications**

#### **1.15.1.1. Media and Communications Team Contacts**

- A. City must designate at least two (2) City staff members authorized to receive notices and communicate with Principal Project Company about all public outreach program matters (each, the "City Project Communications Team Contact") and designate at least two (2) City staff members authorized to receive notices and communicate with Principal Project Company about all media matters (each, the "City Media Contact")
- B. Principal Project Company must designate at least one person (the "Principal Project Company Project Communications Team Contact") who will be authorized to receive notices and communicate with City about the public outreach program matters and designate at least one person (the "LD Media Contact") who will be authorized to receive notices and communicate with City about all media matters. Either Party shall have the right to change the persons designated as their respective Communications Team Contact and Media Contact by delivering written notice of that change to the other Party.

#### **1.15.1.2. Press Contacts**

- A. Principal Project Company must not speak with the press or social media about the Project, its negotiations with City or submittals to City, or Principal Project Company's proposed development concepts, plans, phasing or uses (collectively, "Press Matters") that have not been approved by City in writing for public release.
- B. A "Press Release" means any written press release, advertisement, or other formal communication to any media outlet (including newspapers, local blog, radio and television stations, and web sites). Principal Project Company agrees it will provide the City Media Contact with a draft copy of any Press Release with no less than three (3) Business Days' prior notice before its proposed release and will not issue any Press Release that has not been approved by the City Media Contact. City will have the right to issue its own separate Press Releases.

- C. The Principal Project Company Outreach Plan, see below, will govern Principal Project Company's Press Releases and Principal Project Company's media contacts unless City gives Principal Project Company written notice (a "Noncompliance Notice") that Principal Project Company has not kept City informed of Principal Project Company media's activities with respect to the Project as required in the Principal Project Company Outreach Plan. As of the date of a Noncompliance Notice, Principal Project Company may not issue, nor permit or authorize any other party to issue, any Press Release relating to the Project, its negotiations with City or submittals to City, or Principal Project Company's proposed development concepts, plans, phasing or uses that have not been approved by the City Media Contact in writing for public release.

#### **1.15.1.3. Press Conference or Media Activity**

- A. Principal Project Company agrees not to hold any press conference or media activities regarding any Press Matters without first inviting the City Media Contact to be present, or have another City representative to be present, at the press conference or media activity and obtaining the City Media Contact's consent to the press conference or media activity. Principal Project Company must provide the City Media Contact with no less than five (5) Business Days' prior notice of the date and time of any proposed press conference or media activity and state in detail the purpose of the press conference or media activity and the topics to be discussed ("Conference/Media Summary"). The City Media Contact must review the Conference/Media Summary promptly and advise Principal Project Company of any comments by 5:00p.m. on the day before the press conference/media activity. If the City Media Contact does not respond within two (2) Business Days of receiving the Conference/Media Summary, the Conference/Media Summary will be deemed approved.
- B. Principal Project Company must make reasonable efforts to schedule the press conference or media activity to accommodate the schedules of the City representatives designated to attend by the City Media Contact. If City reasonably believes the proposed press conference/media activity would adversely affect its interests, then City shall have the right to withhold its consent to Principal Project Company holding the press conference or media activity, even if the press conference or media activity may further Principal Project Company's interests.
- C. City is entitled to withhold its consent to a Press Release, proposed press conference or media activity by Principal Project Company, or a Conference/Media Summary if the City believes it would adversely affect the City's relationship with the public or a regulatory agency or adversely affect a regulatory agency's decision regarding any Regulatory Approvals. If the City Media Contact reviews a Press Release or Conference/Media Summary and believes that revisions or changes are advisable and appropriate, Principal Project Company must make the those suggested revisions or changes irrespective of whether it may further Principal Project Company's interests.
- D. Principal Project Company must timely notify the City Media Contact of media inquiries regarding the Project received by Principal Project Company and Principal Project Company's proposed response. The City Media Contact can waive any of the notice periods required under Section 7.6 (Community Outreach and Public Relations) in writing or by telephone.

## **1.15.2. Public Outreach and Engagement**

### **1.15.2.1. City Public Outreach and Engagement Program**

- A. The City will lead the stakeholder outreach to the following parties (the “City Outreach Parties”): City staff, SFMTA staff, the SFMTA Citizens’ Advisory Council, other SFMTA working and advisory groups, the SFMTA Board, the Board of Supervisors (and its committees and members), City departments, and other City regulatory agencies. This outreach (the “City Public Outreach and Engagement Program”) will be to educate the City Outreach Parties and address any of their questions regarding the Bus Yard Component. Principal Project Company must not initiate any outreach for matters within the City Public Outreach and Engagement Program. Principal Project Company must forward any questions or information requests it receives from the City Outreach Parties for matters within the scope of the City Public Outreach Program (other than those raised by a Regulatory Agency in connection with a Regulatory Approval) to a City Project Communications Team Contact and notify the questioner or requester that it is doing so.

### **1.15.2.2. Principal Project Company Support**

- A. Principal Project Company must use commercially reasonable efforts to support the City Public Outreach and Engagement Program by taking the following actions:
1. Attending meetings scheduled by the City with members of the public and any of the City Outreach Parties to describe the Bus Yard Component, the Common infrastructure, or the Infrastructure Facility, provided the City shall provide at least five (5) Business Days’ prior notice of such meetings to Principal Project Company.
  2. Providing supporting materials for those meetings, as requested by the City
  3. Collaborating with the City on any written materials provided by the City to Principal Project Company for the City Public Outreach and Engagement Program
  4. If the City requests Principal Project Company to provide supporting materials for the meetings described above or input on any materials described above, Principal Project Company must make commercially reasonable efforts to provide those materials or that input within three (3) Business Days following its receipt of the City’s request; if such supporting materials cannot be reasonably provided within such three (3) Business Day period, then Principal Project Company must provide them as soon as reasonably possible.

### **1.15.2.3. Public Outreach and Engagement Plan**

- A. Principal Project Company shall develop a Public Outreach and Engagement Plan (the “Public Outreach Plan”) and submit for City’s review. Once approved by City, Principal Project Company must comply with the processes and requirements of the Public Outreach Plan. Principal Project Company will work collaboratively with City to ensure that the goals of the Public Outreach Plan are met, and address any needed changes to Public Outreach Plan during the Term.

- B. Principal Project Company shall develop the Public Outreach Plan using City's Communications Division's Public Outreach and Engagement Requirements (POER) v.1.0, which is included in Division 9 of the Technical Requirements. The Public Outreach Plan also must conform to the process described in the Public Outreach and Engagement Plan Guide included as an attachment to Division 9 of the Technical Requirements.
- C. At a minimum, the Public Outreach Plan shall provide for the requirements herein and referenced herein and shall:
1. Identify community stakeholders and describe planned engagement with stakeholders, including those located within a minimum of 900 feet of the Project Site:
    - a. Local residents (renters and homeowners)
    - b. Neighborhood and merchant groups
    - c. Businesses
    - d. Property owners (business improvement districts, etc.)
    - e. Faith-based institutions
    - f. Cultural organizations
    - g. Community-based organizations
  2. Identify opportunities for community stakeholders to provide input and influence the Project including in developing alternatives and formulating solutions.
  3. Detail outreach and engagement techniques that will be used to inform the public and solicit stakeholder input that could affect the Project, including multi-channel, multilingual communications tactics, community meetings, and other outreach methods.
  4. Develop key messages for both general and specific audiences.
  5. Establish a schedule for public outreach and engagement activities and tasks.
  6. Establish a budget to fund the City Public Outreach and Engagement Program and Public Outreach Plan to safely and effectively engage with Project stakeholders through each Project phase (i.e. i.e. Project led events, community tabling events, sponsoring community events, collateral mailers, newspaper, radio and online ads, brochures, flyers, posters/signage, website/digital content, stakeholder giveaways, hand sanitizers, t-shirts, tote bags, water bottles, and other forums for educating the public).
  7. Ensure that stakeholder contact information and correspondence is sent weekly to the City Project Communications Team Contact in order to update their stakeholder database.
- D. Propose, plan, and schedule regular stakeholder updates by email, physical mailers, or in-person or virtual meetings when appropriate. These various communications channels are intended to keep Project stakeholders informed as the Project progresses. The proposed schedule of in-person and/or virtual meetings may be based on time, such as quarterly, and or may track to key Project milestones or community decision points for the Project.

#### **1.15.2.4. Potrero Yard Neighborhood Working Group**

- A. Commencing on the Effective Date, Principal Project Company will take the lead in facilitating, attending and sufficiently funding regular Potrero Yard Neighborhood Working Group meetings and activities during the Term. Prior to the Effective Date, the Potrero Yard Neighborhood Working Group generally met on a monthly basis.

**1.15.3. Project Tours**

- A. From time to time, representatives of public agencies, community-based organizations, elected officials, and others may wish to tour the Project Site. Principal Project Company shall accommodate reasonable requests for Project tours, provided notice of not less than seven Days is provided, bearing in mind both the need for positive community engagement and the safe and timely prosecution of the Work.

# Appendix A

## IT and Communications Scope Allocation

Information technology and communications (together, IT/Comms) requirements are included in Division 3 of the Technical Requirements. City-Furnished IT/Comms is the subject of an Allowance. For avoidance of doubt, the following defines the scope of the IT/Comms systems for the BYC in two groups and provides clarity on the scope allocation between Principal Project Company and the City:

- **Table 5** defines the IT/Comms Infrastructure that Principal Project Company will be responsible for. This IT/Comms Infrastructure is generally defined as the fixed infrastructure in the BYC including IT/Comms rooms and their corresponding HVAC, cabling distribution support hardware (e.g., such as raceways and conduits), power feeds, etc.
- **Table 6** defines the IT/Comms Equipment that the Principal Project Company or the City will be responsible for. This IT/Comms Equipment is generally defined as equipment in the BYC including servers, network switches, LAN/Wifi networking equipment and cabling, displays, etc. This table allocates responsibilities for specific items of the IT/Comms Equipment to the Principal Project Company or the City – items allocated to the City will be furnished, installed, operated, and maintained by the City and subject to the City-Furnished IT/Comms Allowance, unless noted otherwise in Table 5.

The IT/Comms Systems associated with the Common Infrastructure will be designed, procured, and installed, unless noted otherwise, by the Principal Project Company and maintained as part of the IFM Services.

**Table 5: Scope of Work for the Infrastructure Facility’s IT/Comms Infrastructure**

Component of the IT/Comms Infrastructure	Principal Project Company	City	Notes
Facility infrastructure, rooms, pathways, Telecom vaults, and the MEP and Fire Protection systems required to support them	X		Provision and maintenance responsibility of the Principal Project Company.
In-building pathways and distribution	X		Provision and maintenance responsibility of the Principal Project Company. Horizontal cable trays and EMT conduit are acceptable.

EMT = Electrical Metal Tubing

MEP = Mechanical, Electrical, and Plumbing

**Table 6: Scope of Work for the Infrastructure Facility’s IT/Comms Equipment**

Component of the IT/Comms Equipment	Principal Project Company	City-Furnished IT/Comms FF&E	Subject to Allowance	Notes
Incoming Service – Telephone		X		City orders or coordinates installation of telephone service via the Principal Project Company.
Incoming Service – Private Circuits		X		City orders or coordinates installation of private circuits via the Principal Project Company.
Incoming Service – Internet		X		The City provides internet service for Wireless LAN.
Fit-out of IT/Comms Infrastructure spaces	X			Includes racks, pathways, and grounding system.
Active network and switches		X	X	The City will furnish and install the permanent network switches. The Principal Project Company needs to outfit the BYC for the City’s network to be functional, including running cabling for the appropriate data drops to workspaces and offices per the Principal Project Company’s design, and installing appropriate cable trays and conduit to properly route and support the cabling.
Fit-out of Security Office	X			Includes furniture and connectivity – see <u>Division 3 (Design Criteria Document)</u> of the Technical Requirements. The City provides the needed technology. Principal Project Company will provide the FF&E similar to a Class A office.
PC’s, displays, RTLS, and other equipment		X	X	City procures, installs, maintains, and manages any equipment that the City needs in the BYC.
Backbone cabling (fiber, multipair copper, and coax)	X			Provision and installation responsibility of the Principal Project Company.
Horizontal/distribution cabling (in-building and on-site)	X			Provision and installation responsibility of the Principal Project Company.
Tel/data terminations, patch panels, and outlets	X			Provision and installation responsibility of the Principal Project Company.

Component of the IT/Comms Equipment	Principal Project Company	City-Furnished IT/Comms FF&E	Subject to Allowance	Notes
Digital signage	X			Provision and installation is the responsibility of the Principal Project Company. Digital signage is not specifically required by <u>Division 3 (Design Criteria Document)</u> of the Technical Requirements. If Principal Project Company recommends digital signage, the Principal Project Company will be responsible for its provision and installation and this will not constitute a Change.
Component of the IT/Comms Equipment	Principal Project Company	City-Furnished IT/Comms FF&E		Notes
Master clock system and display clocks	X			Provision and installation is the responsibility of the Principal Project Company. City will provide content for master clock. A master clock system is not specifically required by <u>Division 3 (Design Criteria Document)</u> of the Technical Requirements. If during design the LD or Principal Project Company recommends a master clock system, the Principal Project Company will be responsible for its provision and maintenance. The City will review content and performance
Distributed antenna system for cellular/private mobile radios	X			Provision and maintenance responsibility of the Principal Project Company. The City prefers a neutral host.
Wireless LAN (-65 dB on 95% of site 99.9% availability)	X	X	X (for WAP devices only)	The Principal Project Company shall install conduit and Ethernet cabling to each of the wireless access points (WAPs). The City will provide the WAP devices, and Principal Project Company shall install WAP devices. The Principal Project Company shall propose the locations of the WAP devices, subject to City approval, prior to Principal Project Company's installation of WAP devices. The Principal Project Company will be responsible for proposing locations and installing the hardware. The Principal Project Company is expected to design based on predictive analysis and will run appropriate network cabling. The City will be responsible for

Component of the IT/Comms Equipment	Principal Project Company	City-Furnished IT/Comms FF&E	Subject to Allowance	Notes
				configuring the hardware, perform surveys, and create heat maps after the WAP installation.
Office automation systems (email, file servers, etc.)		X		City provides, operates, and maintains.
Geographical Information Systems		X		City provides, operates, and maintains.
CCTV cameras	X			Provision, installation, and maintenance responsibility of the Principal Project Company.
Other IT/Comms Equipment		X	X	City provides, installs, operates, and maintains.

dB = decibels

LAN = local area network

FF&E = furniture, fixtures, and equipment

WAP = wireless access points

# Appendix B

## Initial List of Submittals

Potrero Yard - Technical Requirements

Exhibit 18, Division 01 - Initial List of Submittals

Date of update:		15-Nov-24			
ID Number	Section Reference	Contract Data Item Title / Description	Required Submission Timing	City Submittal Action	Notes/Comments
001	1.1.1. - A	Project Management Plan	NTP 1 + 15 Days	Approval	
002	1.1.3 - D	Project Meeting Agendas and Materials	3 Business Days before meeting	Review/Comment	
003	1.1.3 - D	Project Meeting Minutes	3 Business Days after meeting	Review/Comment	
004	1.1.3.1	Project Work Initiation Meeting Agenda	3 Business Days before meeting	Review/Comment	
005	1.1.3.1	Project Work Initiation Meeting Minutes	3 Business Days after meeting	Review/Comment	
006	1.1.3.2	Design Initiation Meeting Agenda	3 Business Days before meeting	Review/Comment	
007	1.1.3.2	Design Initiation Meeting Minutes	3 Business Days after meeting	Review/Comment	
008	1.1.3.3	Construction Initiation Meeting Agenda	3 Business Days before meeting	Review/Comment	
009	1.1.3.3	Construction Initiation Meeting Minutes	3 Business Days after meeting	Review/Comment	
010	1.1.3.4	Quality Initiation Meeting Agenda	3 Business Days before meeting	Review/Comment	
011	1.1.3.4	Quality Initiation Meeting Minutes	3 Business Days after meeting	Review/Comment	
012	1.1.3.5	Environmental Compliance Initiation Meeting Agenda	3 Business Days before meeting	Review/Comment	
013	1.1.3.5	Environmental Compliance Initiation Meeting Minutes	3 Business Days after meeting	Review/Comment	
014	1.1.3.6	Weekly Project Coordination Meeting Agenda	3 Business Days before meeting	Review/Comment	
015	1.1.3.6	Weekly Project Coordination Meeting Minutes	3 Business Days after meeting	Review/Comment	
016	1.1.3.7	Monthly Progress Meeting Agenda	3 Business Days before meeting	Review/Comment	
017	1.1.3.7	Monthly Progress Meeting Minutes	3 Business Days after meeting	Review/Comment	
018	1.1.4. - B	Key Personnel Register	NTP 1 + 5 Days	Approval	
019	1.1.4. - C	Candidate Key Person Replacement Resume and References	21 Days before anticipated start	Approval	
020	1.1.6	Regulatory Approvals Plan	NTP 1 + 30 Days	Review/Comment	
021	1.1.7.1. - A	Design Management Plan	NTP 1 + 30 Days	Review/Accept	
022	1.1.7.2. - A	Construction Management Plan	NTP 1 + 60 Days	Approval	
023	1.1.8	IFM Management Plan		Approval	
024	1.2.1.2. - A	Project Schedule	Final (Project Schedule); Initial City Response + 14 Days	Approval	
025	1.2.1.2. - A	Revised Project Schedule	Within 10 Days after criteria occurs	Approval	
026	1.2.1.4. - A	Proposed Recovery Schedule	Within 15 Days after criteria occurs	Approval	
027	1.2.1.5. - A	Project Schedule Monthly Updates	Monthly: 3 days before Monthly Progress Meeting	Review/Comment	
028	1.2.1.6	D&C Submittal Schedule	Initial: Project Schedule + 7 Days Final: Initial City Response + 14 Days	Review/Accept	
029	1.2.1.7	Lookahead Activity Reports	3 Business Days prior to Weekly Coordination Meeting	Information	
030	1.2.4.1	Monthly Progress Status Report	3 Business Days before Monthly Progress Meeting	Review and Comment	
031	1.2.5	As-Built Schedule and Final Schedule Report	as a precondition for Final Acceptance	Approval	
032	1.2.6. - A	Time Impact Analysis	with any requests of claims for extension in Contract Time	Approval	
033	1.3.C	List of Submittals	Initial: Financial Close + 30 Days Updates: Monthly in Progress Status Report, more frequent if necessary	Review/Accept	
034	1.4.1	PPC Quality Program Plan (PQPP)	Initial: NTP 1 + 30 Days Updates: Monthly in Progress Status Report, more frequent if necessary	Review/Accept	
035	1.4.1.4	Product Identification, Availability, and Traceability			
036	1.4.1.7.B	Control of Inspection, Measuring, and Test Equipment			
037	1.4.1.9	Control of Nonconforming Work			
038	1.4.1.11	Control of Quality Records			
039	1.4.1.12	Quality Audits			
040	1.4.1.13	Training			
041	1.4.2	PPC Design Quality Plan (PDQP)	NTP 1 + 15 Days	Review/Accept	
042	1.4.3	PPC Construction Quality Plan (PCQP)	NTP 1 + 75 Days	Review/Accept	
043	1.4.3.1 - F	Candidate Independent Testing Laboratory Credentials	60 Days before planned testing at that ITL	Review/Accept	
044	1.4.3.1 - G	ITL Portable and Satellite Policies and Procedures	5 Days after the City request received	Information	
045	1.4.3.3	Material and Equipment Conformance Certifications	5 Days after the City request received	Information	
046	1.4.3.3 - C	Source of Supply Compliance Certifications	5 Days after the City request received	Information	
047	1.4.3.4 - D	Construction Quality Work Plans (CQWP)	15 Days before related Construction Work activity/phase	Review/Comment	
048	1.4.4 - C	PPC response to the City Quality Oversight Reports	5 Days after the City report received	Approval	
049	1.4.5 - A	Software Quality Assurance Plan (SQAP)	NTP 1 + 90 Days	Review/Accept	
050	1.4.5 - B	Software Design Documentation	NTP 1 + 90 Days	Information	
051	1.5	Existing Conditions			
052	1.5.1 - A	Pre-construction Survey Reports	20 Days prior to related construction	Information	
053	1.5.1 - A	Post-construction Survey Reports	120 Days after related construction	Information	
054	1.6	Information Management Plan (IMP)	NTP 1 + 60 Days	Approval	

Potrero Yard - Technical Requirements

Exhibit 18, Division 01 - Initial List of Submittals

Date of update:		15-Nov-24			
ID Number	Section Reference	Contract Data Item Title / Description	Required Submission Timing	City Submittal Action	Notes/Comments
055	1.6.3 - A	As-Built Documents	Collectively: prior to Final Acceptance	Approval	
056	1.7 - B	Training Procedures, Materials and Records Plan	Initial: 270 Days before Substantial Completion Final: before Substantial Completion	Review/Comment	
057	1.8.5.2	50% Design Development (50% DD) Proprietary Design Review Deliverable	at 50% Design Development	Review/Comment	
058	1.8.5.2	100% Design Development (100% DD) Proprietary Design Review Deliverable	at 100% Design Development	Review/Comment	
059	1.8.5.2	50% Construction Documents (50% CD) Proprietary Design Review Deliverable	at 50% Construction Documents	Review/Comment	
060	1.8.5.2	90% Construction Documents (90% CD) Proprietary Design Review Deliverable	at 90% Construction Documents	Review/Comment	
061	1.8.5.2	100% Construction Documents (100% CD) Proprietary Design Review Deliverable	at 100% Construction Documents	Review/Comment	
062	1.8.5.2.3	Basis of Design Report			
063	1.8.6.1 - B	Design Review Report	15 Days after each Design Review / Workshop	Information	
064	1.9.1	Sustainability Management Plan	NTP 1 + 4 Months	Review/Comment	
065	1.10.2	BIM Project Execution Plan	NTP 1 + 60 Days	Review/Comment	
066	1.11.2.2	Site Security Plan (SSP)	NTP 1 + 60 Days	Review/Comment	
067	1.11.2.3	Security Requirements	24 hours after City request		
068	1.11.3.1 - A	Transportation Management Plan (TMP)	60 Days before start of each phase of each Construction Work zone	Review/Comment	
069	1.11.3.2.1	Traffic Control Plan (TCP)	Initial: 30 Days before start of each phase of each Construction Work zone Updates: Monthly in Progress Status Report, more frequent if necessary	Review/Comment	
070	1.11.3.5 - F	Haul Routes	60 Days before start of each phase of each Construction Work zone	Review/Comment	
071	1.11.4.1 - C	Temporary Utility Designs and Engineered Drawings	Per Utility Agreement	Information	
072	1.11.4.3	Construction Management Office Plans	45 Days prior to planned office occupancy	Approval	
073	1.12.2	Third Party Coordination Work Plan (one per Third Party)	NTP 1 + 30 Days	Information	
074	1.12.3	Third Party Project Execution Plan (one per Third Party)	NTP 1 + 60 Days	Review/Accept	
075	1.13.1	Utility Coordination Work Plan (UCWP) (one or more per Utility Owner)	Initial: NTP 1 + 30 Days Update: Monthly in Progress Status Report	Information	
076	1.13.1	Project Utility Plans	Monthly	Information	
077	1.13.2	Utility Project Execution Plan (one per Utility Owner)	NTP 1 + 60 Days	Review/Accept	
078	1.13.3	Utility Tracking Report	Monthly, more frequent if necessary	Information	
079	1.15.2.3	Public Outreach and Engagement Plan (PPC Outreach Plan)	Initial: NTP 1 + 60 Days Updates: Monthly in Progress Status Report	Approval	

Potrero Yard - Technical Requirements

Exhibit 18, Division 03 - Initial List of Submittals

Date of update:		15-Nov-24			
ID Number	Section Reference	Contract Data Item Title / Description	Required Submission Timing	City Submittal Action	Notes/Comments
001	4.1.1 Slab on Grade	Design and locate joints to control and direct shrinkage cracking of concrete elements per ACI recommendations. Submit a Joint Plan.	60 days prior to placing exposed slabs and walls.	Review/Comment	
002	4.3 Exterior Enclosures	Project aesthetics package	include in 50% Design Development (50% DD) Proprietary Design Review Deliverable	Approval	
003	4.3.4 Exterior Masonry	Material sample(s), mock-ups, shop drawings, anchorage, and reinforcing materials.	include in 50% Design Development (50% DD) Proprietary Design Review Deliverable	Approval	
004	4.3.6 Precast Architectural Concrete	Product data and samples, mock up, and shop drawings.	include in 50% Design Development (50% DD) Proprietary Design Review Deliverable	Approval	
005	4.3.12 Glazing	12-inch by 12-inch samples for each glass type with fabricator product information.	include in 50% Design Development (50% DD) Proprietary Design Review Deliverable	Approval	
006	4.3.31 Expansion Control	Submit movement control diagrams addressing full structure. Submit calculations and rationale for joint locations, types and sizes. Expansion control elements shall match or be of a compatible color with the adjacent materials.	include in each Proprietary Design Review Deliverable, see Div 01, Section 1.8.5	Approval	
007	4.4 Interior Construction	Submit for approval by the SFTMA product data, certificates and test reports verifying materials selected conform to performance standards listed in this document.	include in each Proprietary Design Review Deliverable, see Div 01, Section 1.8.5	Approval	
008	4.5.5 Expansion Control	Submit movement control diagrams addressing full structure. Submit calculations and rationale for joint locations, types and sizes. Expansion control elements shall match or be of a compatible color with the adjacent materials.	include in each Proprietary Design Review Deliverable, see Div 01, Section 1.8.5	Approval	
009	4.8 Conveying - Elevators	The PPC shall submit 3-inch by 12-inch samples of actual finished material for review of color, pattern, and texture of exposed finishes.	include in 50% Design Development (50% DD) Proprietary Design Review Deliverable	Approval	
010	4.10 HVAC	Submit ventilation plan demonstrating compliance with this article before submitting it to the San Francisco Department of Public Health for review and approval prior to submitting mechanical drawings for approval.	include in each Proprietary Design Review Deliverable, see Div 01, Section 1.8.5	Approval	
011	4.13 Electrical	Submit the following calculations and analyses, sealed by a Registered Professional Engineer: Demand load as calculated per requirements of NFPA 70 Article 220. Lighting Photometrics: Submit point-by-point calculations for 100 percent of the site and each unique room type in the buPPCings. Submit separate calculations proving compliance with NFPA 101 for emergency/egress lighting. Emergency generator – provide calculations proving the capability of the proposed generator to serve the required emergency loads plus 25 percent spare capacity. The analysis shall assume the spare capacity load to be constant kVA load. Analysis shall include starting of motor loads as sequenced by the BAS. Calculations shall assume generator operation with diesel fuel source. A diesel-fueled engine generator set shall provide power for the emergency/standby system loads. Short circuit – provide calculated momentary (0.5 cycle) fault current values for all 15 kV and 480V busses, and 208/240V panels served from 75 kVA or larger transformers. Arc flash (hazard analysis, arc flash boundary, incident energy) – provide calculation results for all busses 150V (AC and DC) and greater. Voltage drop – provide calculations for the main buPPCing services, feeders longer than 50-feet, all site lighting branch circuits, and all branch circuits longer than 75-feet or loaded greater than 50 percent of the circuit rating. Protective device coordination – provide time-current curve (TCC) plots showing proper coordination of all panel main breakers with upline devices, coordination of switchboard feeder breakers with main breakers and coordination of switchboard main breakers with 15 kV feeder relaying. Fire Alarm – provide battery capacity calculations proving compliance with NFPA 72. UPS – provide battery capacity calculations.	include in each Proprietary Design Review Deliverable, see Div 01, Section 1.8.5	Approval	
012	4.13.1 Building Power Distribution	The PPC shall submit calculations which support the required size of the UPS and batteries. The UPS input shall be fed from the generator or the secondary utility feed for continued operation following the rated load period of 90 minutes. A diesel-fueled engine generator set shall provide power for the emergency/standby system loads.	include in each Proprietary Design Review Deliverable, see Div 01, Section 1.8.5	Approval	
013	4.13.9 Closed Circuit Television System (CCTV)	Camera views will be selected based on their function, location, and resolution. The PPC shall submit the CCTV design site plan that shows camera locations, coverage, camera function and the camera model for each location. Submittal shall also include required views generated from the project 3D model from each camera location.	include in each Proprietary Design Review Deliverable, see Div 01, Section 1.8.5	Approval	
014	4.13.9 IT Equipment Procurement	The PPC shall submit the CCTV design site plan that shows camera locations, coverage, camera function and the camera model for each location. Submittal shall also include required views generated from the project 3D model from each camera location.	include in each Proprietary Design Review Deliverable, see Div 01, Section 1.8.5	Approval	

Potrero Yard - Technical Requirements

Exhibit 18, Division 04 - Initial List of Submittals

Date of update: 15-Nov-24

ID Number	Section Reference	Contract Data Item Title / Description	Required Submission Timing	City Submittal Action	Notes/Comments
001	1.5.1	50% Design Development Proprietary Design Review Deliverable	at 50% Design Development	Review/Comment	
002	1.5.2	100% Design Development Proprietary Design Review Deliverable	at 100% Design Development	Review/Comment	
003	1.5.3	50% Construction Documents Proprietary Design Review Deliverable	at 50% Construction Documents	Review/Comment	
004	1.5.4	90% Construction Documents Proprietary Design Review Deliverable	at 90% Construction Documents	Review/Comment	
005	1.5.5	100% Construction Documents Proprietary Design Review Deliverable	at 100% Construction Documents	Review/Comment	
006	1.5.6	Testing Report verifying Project Criteria are met	more than 21 days before Substantial Completion	Review/Comment	
007	2.7	Seismic Resilience Peer Review - Principal Project Company shall prepare and submit deliverables, as described in Section 2.9.	as per Table 1 in Section 2.9 of Division 4	Approval	NTD: Approval may not be the right submittal action in drafting. City to confirm.
008	2.8	Podium Roof HCC Alternative - Principal Project Company shall submit the temporary construction loading plan for SFMTA review and concurrence.	with each Design Review Deliverable, as applicable	Review/Comment	
009	2.8	Paratransit Alternative - Principal Project Company shall submit the temporary construction loading plan for SFMTA review and concurrence.	with each Design Review Deliverable, as applicable	Review/Comment	

**Potrero Yard - Technical Requirements**  
**Exhibit 18, Division 06 - Initial List of Submittals**

Date of update:		15-Nov-24			
ID Number	Section Reference	Contract Data Item Title / Description	Required Submission	Submittal Action (Proprietary)	Comments/Notes
001	6.6.2.1	Pre-Construction Requirements - Commissioning Plan	Principal Project Company shall prepare and submit to the City for its review and approval no later than NTP2 a Commissioning Plan to evaluate and document that the design, construction, and operation of the Commissioned Systems comply with the Contract Documents.	Approval	
002	6.6.2.2	Pre-Construction Requirements - Review of Design Documentation	In addition to the Commissioning Issues and Resolution Log, for each round of design review, the CxP shall prepare and submit to Principal Project Company a design review memorandum addressing: <ul style="list-style-type: none"> <li>•List of the documents reviewed;</li> <li>•Laws, standards, and guidelines used to perform the review; and</li> <li>•A summary of the review flagging and describing major issues discovered.</li> </ul> The CxP shall submit the design review memorandum and Commissioning Issues and Resolution Log to Principal Project Company, no more than two weeks after the Design Deliverables are submitted for City review. Principal Project Company shall review the comments and respond to each item with acceptance or a response to the comment. All the comments shall be settled by Principal Project Company, D&C Contractor, and CxP. A workshop(s) between the D&C Contractor, Principal Project Company and/or CxP may be held to discuss any comments requiring clarification or discussions or decision by Principal Project Company. The CxP can chair these workshop(s). Any CxP reviews of design documentation prior to NTP 2 may take place before or during the preparation of the Commissioning Plan.	Information	
003	6.6.3.2	Submittals Review	During construction the CxP shall review the Submittals stated in the Commissioning Plan as well as any construction Submittals generated by the D&C Contractor related to Commissioned Systems to verify compliance with the Contract Documents. The CxP shall enter all Commissioning Submittal reviews in the Commissioning Issues and Resolution Log. At a frequency determined by the Commissioning Plan, the CxP shall prepare and submit to Principal Project Company a Submittal review memorandum addressing: <ul style="list-style-type: none"> <li>•List of the documents reviewed;</li> <li>•Codes, standards and guidelines used to perform the review; and</li> <li>•A summary of the review flagging and describing major issues discovered.</li> </ul> The CxP shall notify Principal Project Company of any reviewed submittals that the CxP deems not to meet the requirements of the Contract Documents.	Information	
004	6.6.3.7	Commissioning Report	Principal Project Company shall submit the Commissioning Report to the City for review and approval before Substantial Completion can be achieved.	Approval	
005	6.6.4.1	System Manual	By its nature, the Systems Manual will be a collection of materials already produced by Principal Project Company, the D&C Contractor, or the CxP. Principal Project Company shall submit the Systems Manual to the City for review and acceptance no later than 180 days after Substantial Completion.	Review/Accept	
006	6.6.4.3	Near Warranty End Post Occupancy Review	The PPC shall, one (1) year after the Substantial Completion date, provide written documentation to the City describing what was learned through interviews and investigations into performance of SFMTA O&M Facilities and certain Equipment List items, how issues will be resolved through warranties or other means, and develop a final deficiency and action list. This documentation shall include requests for services to remedy outstanding problems. Principal Project Company shall provide the written documentation to the City for information.	Information	
007	6.6.4.4	On-going Commissioning Plan	For purposes of complying with LEED Enhanced Commissioning and building envelope Commissioning requirements, the CxP shall produce and submit to Principal Project Company an Ongoing Commissioning Plan no later than one year after the Substantial Completion Date. The plan shall provide the Infrastructure Facility operating staff with procedures, blank test scripts, and a schedule for ongoing Commissioning activities.	Information	
008	6.7	Monitoring-Based Commissioning (MBCx)	After MBCx activities are complete, the CxP shall update the Systems Manual with any modifications or new settings and give the reason for any modifications from the original design. Principal Project Company shall submit any revised Systems Manual to the City and the IFM Provider.	Information	
009	6.8	Operational Readiness (OR)	Principal Project Company shall prepare the Operational Readiness Plan and submit it to the City for review and approval no later than 180 days prior to the scheduled Substantial Completion Date. Principal Project Company shall amend and reissue the plan if changes are required. All activities in the Operational Readiness Plan shall be either: (1) completed no later than the Substantial Completion Date; or (2) completed after the Substantial Completion Date as part of the Bedding-In Period activities.	Approval	

Potrero Yard - Technical Requirements

Exhibit 18, Division 07 - Initial List of Submittals

Date of update:					
ID Number	Section Reference	Contract Data Item Title / Description	Required Submission Timing	City Submittal Action	Notes/Comments
001	B.5.1 Annual Service Plan	Annual Service Plan	Annually	Review/Accept	Pre Substantial Completion and then Annually revised during operational period
002	B.6 IFM Service Procedures	<p>Service Procedures</p> <p>PPC will develop Service Procedures for the service areas outlined below:</p> <p>(a) General Management</p> <p>i. Communications &amp; Committee Procedures</p> <p>ii. Human Resources</p> <p>iii. Occupational Health and Safety/Risk Management.</p> <p>iv. Quality Management System</p> <p>v. Periodic Reporting (process and templates)</p> <p>vi. Performance Monitoring Program</p> <p>vii. FM Call Center Services.</p> <p>viii. Utilities Management Services</p> <p>ix. Environmental Management System, relative to Environmental and Sustainability Services.</p> <p>x. Emergency Management, including operational risk assessment</p> <p>xi. Fire Management Plan.</p> <p>(b) Project Site &amp; Infrastructure Facility Operations</p> <p>i. Security Services</p> <p>ii. Solid Waste Collection, Recycling, and Removal Services.</p> <p>iii. Pest Control Services</p> <p>iv. Grounds Maintenance Work.</p> <p>v. Cleaning Services</p> <p>vi. Maintenance Work</p> <p>vii. Renewal Work Services</p>	Annually	Review/Comment	Pre Substantial Completion for initial development then revised/updated during operational term.
003	B.6.1 IFM Services Procedures Submission Process	Submittal Schedule	PPC shall submit a schedule of Submittals required under these IFM Specifications at least ten (10) months prior to Substantial Completion Deadline, to commence no later than eight (8) months prior to Substantial Completion Deadline and the final submitted no later than one (1) month prior to Substantial Completion Deadline	Review/Accept	Pre Substantial Completion
004	B.8.1.5. Training and Qualifications	Ensure that all personnel hold up-to-date certification, training and qualifications related to their responsibilities	Annually	Information	Operational period
005	B.8.1.6. Infrastructure Facility Orientation	Orientation Training	Annually	Information	Operational period
006	B.8.1.6. Occupational Health & Safety	Occupational Health & Safety Procedure	Annually	Review/Comment	Pre Substantial Completion for initial development then revised/updated during operational term.
007	B.9.1.2 IFM Operations Committee	Monthly Agenda	Monthly Prepare the agenda and provide at least five (5) Business Days in advance of the meeting.	Information	Operational period
008	B.9.1.2 IFM Operations Committee	Minutes	Monthly Provide not more than five (5) Business Days following the meeting.	Review/Accept	Operational period
009	B.9.4 City Orientation & Training	Orientation Training for City Personnel	Annually	Review/Accept	Pre Substantial Completion and then Annually revised during operational period
010	B11.1 Performance Monitoring Report	Performance Monitoring Report	Monthly PPC shall deliver the monthly reports to City five (5) Business Days following the last day of the month	Review/Accept	Operational period
011	B11.1.2 Operational Report	Operational Report	Monthly PPC shall deliver the monthly reports to City five (5) Business Days following the last day of the month	Review/Accept	Operational period
012	B11.1.3 Maintenance Status Report	Maintenance Status Report	Monthly PPC shall deliver the monthly reports to City five (5) Business Days following the last day of the month	Review/Accept	Operational period
013	B.11.1.4 Renewal Work Report	Renewal Work Report	Monthly PPC shall deliver the monthly reports to City five (5) Business Days following the last day of the month	Review/Accept	Operational period

Potrero Yard - Technical Requirements

Exhibit 18, Division 07 - Initial List of Submittals

Date of update:						
ID Number	Section Reference	Contract Data Item Title / Description	Required Submission Timing	City Submittal Action	Notes/Comments	
014	B12.1 Annual Summary Report	Annual IFM Services Report	Annually The Annual Summary report shall be provided to City no more than 20 Business Days following the completion of each contract year.	Review/Accept	Operational period	
015	B.13 Annual Planned Maintenance and Renewal Work Schedule	Annual Planned Maintenance and Renewal Work schedule	Annually	Review/Accept	Operational period - accept where schedule does not impede SFMTA operations, otherwise not impact.	
016	B.16.2 IFM Quality Management Plan	IFM Quality Mangement Plan	Annually	Review/Comment	Pre Substantial Completion and then Annually revised during operational period	
017	B.17 Occupant Satisfaction Surveys	Questions and Methodology	At least two months in advance of survey	Review/Accept	Operational period	
018	B.17.4 Satisfaction Survey Report	Survey Report	Provide survey results and analysis within 30 days of the close of the survey for the occupant satisfaction survey or 30 days after each Quarter for the Transaction Survey.	Review/Accept	Operational period	
019	B.17.4 Satisfaction Survey Report	Action Plan	Provide an action plan within 45 days of the close of the survey if conditions met	Review/Accept	Operational period	
020	B.18.2 Performance Action Plans	Performance Action Plans (PAP)	(1)At any time, City may request that PPC prepare and submit a Performance Action Plan (PAP) to address any concerns related to the IFM Work. The PAP will be due either five (5) Business Days from the request or an alternate later date as identified by City.	Review/Accept		
021	B.22.2. Environmental Management System	Relevant Polivies and Processes: (a) Energy conservation. (b) Water conservation. (c) Greenhouse gasses emission reduction. (d) Green materials use. (e) Halocarbons management. (f) Storage tank management (fuel, lubrications, chemicals, etc.). (g) Potable water quality management. (h) Indoor air quality management. (i) Material storage and use. (j) City employee communications. (k) Training. (l) Testing, inspection and auditing.	Annually	Review/Comment	Pre Substantial Completion for initial development then revised/updated during operational term.	
022	B.22.1 General Requirements	Annual Environmental Compliance Statement	Annually	Information	Operational period	
023	B.22.4 LEED	LEED EBOM Certification	Within five (5) years of Substantial Completion	Information	Operational period	
024	B.23.2. Emergency Response	Emergency Response and Mitigation Plans (a) Utility Disruptions (b) Natural Disasters (c) Flood/Water leaks (d) Heating/Cooling failure (e) Weather Events (f) Bomb Threats (g) Fire (including evacuation plan) (h) Environmental Spill / Hazardous Material release (i) Medical Emergency (j) Structural Collapse (k) Pandemics	Annually	Review/Comment	Pre Substantial Completion and then Annually revised during operational period	
025	B.23.3 Contingency Planning	Contingency Plans		Review/Accept	Pre Substantial Completion and then Annually revised during operational period	
026	B.24	Fire Management & Evacuation	(2)PPC shall submit the fire safety and evacuation plan to the local fire authorities in accordance with legislative requirements prior to Substantial Completion Deadline. PPC will keep the plan up-to-date and make changes as needed to accommodate City Operations.	Review/Comment	Pre Substantial Completion and then Annually revised during operational period	
027	B.25 Move-In Services	Move-In Plan	PPC shall submit a Move-In Plan no later than six (6) months prior to Substantial Completion Deadline	Review/Accept	Pre Substantial Completion	
028	C.6.3 Scheduling of Maintenance	Monthly Schedule	PPC must provide City with a monthly schedule at least 1 month in advance of planned Maintenance Work activities to be carried out.	Review/Accept	Operational period - accept where schedule does not impede SFMTA operations, otherwise not impact.	

**Potrero Yard - Technical Requirements**

**Exhibit 18, Division 07 - Initial List of Submittals**

Date of update:						
ID Number	Section Reference	Contract Data Item Title / Description	Required Submission Timing	City Submittal Action	Notes/Comments	
029	C.6.7.1 1 Year Scheduled Maintenance Plan	1 Year Scheduled Maintenance Plan	The plan is to be provided at least 3 months prior to the start of the Year at the IFM Operations Committee.	Review/Accept	Pre Substantial Completion and then Annually revised during operational period	
030	C.9.2 5 Year Scheduled Maintenance Plan	5 Year Scheduled Maintenance Plan	The plan is to be provided at least 3 months prior to the start of the Year at the IFM Operations Committee.	Review/Accept	Pre Substantial Completion and then Annually revised during operational period	
031	E.2 Renewal Work Plans and Reports	Initial 30- Year Renewal Work Plan	Annually	Review/Accept	Pre Substantial Completion and then Annually revised during operational period	
032	E.4 Facility & System Condition Index	Facility Condition Index and System Condition Index	Every 5 years	Review/Accept	Operational Period	
033	E.5 Joint Technical Review	Joint Technical Review Report	Every 5 years, a Joint Technical Review to occur.	Review/Accept	Operational Period	
034	F.2 Handback	Handback Renewal Work Plan	Within 30 days of the commencement of the 26th Contract Year, and annually thereafter	Approval	Operational Period	
035	F.2 Handback	Handback Requirements Recovery Plan	As needed	Approval	Operational Period	

**Potrero Yard - Technical Requirements**  
**Exhibit 18, Division 09 - Initial List of Submittals**

<b>Date of update:</b>	15-Nov-24				
ID Number	Section Reference	Contract Data Item Title / Description	Required Submission	City Submittal Action	Notes/Comments
001	Public Outreach and Engagement Plan		A report submitted to the POETS webpage after each project phase	Information	

**Potrero Yard - Technical Requirements  
Exhibit 18, Division 10 - Initial List of Submittals**

Date of update: 15-Nov-24						
ID Number	Division and Section Reference	Subsection Reference	Contract Data Item Title / Description	Required Submission	Submittal Action (Proprietary)	Notes/Comments
001	Div. 10 - Sec. 007320	1.2.A.4.d	EXISTING UTILITIES - Governmental Facilities in the City of San Francisco	PPC shall submit support designs for approval and start work only with approved support designs.	Information	Only applicable if submitted to Governmental Utility
002	Div. 10 - Sec. 007321	2 Contract Activities	UTILITY CROSSINGS - Supporting Documentation for City Projects other than Spot Sewer Repair Contracts	The PPC shall, at a minimum, submit the following supporting documentation with each invoice submitted to the Utility Company for payment:	Information	Only applicable if submitted to Utility Company
003	Div. 10 - Sec. 007321	2 Contract Activities	UTILITY CROSSINGS - Supporting Documentation for work according to the Fixed Price Schedule	The PPC shall, submit following documentation with each invoice submitted to the Utility Company for payment for Spot Sewer Repair Contracts:	Information	
004	Div. 10 - Sec. 011400	1.3.A	ARTWORK COORDINATION - Schedule	Dates for Pre-Art Installation Conference, Artwork installation and Artwork acceptance	Information	
005	Div. 10 - Sec. 011400	1.4	ARTWORK COORDINATION - Artwork Submittals	Submit shop drawings, product data, and samples per this section.	Information	
006	Div. 10 - Sec. 011401	1.8.E	ARTWORK COORDINATION - Artwork Quality Assurance - Mock Ups	PPC shall submit all applicable mock-ups per this section	Information	
007	Div. 10 - Sec. 013233	1.2	Photographic Documentation - Pre-construction and Construction photographs	Pre-construction photographs - submit no later than NTP2 - Delineated by numbers/ letters indicating location on Site plan - Formatt, CD , DVD, USB drive  Construction Photographs per requirements in Part 3 - Execution	Information	
008	Div. 10 - Sec. 013543	1.4.A.1.a	ENVIRONMENTAL PROCEDURES - Submittals	Pre-construction survey for nesting birds that may be affected during construction work. (see Article 3.12 of this section)	Review/Comment	
009	Div. 10 - Sec. 013543	1.4.A.1.b	ENVIRONMENTAL PROCEDURES - Submittals	Photographs of existing landscaping at the limit-of-work line(s). (see Article 3.14 of this section)	Review/Comment	
010	Div. 10 - Sec. 013543	1.4.A.1.c	ENVIRONMENTAL PROCEDURES - Submittals	Tree protection fence locations and stake placement provided at least two weeks in advance of the date for any on-site review of the fence and stake placement. (see Article 3.14 of this section)	Review/Comment	
011	Div. 10 - Sec. 013543	1.4.A.1.d	ENVIRONMENTAL PROCEDURES - Submittals	Written and/or photographic documentation of methods for avoidance of Environmentally Sensitive Areas. (see Article 3.11 of this section)	Review/Comment	
012	Div. 10 - Sec. 013543	1.4.A.1.e	ENVIRONMENTAL PROCEDURES - Submittals	A copy of written notice, accompanied by proof of submittal, provided to the Bay Area Air Quality Management District in accordance with the requirement of the "Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations," in advance of roadway construction and maintenance activities in areas soils containing naturally occurring asbestos. (see Article 3.08 of this section)	Review/Comment	see section 3.8
013	Div. 10 - Sec. 013543	1.4.A.1.f	ENVIRONMENTAL PROCEDURES - Submittals	Prior to issuance of construction permits, and prior to commencement of each construction stage, a Project-specific construction noise control plan shall be reviewed and approved by City Planning Department and City. (see Article 3.07 of this section)	Review/Comment	see section 3.7 (not 3.07)
014	Div. 10 - Sec. 013543	1.4.A.1.g	ENVIRONMENTAL PROCEDURES - Submittals	Prior to issuance of construction permits, Principal Project Company's construction emissions minimization plan (CEMP.) shall be reviewed and approved by City Planning Department and City. (see Article 3.06 and 3.20 of this section for CEMP plan requirements)	Information	see Section 3.6 (not 3.06) and 3.20. Information as City Planning Dept has review and approval authority, not City.
015	Div. 10 - Sec. 013543	1.4.A.1.h	ENVIRONMENTAL PROCEDURES - Submittals	Principal Project Company's initial dust control plan (DCP). (see Article 3.03 of this section)	Review/Comment	
016	Div. 10 - Sec. 013543	1.4.A.1.i	ENVIRONMENTAL PROCEDURES - Submittals	SFDPH Permit and notification for removal and installation of fuel or chemical storage tanks (see Article 3.23 of this section)	Review/Comment	
017	Div. 10 - Sec. 013543	1.4.A.1.j	ENVIRONMENTAL PROCEDURES - Submittals	SFDPH Well Construction/Decommissioning or Soil Borings Permit (see Article 3.23 of this section)	Review/Comment	
018	Div. 10 - Sec. 013543	1.4.A.1.k	ENVIRONMENTAL PROCEDURES - Submittals	Finalized Asbestos Dust Mitigation Plan approved by BAAQMD (see Article 3.09 of this section)	Review/Comment	
019	Div. 10 - Sec. 013543	1.4.A.1.l	ENVIRONMENTAL PROCEDURES - Submittals	Prior to issuance of construction permits, and prior to commencement of each construction stage, a Noise Control Plan shall be reviewed and approved by City Planning Department and City (see Article 3.07 of this section)	Review/Comment	repeat of sub item f above?
020	Div. 10 - Sec. 013543	1.4.A.1.m	ENVIRONMENTAL PROCEDURES - Submittals	San Francisco Public Works Night-Noise Permit (see Article 3.10 of this section)	Review/Comment	
021	Div. 10 - Sec. 013543	1.4.A.1.n	ENVIRONMENTAL PROCEDURES - Submittals	Prior to issuance of a construction permit, an Archeological Monitoring Plan shall be reviewed and approved by City Planning Department.	Information	City Planning Dept only (not City)
022	Div. 10 - Sec. 013543	1.4.A.1.o	ENVIRONMENTAL PROCEDURES - Submittals	The issued Construction Project Site Runoff Control Permit for the project from the SFPUC with written and schematic summary of details. (see Article 3.21 of this section)	Review/Comment	
023	Div. 10 - Sec. 013543	1.4.A.1.p	ENVIRONMENTAL PROCEDURES - Submittals	The issued WDD for the Stormwater Pollution Prevention Plan (SWPPP) from the Regional Water Quality Control Board with certified SWPPP inspection checklist. (see Article 3.22 of this section)	Review/Comment	
024	Div. 10 - Sec. 013543	1.4.A.1.q	ENVIRONMENTAL PROCEDURES - Submittals	(Not Used)	Review/Comment	
025	Div. 10 - Sec. 013543	1.4.A.1.r	ENVIRONMENTAL PROCEDURES - Submittals	Underground Storage Tank (UST) Permit (see Article 3.23 of this section)	Review/Comment	
026	Div. 10 - Sec. 013543	1.4.A.1.s	ENVIRONMENTAL PROCEDURES - Submittals	Well Construction/Decommissioning or Soil Borings Permit (see Article 3.23 of this section)	Review/Comment	
027		1.4.A.2	ENVIRONMENTAL PROCEDURES - Submittals	Submit qualifications meet the requirements for the following: - Qualified Acoustical Consultant - Qualified Arborist - Specialty Environmental Monitor - Qualified Historic Architect or Historic Preservation Professional - Qualified SWPPP Practitioner (QSP)	Review/Comment	

**Potrero Yard - Technical Requirements  
Exhibit 18, Division 10 - Initial List of Submittals**

Date of update:		15-Nov-24				
ID Number	Division and Section Reference	Subsection Reference	Contract Data Item Title / Description	Required Submission	Submittal Action (Proprietary)	Notes/Comments
028	Div. 10 - Sec. 013543	1.4.B.1	ENVIRONMENTAL PROCEDURES - Submittals	Principal Project Company shall submit the "ALERT" sheet affidavit within five business days of the start of construction activities. (see Article 3.18 of this section)	Review/Comment	
029	Div. 10 - Sec. 013543	1.4.B.2	ENVIRONMENTAL PROCEDURES - Submittals	(Not Used)	Review/Comment	
030	Div. 10 - Sec. 013543	1.4.B.3	ENVIRONMENTAL PROCEDURES - Submittals	Documentation of disposal in landfill or at a commercial composting facility of plant materials potentially harboring the <i>Phytophthora ramorum</i> pathogen within one week of disposal. (see Article 3.14 of this section)	Review/Comment	
031	Div. 10 - Sec. 013543	1.4.B.4	ENVIRONMENTAL PROCEDURES - Submittals	Certificates of Quarantine Compliance from County Agricultural Commissioner documenting that hay, straw, or mulch used on the project has been inspected and is weed free before installation of stormwater BMPs. (see Article 3.04 of this section)	Review/Comment	
032	Div. 10 - Sec. 013543	1.4.B.5	ENVIRONMENTAL PROCEDURES - Submittals	ESCP inspection checklists transmitted on a monthly basis (see Article 3.21/3.22 of this section)	Review/Comment	
033	Div. 10 - Sec. 013543	1.4.B.6	ENVIRONMENTAL PROCEDURES - Submittals	Notification(s) that Change Orders or other changes in construction conditions will alter the ESCP, and any additional modifications to the ESCP (see Article 3.21/3.22 of this section)	Review/Comment	
034	Div. 10 - Sec. 013543	1.4.B.7	ENVIRONMENTAL PROCEDURES - Submittals	Analytical water-quality monitoring results (see Article 3.21-3.23 of this section)	Review/Comment	
035	Div. 10 - Sec. 013543	1.4.B.8	ENVIRONMENTAL PROCEDURES - Submittals	Noise complaint logs (see Article 3.07 of this section).	Review/Comment	
036	Div. 10 - Sec. 013543	1.4.B.9	ENVIRONMENTAL PROCEDURES - Submittals	Photographic documentation of signage to be posted by the Principal Project Company as required by this section:	Review/Comment	
037	Div. 10 - Sec. 013543	1.4.B.9.a	ENVIRONMENTAL PROCEDURES - Submittals	A sign with the telephone number and a City person to contact regarding dust complaints and the BAAQMD's phone number (see Article 3.03 of this section)	Review/Comment	
038	Div. 10 - Sec. 013543	1.4.B.9.b	ENVIRONMENTAL PROCEDURES - Submittals	Legible and visible posted signs, in English, Spanish, and Chinese, in designated queuing areas and at the construction site to remind operators of the engine-idling limit (see Article 3.06 of this section)	Review/Comment	
039	Div. 10 - Sec. 013543	1.4.B.9.c	ENVIRONMENTAL PROCEDURES - Submittals	Signs on-site pertaining to permitted construction days and hours and noise complaint procedures and who to notify in the event of a problem, with telephone numbers listed (see Article 3.07 of this section)	Review/Comment	
040	Div. 10 - Sec. 013543	1.4.B.9.d	ENVIRONMENTAL PROCEDURES - Submittals	A legible and visible sign summarizing the Construction Emissions Minimization Plan (see Article 3.06 of this section)	Review/Comment	
041	Div. 10 - Sec. 013543	1.4.B.10	ENVIRONMENTAL PROCEDURES - Submittals	Photographic documentation of temporary fence Type ESA at the entire perimeter of ESA – Biology as shown on the Design Documents (see Article 3.11 and 3.14 of this section).	Review/Comment	
042	Div. 10 - Sec. 013543	1.4.C.1	ENVIRONMENTAL PROCEDURES - Submittals	A final construction emissions minimization plan (CEMP) report summarizing construction activities including the start and end dates and duration of each construction phase, and the specific information required in the CEMP (see Article 3.06 of this section)	Review/Comment	after completion of construction activities
043		3.3.C.2	ENVIRONMENTAL PROCEDURES - Dust Control BMPs	Principal Project Company shall submit a completed application and pay the associated fees to the SFDPH. Principal Project Company may not commence Construction Work, demolition, excavation, grading, foundation work, or other permitted activities until Principal Project Company has submitted to the City's Authorize Representative City and City Planning Department a copy of SFDPH director's written approval of the DCP, the plan provisions have been implemented, and the City has subsequently given Principal Project Company permission to proceed.		see DCP in Appendix A of the SMP approved by SFDPH Oct 10, 2024
044	Div. 10 - Sec. 013543	3.7.B.3	ENVIRONMENTAL PROCEDURES - Construction Noise Control Best Management Practices	Post a sign onsite describing noise complaint procedures and a complaint hotline number that shall always be answered during construction, and provide to City and City Planning Department photographic documentation that the signage has been posted.	Information	submittal is photographic evidence of signage being posted
045	Div. 10 - Sec. 013543	3.7.D.3	ENVIRONMENTAL PROCEDURES - Construction Noise Control Best Management Practices	If directed by the City Planning Department, Principal Project Company must revise the Project-specific construction noise control plan and resubmit for City Planning Department review and approval. Principal Project Company's proposed revisions to the construction noise control plan must be prepared by a qualified acoustical engineer and demonstrate to the City Planning Department what alternative measures to reduce the impacts of construction noise to the extent feasible. The revised construction noise control plan must be approved by the City Planning Department and Principal Project Company shall enact all of its provisions before Project Principal Company commences Construction Work that may exceed the standards or omit the controls required above.	Review/Comment	pertains to resubmittal if, before construction mobilization, PPC determines that these standards and/or one or more of these controls cannot be applied
046	Div. 10 - Sec. 013543	3.7.H.1	ENVIRONMENTAL PROCEDURES - Construction Noise Control Best Management Practices	When directed by the City Planning Department, Principal Project Company shall submit revisions to the approved construction noise-control plan for review and written approval if, in the sole determination of the City Planning Department, modified noise control minimization measures are not effective. In the event that revisions to the construction noise-control plan are required, Principal Project Company shall cease the use of equipment that is responsible for exceedances. Principal Project Company may resume the use of such equipment after the revised construction noise-control plan is approved and all its provisions are enacted.	Review/Comment	pertains to resubmittal if City determines in sole discretion, revisions to the noise control plan are necessary due to recorded excessive noise levels or repeated complaints.
047	Div. 10 - Sec. 013543	3.8.D	ENVIRONMENTAL PROCEDURES - Naturally Occurring Asbestos (NOA)	Before work in areas of NOA shown in the Design Documents which intersect with areas of roadway construction and maintenance which require the disturbance of soils by construction and grading, Principal Project Company shall submit the Bay Area Air Quality Management District's (BAAQMD) "Notification Form for Road Construction and Maintenance Operations" to BAAQMD fourteen business days in advance of land disturbance of soils containing NOA.	Information	Informational for City as submittal is to BAAQMD
048	Div. 10 - Sec. 013543	3.8.E.1.a	ENVIRONMENTAL PROCEDURES - Naturally Occurring Asbestos (NOA)	If NOA is unexpectedly encountered after the Project has started, Principal Project Company shall submit a notification to the BAAQMD no later than the next business day using the Asbestos Dust Mitigation Plan (ADMP) Discovery Notification Form found at the link below: <a href="https://www.baaqmd.gov/-/media/Files/Compliance%20and%20Enforcement/Asbestos/admp_discovery_application.ashx?la=en">https://www.baaqmd.gov/-/media/Files/Compliance%20and%20Enforcement/Asbestos/admp_discovery_application.ashx?la=en</a> , and followed by email to the BAAQMD, and at the same time notify City with the project details.	Information	Informational for City as notification is to BAAQMD
049	Div. 10 - Sec. 013543	3.9.A.1	ENVIRONMENTAL PROCEDURES - Asbestos Dust Mitigation	Sixty days (60) days before commencement of grading, and excavation activities, Principal Project Company shall submit to the City an Asbestos Dust Mitigation Plan (ADMP) for review.	Review/Comment	

**Potrero Yard - Technical Requirements  
Exhibit 18, Division 10 - Initial List of Submittals**

Date of update:		15-Nov-24				
ID Number	Division and Section Reference	Subsection Reference	Contract Data Item Title / Description	Required Submission	Submittal Action (Proprietary)	Notes/Comments
050	Div. 10 - Sec. 013543	3.9.A.2	ENVIRONMENTAL PROCEDURES - Asbestos Dust Mitigation	Upon City's written approval, Principal Project Company shall submit the ADMP, the ADMP application, and the BAAQMD Regulation 3 Fees to the (Air Pollution Control Officer (APCO) for its review and approval. Principal Project Company shall furnish all information required by the BAAQMD to amend and finalize the ADMP. Principal Project Company shall not be reimbursed for the BAAQMD Regulation 3 Fees.	Review/Comment	APCO not spelled out in TRs
051	Div. 10 - Sec. 013543	3.9.A.5	ENVIRONMENTAL PROCEDURES - Asbestos Dust Mitigation	Principal Project Company, at no cost to the City, will perform perimeter air monitoring for asbestos at the project site during its soil disturbance activities for the duration of the project. This will be in accordance with the approved ADMP. All record keeping and reporting will be submitted to the BAAQMD on a weekly basis or as per a reporting schedule requested by BAAQMD.	Information	Informational for City as notification is to BAAQMD
052	Div. 10 - Sec. 013543	3.15.F.1	ENVIRONMENTAL PROCEDURES - Site Restoration	With regards to seeding for purposes of restoring the site, mixing shall be performed in the presence of Principal Project Company's QC Manager and City. Principal Project Company shall submit bags of materials used in the mix to City.	Review/Comment	
053	Div. 10 - Sec. 013543	3.18.A	ENVIRONMENTAL PROCEDURES - ARCHAEOLOGICAL RESOURCE PROTECTION	Prior to issuance of construction permits, Principal Project Company shall have an Archeological Monitoring Plan reviewed and approved by City Planning Department. Principal Project Company shall ensure compliance with the approved Archeological Monitoring Plan which shall govern for the associated construction activities as stated in the approved plan.	Information	Informational for City as approval is City Planning Department
054		3.18.A.1	ENVIRONMENTAL PROCEDURES - ARCHAEOLOGICAL RESOURCE PROTECTION	Following the distribution of the "ALERT" sheet, Principal Project Company shall provide City with a signed affidavit confirming that all field personnel have received copies of the "ALERT" sheet.	Review/Comment	
055	Div. 10 - Sec. 013543	3.20.C	ENVIRONMENTAL PROCEDURES - San Francisco Environment Code Clean Construction Requirements for Work in an Air PollutantExposure Zone (APEZ)	Principal Project Company shall submit a Construction Emissions Minimization Plan (CEMP) to the City Planning Department for review and written approval for compliance with Chapter 25 of the San Francisco Environment Code.	Information	redundant with 1.4.A.1.g above
056	Div. 10 - Sec. 013543	3.20.D	ENVIRONMENTAL PROCEDURES - San Francisco Environment Code Clean Construction Requirements for Work in an Air PollutantExposure Zone (APEZ)	Principal Project Company must submit a signed Clean Construction Emissions Plan Certification Statement to the City Planning Department. Refer to the following link for the Emissions Plan Certification Statement Template: <a href="https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp">https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp</a> .	Information	submittal part of CEMP process
057	Div. 10 - Sec. 013543	3.20.H	ENVIRONMENTAL PROCEDURES - San Francisco Environment Code Clean Construction Requirements for Work in an Air PollutantExposure Zone (APEZ)	Principal Project Company shall submit quarterly and biannual reports to the City Planning Department documenting compliance with the CEMP, and submit each report within seven business days of the end of each quarter.	Information	
058	Div. 10 - Sec. 013543	3.20.I	ENVIRONMENTAL PROCEDURES - San Francisco Environment Code Clean Construction Requirements for Work in an Air PollutantExposure Zone (APEZ)	Principal Project Company shall submit a final CEMP report within four weeks of achieving Substantial Completion summarizing compliance of construction activities with the CEMP, including the start and end dates and duration of each Construction Phase	Information	
059	Div. 10 - Sec. 013543	3.21.B	ENVIRONMENTAL PROCEDURES - CONSTRUCTION SITE RUNOFF CONTROL PERMIT	Principal Project Company shall submit the Construction Site Runoff Control Permit Application within (30) thirty calendar days after NTP 2 for review and approval by the City.	Review/Comment	
060	Div. 10 - Sec. 013543	3.21.D	ENVIRONMENTAL PROCEDURES - CONSTRUCTION SITE RUNOFF CONTROL PERMIT	Principal Project Company shall provide the SFPUC with a transmittal, with a copy to the City Planning Department, at least two working days before each these milestones to inform the SFPUC inspector that the following are about to occur: 1. Commencement of Construction Work. 2. Erosion and sediment control measures are completely installed and stabilized. 3. Final grading has been completed. 4. Substantial Completion.	Information	Informational for City as notification is to SFPUC
061	Div. 10 - Sec. 013543	3.24.A.3	EMERGENCY OR BACKUP DIESEL GENERATOR HEALTH RISK REDUCTION PLAN	The Principal Project Company shall submit the plan to City Planning Department for review and approval prior to issuance of a permit for emergency diesel generators from the San Francisco Department of Building Inspection or the Bay Area Air Quality Management District.	Information	Informational for City as notification is to SF Building Inspection or BAAQMD
062	Div. 10 - Sec. 013543	3.25.A	FIXED MECHANICAL EQUIPMENT NOISE CONTROL FOR BUILDING OPERATIONS	Prior to approval of a building permit, the Principal Project Company shall submit documentation to City Planning Department, demonstrating with reasonable certainty that the building's fixed mechanical equipment (such as heating, ventilation and air conditioning [HVAC] equipment).	Information	Informational for City as notification is to City Planning Dept. There are 9 measures follow this statement in the TRs
063	Div. 10 - Sec. 013543	Appendix B	COMPLETE ENVIRONMENTAL MITIGATION AND MONITORING PLAN	See all submittals contained therein.	Information	Principal Project Company is responsible for all submittal requirements in Division 10 Section 01 35 43 Appendix B: COMPLETE ENVIRONMENTAL MITIGATION AND MONITORING PLAN.

**Potrero Yard - Technical Requirements  
Exhibit 18, Division 10 - Initial List of Submittals**

Date of update:		15-Nov-24				
ID Number	Division and Section Reference	Subsection Reference	Contract Data Item Title / Description	Required Submission	Submittal Action (Proprietary)	Notes/Comments
064	Div. 10 - Sec. 013544	1.1.E	HAZARDOUS BUILDING MATERIALS - Summary - Environmental	Principal Project Company shall submit to City as Regulator certifications or proof of the trainings, listed below, as a Submittal as per Section 02 80 13 Hazardous Building Materials Remediation. 1. Health and Safety training 2. HAZWOPER training 3. Cal/OSHA Competent Person training for the field supervisor overseeing activities that disturb asbestos, or naturally occurring asbestos (NOA) as per Title 8 CCR 1529. 4. Cal/OSHA asbestos training (for all trades who will come in contact and disturb asbestos or NOA. 5. Lead training (for all trades that will come in contact and disturb lead containing paints as per Cal/OSHA 1532.1 Lead in Construction standard) 6. Medical examination and blood tests (as warranted) 7. Respiratory protection (including current respirator fit test records) 8. Storm water pollution prevention awareness training to enable the Principal Project Company's personnel to comply with the Erosion and Sediment Control Plan. 9. Other training pertaining to the Work being conducted.	Information	
065	Div. 10 - Sec. 013544	1.4.A.1	HAZARDOUS BUILDING MATERIALS - Abatement Contractor's Qualifications	Principal Project Company shall ensure that any entity that performs the abatement Work submits to the City as Regulator current licenses and certifications for the specific type of abatement Work to be performed. Submits to the City as Regulator a letter confirming compliance with current Laws, as outlined in the specifications listed in the paragraph below.	Information	
066	Div. 10 - Sec. 013544	1.4.A.2	HAZARDOUS BUILDING MATERIALS - Abatement Contractor's Qualifications	Principal Project Company shall ensure that any entity that performs the abatement Work submits to City as Regulator copies of any notices regarding safety and environmental violations received from regulatory agencies in the last 20 years.	Information	
067	Div. 10 - Sec. 013544	1.4.B.1	HAZARDOUS BUILDING MATERIALS - Hazardous Material Management Plan (HMMP)	Before commencing any abatement Work, Principal Project Company shall submit to the City's Authorized Representative and City as Regulator a Hazardous Materials Management Plan (HMMP) in accordance to the requirements of this Section, and Section 02 80 13 Building Related Hazardous Materials Remediation.	Review/Comment	See 02 80 13 for additional Hazardous Materials and Hazardous Waste requirements.
068	Div. 10 - Sec. 013544	1.8.A	HAZARDOUS BUILDING MATERIALS - Waste Handling and Characterization	The Contractor shall submit to the City as Regulator a Waste Management Plan (WMP) as specified under Section 02 80 13 Building Related Hazardous Materials Remediation.	Information	
069	Div. 10 - Sec. 013544	1.8.D	HAZARDOUS BUILDING MATERIALS - Waste Handling and Characterization	Principal Project Company shall obtain and pay for all sampling and profiling analyses required for waste disposal. Principal Project Company shall ensure that California CDPH-accredited laboratories perform analyses. Principal Project Company shall submit results of such analyses to the City as Regulator prior to scheduling the waste off haul.	Information	
070	Div. 10 - Sec. 013544	1.8.P	HAZARDOUS BUILDING MATERIALS - Asbestos Waste Disposal	1.d. Principal Project Company shall provide, prepare and submit to the City's Authorized Representative and SAR group within City Public Works Department a Uniform Hazardous Waste Manifest Form for asbestos Hazardous Waste shipments.	Information	
071	Div. 10 - Sec. 013544	1.9.B	HAZARDOUS BUILDING MATERIALS - Non-hazardous manifest form	Principal Project Company shall submit each non-hazardous waste manifest form to the SAR group within City Public Works Department for the generator's signature at least 72 hours in advance of the day of the off-haul with an estimate of the number of loads scheduled for off-haul.	Information	
072	Div. 10 - Sec. 013544	1.9.D	HAZARDOUS BUILDING MATERIALS - Non-hazardous manifest form	Within 30 days of the off haul, Principal Project Company shall submit to the City's Authorized Representative and SAR group within City Public Works Department with copies of each completed non-hazardous waste manifest Form (with the landfills signature).	Information	
073	Div. 10 - Sec. 013545	1.3.A	HEALTH AND SAFETY CRITERIA - Submittals	Principal Project Company shall submit to the City the following Submittals no later than ten Days before start of Work at the Project Site or NTP2, whichever is earlier. 1. Site-specific Health and Safety Plan (HASP) prepared, signed and stamped by a Certified Industrial Hygienist (CIH) prepared in accordance with the requirements contained in this Section 01 35 45, CFR Title 29, CCR Title 8 and other applicable regulations, which shall cover all aspects and scope of Work. 2. Principal Project Company's Injury and Illness Prevention Programs (IIPP) and Code of Safe Practices (CSP), in accordance with the requirements contained in this Section 01 35 45 and the California Code of Regulations (CCR), Title 8. 3. Templates for all safety forms and reports 4. Completed Activity Hazard Analysis (AHA) or Job Hazard Analysis (JHA) submitted with the HASP using the AHA/JHA template for all significant activities and tasks with a highrisk potential, describing the job steps, hazards associated with each job step, and the controls used to remove or minimize the associated hazards 5. SDS (Safety Data Sheet) for all chemicals and other hazardous materials used in the Work. 6. If Serpentine is present Principal Project Company shall have Cal/OSHA 40-hour asbestos training for the competent person overseeing Serpentine/ Naturally Occurring Asbestos (NOA) disturbance activities and managing personal air monitoring for asbestos.	Information	
074	Div. 10 - Sec. 013545	1.3.B	HEALTH AND SAFETY CRITERIA - Experience Statement	Principal Project Company shall submit to the City no later than 10 days prior to the start of construction Work the qualifications and experience of the it's Project Safety Representative (PSR) as specified in this Section 01 35 45 - Health and Safety Criteria.	Review/Comment	
075	Div. 10 - Sec. 013545	1.5.H	HEALTH AND SAFETY CRITERIA - Health and Safety Plan	Furnish copies of all records of all health and safety audits, inspections, and reviews [48 hours after the audit, inspection or review.]	Information	
076	Div. 10 - Sec. 013545	1.13.E	HEALTH AND SAFETY CRITERIA - Personal Protective Equipment (PPE)	Where "Hot Work" is involved, a Hot Work permit must be submitted to the City as Regulator prior to commencing that Work.	Information	
077	Div. 10 - Sec. 013545	1.19.B	HEALTH AND SAFETY CRITERIA - Logs, Reports, and Recordkeeping	Principal Project Company shall submit Monthly project safety statistics, which shall include Project safety inspections, hours worked by Principal Project Company, OSHA Recordable Incidents, Incident Rates, Lost Work Day Cases, Total Project Lost Work Days, Days Away from Work Rate, First Aid Cases, and Property Damage Incidents, to City as part of the Monthly Progress Status Report.	Information	

**Potrero Yard - Technical Requirements  
Exhibit 18, Division 10 - Initial List of Submittals**

Date of update:		15-Nov-24				
ID Number	Division and Section Reference	Subsection Reference	Contract Data Item Title / Description	Required Submission	Submittal Action (Proprietary)	Notes/Comments
078	Div. 10 - Sec. 013545	1.21.F	HEALTH AND SAFETY CRITERIA - Incident Reporting	Principal Project Company shall submit to the City a Preliminary Incident/Near Miss Investigation Report (PIR) within 24 hours of the incident or near miss. Principal Project Company shall submit a Final Incident/Near Miss Investigation Report (FIR) as soon as possible (generally within 48 hours) after incident or near miss. Principal Project Company shall not perform Work in the area or of a type that poses risks similar to those of the incident or near miss until a Corrective Action Report (CAR) is complete and submitted to the City.	Information	Applies if/when an incident and near miss incident ("near miss") occurs
079	Div. 10 - Sec. 013545	1.23.B	HEALTH AND SAFETY CRITERIA - Project Safety Representative	If the City observes an unsafe Project Site condition or unsafe means or methods of performing Work, the City will inform Principal Project Company's Construction Manager or PSR, who shall take whatever actions Principal Project Company deems necessary to immediately remedy the unsafe Project Site condition or unsafe work practice, or unsafe means or methods in which the Work is performed. Principal Project Company shall within 24 hours of taking such remedial action submit a report to the [City's Authorized Representative] describing the unsafe Project Site condition or work practice, and how Principal Project Company remedied that unsafe condition, unsafe work practice, or unsafe means and methods of performing the Work.	Information	NTD: [City's Authorized Representative] says Engineer in drafting currently. Needs correction.
080	Div. 10 - Sec. 013550	2.1.A	ADDITIONAL ENVIRONMENTAL PROCEDURES - Documentation of Historical Resource	Principal Project Company shall submit to the City Planning Department for approval the scope of the documentation which shall include the following elements: 1. Measured Drawings 2. HABS/HALS-Level Photographs: 3. HABS/HALS Historical Report 4. Video Recordation 5. Softcover Book	Information	Informational cit City as review role is City Planning Dept. Each measure 1-5 has detailed requirements in TRs
081	Div. 10 - Sec. 013550	2.2.A	ADDITIONAL ENVIRONMENTAL PROCEDURES - Salvage Plan	Prior to any demolition that would remove character-defining features, Principal Project Company shall consult with the Planning Department as to whether any character-defining features that are proposed to be demolished may be salvaged, in whole or in part, during demolition.	Information	If required by City Planning Department. See 02 41 16 for Demolition Plan requirements.
082	Div. 10 - Sec. 013550	2.3.A	ADDITIONAL ENVIRONMENTAL PROCEDURES - Interpretation of the Historical Resource	Principal Project Company shall submit to the City Planning Department for approval an interpretive program plan prepared by a qualified consultant.	Information	
083	Div. 10 - Sec. 013550	2.4.A	ADDITIONAL ENVIRONMENTAL PROCEDURES - Oral Histories	Principal Project Company shall undertake an oral history project on the resource, undertaken by a professional historian in conformance with the Oral History Association's Principles and Best Practices ( <a href="https://www.oralhistory.org/principles-and-bestpractices-revised-2018/">https://www.oralhistory.org/principles-and-bestpractices-revised-2018/</a> ), and shall submit the completed oral history project to the San Francisco Public Library, Planning Department, and other interested historical institutions. The oral history project shall also be incorporated into the interpretive program (see Article 1.6).	Information	NTD: Article 1.6 reference is not correct.
084	Div. 10 - Sec. 013550	2.6.A	ADDITIONAL ENVIRONMENTAL PROCEDURES - Construction Management Plan	Principal Project Company shall submit to the City Planning Department the Construction Management Plan that shall include additional measures to further minimize disruptions to people walking and bicycling, transit, and emergency vehicles during construction. Additional measures include: 1. encourage carpooling, bicycle, walk, and transit access to the Project Site by construction workers 2. provide nearby residences and adjacent businesses with regularly updated information regarding project construction, including email notices distributed by PPC	Information	This CMP should be the same CMP as required by Division 1, but meeting the requirements in this Section for purposes of City Planning Department review
085	Div. 10 - Sec. 013550	2.7.A	ADDITIONAL ENVIRONMENTAL PROCEDURES - Driveway and Loading Operations Plan (DLOP)	Principal Project Company to submit a Driveway and Loading Operations Plan (DLOP) to the City Planning Department for approval. The intent of the DLOP is to reduce potential conflicts between passenger and freight loading and transit operations, and between passenger and freight loading activities and people walking and bicycling, and other vehicles in the project vicinity, as well as to maximize reliance on onsite facilities to accommodate freight loading demand.	Information	
086	Div. 10 - Sec. 013550	2.8.A	ADDITIONAL ENVIRONMENTAL PROCEDURES - Preconstruction Paleontological Evaluation and Monitoring Plan During Construction	Principal Project Company shall submit the Preconstruction Paleontological Monitoring Plan to the City Planning Department for approval.	Information	See 01 35 50, Section 3.2.A requirements
087	Div. 10 - Sec. 013550	3.2.A	ADDITIONAL ENVIRONMENTAL PROCEDURES - Paleontological Monitoring During Construction	Principal Project Company shall submit a final monitoring report and any data recovery report to the City Planning Department for approval prior to the certificate of occupancy.	Information	
088	Div. 10 - Sec. 013550	3.3.C&F-I	ADDITIONAL ENVIRONMENTAL PROCEDURES - Inadvertent Discovery of Paleontological Resources	C. Principal Project Company shall submit a Paleontological Resources worker awareness training form/affidavit to the City Planning Department within five (5) business days of conducting the training. F. If the qualified paleontologist determines that the discovery is not scientifically important, the qualified paleontologist shall document this conclusion in a Paleontological Evaluation Letter to demonstrate compliance with applicable statutory requirements (e.g., Federal Antiquities Act of 1906, CEQA Guidelines Section 15064.5, California Public Resources Code Chapter 17, Section 5097.5, Paleontological Resources Preservation Act 2009). Principal Project Company shall submit the Paleontological Evaluation Letter to the City Planning Department for review within 30 calendar days of the discovery. G. If the qualified paleontologist determines that the discovery is of scientific importance, and there are no feasible measures to avoid disturbing this paleontological resource, the qualified paleontologist shall prepare and submit to the City Planning Department for approval a Paleontological Mitigation Program. H. If a Paleontological Mitigation Program is required, Principal Project Company shall prepare and submit a Paleontological Resources Report to the City Planning Department for review within 30 calendar days from consultation of the ground disturbing activities, or as negotiated with the City Planning Department. I. The paleontology report shall be submitted to City Planning Department for review within 30 business days from conclusion of ground disturbing activities, or as negotiated following consultation with City Planning Department.	Information	Applies only in the event of the discovery of an unanticipated paleontological resource during construction.
089	Div. 10 - Sec. 015000	1.13.D	TEMPORARY FACILITIES AND CONTROLS - Sign	Principal Project Company shall submit a mock-up of the Project sign in color, on bond paper, 11x17 size, to the City for approval prior to fabrication.	Information	

**Potrero Yard - Technical Requirements  
Exhibit 18, Division 10 - Initial List of Submittals**

Date of update:		15-Nov-24				
ID Number	Division and Section Reference	Subsection Reference	Contract Data Item Title / Description	Required Submission	Submittal Action (Proprietary)	Notes/Comments
090	Div. 10 - Sec. 017450	1.4.G	MATERIAL REDUCTION AND RECOVERY PLAN - Demolition Debris Recovery Plan (DDRP)	Principal Project Company conducting full demolition of an existing structure must submit a Demolition Debris Recovery Plan (DDRP) to the San Francisco Environment Department (SFED). The DDRP must be submitted to and approved by SFE before the Department of Building Inspection will issue a Full Demolition Permit.	Information	
091	Div. 10 - Sec. 017450	1.5	MATERIAL REDUCTION AND RECOVERY PLAN - Material Reduction and Recovery Plan (MRRP)	Develop and submit a project specific MRRP for the Project through the Green Halo waste tracking program. The City will create a Green Halo project account for use by Principal Project Company.	Information	
092	Div. 10 - Sec. 024116	1.6	STRUCTURE DEMOLITION - Informational Submittals	Principal Project Company shall submit a number of informational submittals in addition to the Demolition Plan.	Information	
093	Div. 10 - Sec. 024116	1.7	STRUCTURE DEMOLITION - Demolition Plan	The Principal Project Company shall submit a complete Demolition Plan detailing procedures and sequence for removing the existing structures including all features necessary to remove the structure in a safe and controlled manner to insure stability of the structure at any given time.	Information	
094	Div. 10 - Sec. 028013	1.5.A	HAZARDOUS BUILDING MATERIALS - REMEDIATION - Submittals	Principal Project Company shall submit copies of any notice of safety and environmental violations received from the regulatory agencies that they may have received in the last 20 years in the USA.	Information	
095	Div. 10 - Sec. 028013	1.5.B	HAZARDOUS BUILDING MATERIALS - REMEDIATION - Submittals	Principal Project Company shall submit copies all the Minimum Qualification licensing requirements asked for in Section 01 35 44 Hazardous Building Materials Scope of Work.	Information	
096	Div. 10 - Sec. 028013	1.5.C	HAZARDOUS BUILDING MATERIALS - REMEDIATION - Submittals	Principal Project Company shall submit proof of its five (5) years of hazardous materials abatement and/or removal experience asked for in Section 01 35 44 Hazardous Building Materials Scope of Work.	Information	NTD: need to correct "...or its Hazardous Materials abatement Principal Project Company..."
097	Div. 10 - Sec. 028013	1.5.D	HAZARDOUS BUILDING MATERIALS - REMEDIATION - Submittals	Principal Project Company shall submit proof of its environmental training requirements asked for in Section 01 35 44 Hazardous Building Materials Scope of Work.	Information	
098	Div. 10 - Sec. 028013	1.5.E	HAZARDOUS BUILDING MATERIALS - REMEDIATION - Submittals	For all demolition of buildings and structures, regardless of whether asbestos is present or not, Principal Project Company shall submit a copy of the BAAQMD-issued Approval Letter for Asbestos for Demolition, "[Job Number]" to the City's Authorized Representative prior to the start of Demolition. To obtain this letter, Principal Project Company shall submit an Asbestos Demolition Notification to the BAAQMD through their web-based Online Asbestos Notification System ( <a href="http://learn.baaqmd.gov/course/view.php?id=4#section-5">http://learn.baaqmd.gov/course/view.php?id=4#section-5</a> ) at least ten (10) business days prior to the start of any demolition.	Information	
099	Div. 10 - Sec. 028013	1.5.F	HAZARDOUS BUILDING MATERIALS - REMEDIATION - Submittals	As per Section 01 35 44 Hazardous Building Materials - Scope of Work, Principal Project Company shall submit a Hazardous Materials Management Plan (HMMP) with the following documentation listed below. The HMMP shall be submitted no later than ten Days before start of Work at the Project Site or NTP2, whichever is earlier and before commencement of demolition activities. No hazardous materials work may start without the HMMP reviewed and approved by the City.	Review/Comment	See Section 1.5, items J, K and L for specialty HMMP submittal requirements pertaining to lead-related Work, Copper Chromate Arsenate (CCA) treated wood related Work, and fluorescent light tube related Work, if applicable.
100	Div. 10 - Sec. 028013	1.5.H	HAZARDOUS BUILDING MATERIALS - REMEDIATION - Submittals	As part of Principal Project Company's HMMP, Principal Project Company shall submit a Waste Management Plan (WMP). The WMP is Principal Project Company's comprehensive plan for waste management of hazardous and non-hazardous waste generated during the remediation work of this project.	Information	
101	Div. 10 - Sec. 028013	1.5.I	HAZARDOUS BUILDING MATERIALS - REMEDIATION - Submittals	For Asbestos Containing Construction Materials (ACCM), or Asbestos Containing Material (ACM), as applicable by regulation, and as part of the Hazardous Materials Management Plan (HMMP) Principal Project Company shall submit a number of items (see drafting) for: 1. Pre-job Submittals 2. Periodic Submittals 3. Close-out Submittals	Information	
102	Div. 10 - Sec. 028013	1.5.J	HAZARDOUS BUILDING MATERIALS - REMEDIATION - Submittals	For Lead - Related Work, and as part of the Hazardous Materials Management Plan (HMMP) Principal Project Company shall submit a number of items (see drafting).	Information	
103	Div. 10 - Sec. 028013	1.5.K	HAZARDOUS BUILDING MATERIALS - REMEDIATION - Submittals	For Copper Chromate Arsenate (CCA) treated wood related Work, as part of the Hazardous Materials Management Plan (HMMP), Principal Project Company shall submit the a number of items (see drafting).	Information	
104	Div. 10 - Sec. 028013	1.5.L	HAZARDOUS BUILDING MATERIALS - REMEDIATION - Submittals	For fluorescent light tube related Work, as part of the Hazardous Materials Management Plan (HMMP), Principal Project Company shall submit the a number of items (see drafting).	Information	
105	Div. 10 - Sec. 028013	3.3.F	Hazardous Building Materials Remediation - ASBESTOS ABATEMENT PREPARATION	1.c. (1) Establish a pressure differential of -0.025 inches w.g. with manometer reading records. Submit manometer readings daily or upon request.	Information	NTD: In drafting not clear who submittal needs to go to.
106	Div. 10 - Sec. 028013	3.5.C (1-2)	Hazardous Building Materials Remediation - HAZARDOUS MATERIALS REMOVAL PROCEDURES	1. Mastic removal solvents, procedures, and equipment information submittals must be approved prior to floor coverings removal. 2. In flooring areas where a solvent-based mastic remover is to be applied, Principal Project Company shall use a low odor mastic remover. Principal Project Company shall submit the Safety Data Sheets (SDS) of the mastic remover it intends to use, for the review and approval of the oversight Consultant.	Information	
107	Div. 10 - Sec. 028013	3.5.T	Hazardous Building Materials Remediation - HAZARDOUS MATERIALS REMOVAL PROCEDURES	1. Where mechanical removal of surface coatings constitutes a Level II activity, provide power tools, to the extent feasible, with local HEPA exhaust or dust collector systems to capture the aerosolized lead. Principal Project Company shall submit, as part of the HMMP, a detailed work plan for any of the following activities: a. Removal with power blasting tools b. Removal with power washing c. Removal with Sodium Bicarbonate Blasting.	Information	

**Potrero Yard - Technical Requirements  
Exhibit 18, Division 10 - Initial List of Submittals**

Date of update:		15-Nov-24				
ID Number	Division and Section Reference	Subsection Reference	Contract Data Item Title / Description	Required Submission	Submittal Action (Proprietary)	Notes/Comments
108	Div. 10 - Sec. 028110	1.3	ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS - Submittals	A. The Contractor shall submit the required documents no later than ten Days before start of Work at the Project Site or NTP2, whichever is earlier, before any soil disturbing activity may begin. B. See drafting for detailed list of required submittals.	Information	
109	Div. 10 - Sec. 028110	1.4.B	ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS - Pre-excavation Environmental Soil Profiling (Phase II Environmental Site Assessment)	If Principal Project Company seeks an exemption from the list of as needed environmental consultants, submit the name and qualifications of an environmental consultant that has done work in compliance with Article 21 of the City's Health Code (Maher Ordinance) for the City's approval.	Information	Applicable only for Phase II ESA work.
110	Div. 10 - Sec. 028110	1.4.E,N,O	ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS - Pre-excavation Environmental Soil Profiling (Phase II Environmental Site Assessment)	E. Principal Project Company shall submit a Pre-Excavation Soil Profiling Sampling Plan for review and approval by both the City and San Francisco Department of Public Health prior to any drilling. N.2. Tabulate the testing results from the laboratory and submit it to the City. N.4. Prepare a draft and final report of this Environmental Site Assessment (Phase II) that is signed and stamped by both the principal and a registered professional engineer or geologist. O. Forward a digital copy of the draft environmental report for the City's review. After which, forward the final environmental report at least 5 days prior to excavation work. This report shall be prepared, stamped, and signed by a California licensed professional geologist or professional civil engineer.	Information	
111	Div. 10 - Sec. 028110	1.10.A	ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS - Use of Non-Hazardous Waste Manifest for Class II Material or Lesser	For transportation and disposal of the non-Hazardous Waste, Principal Project Company shall initiate and fill out a non-Hazardous Waste profile form with the Class II/III landfill of its choosing. Then, submit this waste profile form to the City for its approval & signature. Next, Principal Project Company shall prepare a non-hazardous waste manifest form from the landfill. The non-hazardous waste manifest form shall be completed for each vehicle carrying excavated material classified as California Class II and Class III designated waste, or of a lesser waste classification. Principal Project Company shall submit the non-hazardous waste manifest form to the City for the Generator's signature at least 72 hours in advance of the day of the off-haul with an estimate of the number of loads scheduled for off-haul. <u>See drafting for manifest form requirements.</u>	Review/Comment	
112	Div. 10 - Sec. 028110	1.11.D,E,I	ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS - Use of Non-Hazardous Waste Manifest for Class II Material or Lesser	D.1. For transportation and disposal of the Hazardous Waste, Principal Project Company shall initiate and fill out a Hazardous Waste profile form with the Class I landfill of its choosing. Then, it shall submit this Hazardous Waste profile form to the City for its approval and signature. Next, Principal Project Company shall provide and prepare the Hazardous Waste manifest for each shipment of Hazardous Wastes from the Project Site. E. Principal Project Company shall notify the City 72 hours prior to off-haul of all excavated material. If the manifest and other forms above are to be signed by the City during periods other than the hours stipulated above, Principal Project Company shall give an additional 72-hour advance notice to the City. I. Within 2 days of its return, Principal Project Company shall provide the City with the completed waste manifest. The completed waste manifest shall be certified by the receiver of the waste shipment, confirming that the shipment was received at the waste treatment or disposal facility designated in Principal Project Company's bid, and certifying the weight of the shipment.	Review/Comment	
113	Div. 10 - Sec. 028110	1.12.E,F	ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS - Underground Storage Tank (UST) Closure Plan	E. Principal Project Company shall prepare an Underground Storage Tank (UST) Closure Plan in compliance with Article 21 of the San Francisco Health Code, if UST's will be removed. Principal Project Company shall only remove the underground tanks, pipes, and related appurtenances only in the presence of an inspector from the City's Department of Public Health, the City's Fire Department, and the City's Representative. F. Principal Project Company shall furnish documentation of the removal of an underground tank.	Information	
114	Div. 10 - Sec. 028110	3.2.B	ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS - Reuse of Excavated Soils as Backfill	2. Native soils must meet sieve and chloride requirements. Principal Project Company shall submit sample results to the City prior to placement.	Information	
115	Div. 10 - Sec. 028110	3.3.A,B	ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS - Reuse and Recycling of Excavated Soils at Other Facilities	A.3. Submit a letter of acceptance from the receiving facility or project. The letter shall indicate the volumes of soils accepted. Submit a value engineering calculation demonstrating cost savings to the City. Any savings that result from such reuse or recycle work will be a split 50/50 between [the City and Principal Project Company]. B.2. Submit a copy of the letter of acceptance and all records, including the financial statements for the value engineering saving prior to the approval of the reuse or recycling of these soils.	Information	
116	Div. 10 - Sec. 028110	3.4.C,D,R	ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS - Import Fill	C. In advance of hauling in and use of import soil (fill) Principal Project Company for each source of import soil (fill), shall provide the City the original source of where the import soil (fill) is coming from, the name of the laboratory used to analyze the soils, and the date of chemical analysis. Laboratory results shall not be over 6 months old. D. Principal Project Company shall provide chemical analytical results for each source and of the same soil classification type (based on the unified soil classification system) of import soil (fill) in accordance with the Recommended Fill Material Sampling Schedule stated in the Department of Toxic Substances Control (DTSC) Advisory Note for Clean Imported Material. R. Import soil (fill) shall not be brought on-site, prior to the City's approval of the analytical results. Analytical results submitted shall be referenced on the import fill spreadsheet submittal.	Information	

Potrero Yard - Technical Requirements

Exhibit 12 Energy Management - Initial List of Submittals

Date of update: 15-Nov-24

ID Number	Division Page #	Section Reference	Contract Data Item Title / Description	Required Submission Timing	City Submittal Action	Notes/Comments
001	2	3.2	Energy Analysis Report	Annually (60 days following end of each Contract Year)	Review/Accept	
002	4	3.8	Monthly Energy Report	Monthly	Review/Accept	
003	4	4.1.1	Energy Performance Action Plan	As per Section 4.1.1, as needed and 30 days after acceptance of the Energy Analysis Report	Review/Accept	

---

## Division 2: Design Guidelines



**A New Potrero Yard:**

**The San Francisco  
Municipal Transportation Agency  
Potrero Yard Modernization Project**

**Design Guidelines**

# The New Potrero Yard Design Guidelines

## Contents

- 1 Introduction ..... 3
  - 1.1 Background ..... 3
  - 1.2 Project Site and Context ..... 4
  - 1.3 Zoning and CEQA..... 5
  
- 2 Overall Design Guidelines ..... 6
  - 2.1 Vision ..... 6
  - 2.2 Design ..... 7
  
- 3 Building Design Guidelines..... 8
  - 3.1 Uses and Building Organization ..... 8
  - 3.2 Height, Bulk, and Open Space ..... 9
  - 3.3 Wall and Roof Treatment..... 12
  - 3.4 Lighting, Signage, and Public Art..... 14
  - 3.5 Ground Floor Uses..... 15
  
- 4 Streetscape Design Guidelines ..... 16

# The New Potrero Yard Design Guidelines

## 1 Introduction

### 1.1 Background

The Potrero Yard Modernization Project's primary objective is to replace the obsolete Potrero Yard—which was originally built in 1915 as a streetcar facility—with a single integrated Facility that includes a Bus Yard Component, a Housing and Commercial Component, and Common Infrastructure and has an exceptional building and streetscape design.<sup>1</sup>

The San Francisco Municipal Transportation Agency (SFMTA) has been coordinating with the San Francisco Planning Department (SF Planning) and other City agencies since 2016 on preliminary work for the Project and has undertaken a robust stakeholder engagement program to receive and incorporate feedback.

These Design Guidelines provide the architectural and urban design principles and standards to guide the development of the Facility. The Project's Technical Requirements including these Design Guidelines are based on the work completed to date and should be used to develop the Project design.

These Design Guidelines convey general policies and urban design principles to which the Project should adhere. The guidelines help establish a common understanding of design principles and standards, but are not intended to dictate solutions to these principles and standards. Instead, they define a range of appropriate responses to a variety of specific design issues. Where the Design Guidelines state "shall", the PPC must interpret this language as a prescriptive design requirement. Where the Design Guidelines state "should," the City is promoting specific urban design principles and an encouraged urban design approach.

The following pages include examples and illustrations. These are included to illustrate concepts described; they are not intended to suggest a specific design solution or aesthetic.

---

<sup>1</sup> See Division 01 of the Technical Requirements

# The New Potrero Yard Design Guidelines

## 1.2 Project Site and Context

The Project Site, located at 2500 Mariposa Street in San Francisco, is owned by the City and County of San Francisco under the jurisdiction of the SFMTA. The approximately 4.4-acre property is bound by Bryant, 17th, Hampshire, and Mariposa Streets.

The site is located in the northeastern quadrant of the Mission District, an area that includes mixed-use zones and has a variety of light industrial uses as well as residential, retail, office, and other uses. York Street terminates at Mariposa Street on the south side of the site. Franklin Square, a city neighborhood park, is located across 17th Street on the north side of the site.

The existing bus yard and Mariposa Street are relatively flat, while the surrounding terrain slopes up to the northeast. The sidewalk at the northeast corner of the Site at 17th and Hampshire Streets is approximately 22 feet higher than the sidewalk at southwest corner of the site at Mariposa and Bryant Streets.<sup>2</sup>

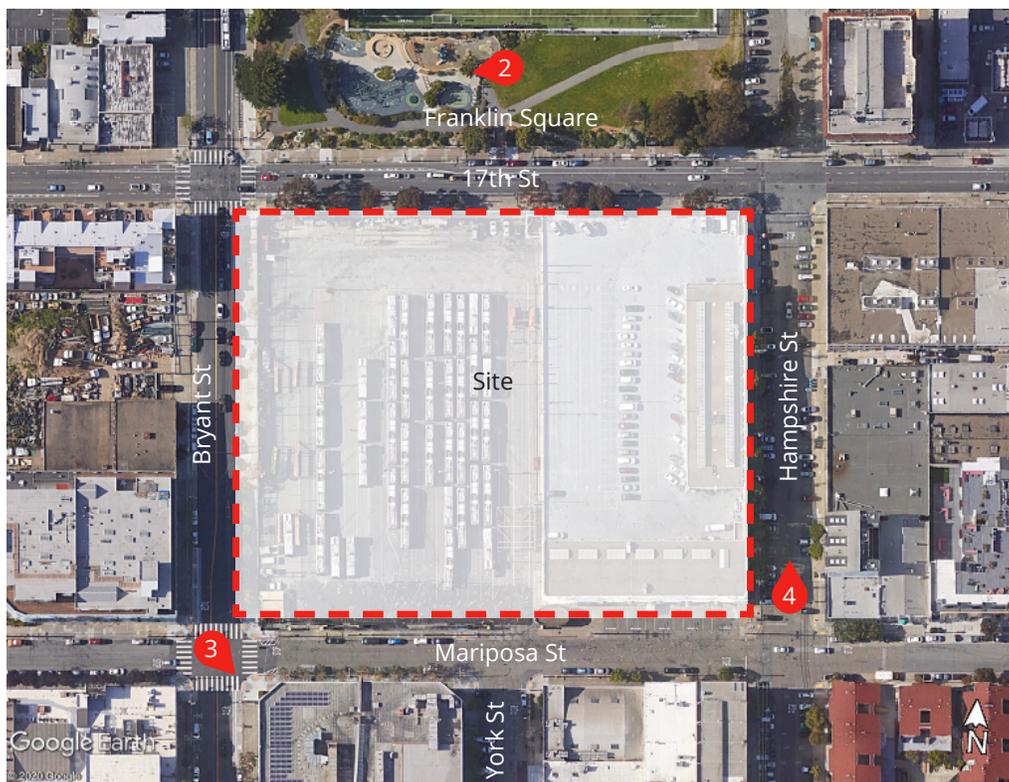


Figure 1. Site Aerial Photograph. Numbered keys refer to Figures on the following page.

<sup>2</sup> See Division 01 of the Technical Requirements

# The New Potrero Yard Design Guidelines

## 1.3 Zoning and CEQA

In 2024 the San Francisco Board of Supervisors adopted an ordinance designating the Project Site as the Potrero Yard Special Use District (SUD) and approving the Project's Final Environmental Impact Report (FEIR).

The Project shall comply with the SUD, the FEIR and the associated Project's Conditional Use Authorization and other City and County of San Francisco ordinances and regulations.



Figure 2. Franklin Square looking west.



Figure 3. Intersection of Bryant and Mariposa Streets looking southeast at KQED facility. Rendering by EHDD Architects.



Figure 4. Hampshire Street looking north.

# The New Potrero Yard Design Guidelines

## 2 Overall Design Guidelines

*“Good urban design is characterized by the thoughtful orchestration of buildings, landscape, open space, and streets ... San Francisco’s architecture spans various eras and architectural styles, but its urban fabric maintains a high degree of continuity and consistency ... [N]ew buildings have the responsibility to sensitively respond to their context and existing patterns of development while being of their moment.”<sup>3</sup>*

### 2.1 Vision

The SFMTA is committed to its mission to “connect San Francisco through a safe, equitable, and sustainable transportation system.”<sup>4</sup> The Project demonstrates the SFMTA’s commitment to providing zero-emission public transit, a safe and modern work environment for the SFMTA employees, and a new development with an exceptional building and streetscape design that enhances the Mission and Potrero neighborhoods.

The proposed Project vision should describe a single integrated Facility that incorporates the bus facility, residential and commercial uses, and infrastructure in a manner that makes it a great place for the building’s occupants and bus yard operations, and a great asset for the community.

The vision should:

- Celebrate the bus yard as the Site’s core use.
- Support a design that reflects the unique combination of bus, residential, and commercial uses and integrates them into a building that is contextual to its highly mixed-use neighborhood.
- Foster the placemaking and community-oriented activities in the building and streetscape design.

---

<sup>3</sup> San Francisco Planning, Urban Design Guidelines, March 22, 2018, p 4.

<sup>4</sup> <https://www.sfmta.com/reports/sfmta-strategic-plan-2021-2024>, accessed 09/08/2023

# The New Potrero Yard Design Guidelines

## 2.2 Design

The concept should be clear, and the design compelling and implemented with care and consistency.

The design should:

- Achieve the Project Objectives and fulfill the Project vision.<sup>5</sup>
- Enhance the skyline and surrounding context with a building massing, that although larger and taller than surrounding buildings provides visual interest, an architectural character that relates to surrounding neighborhood, and active building facades that have a pedestrian orientation that engages the community.
- Comply with the Project's Conditional Use Authorization including its special restrictions as well as the Project's Technical Requirements including these Design Guidelines.

---

5. See Division 01 of the Technical Requirements

# The New Potrero Yard Design Guidelines

## 3 Building Design Guidelines

### 3.1 Uses and Building Organization

The new Potrero Yard is planned to include the bus yard, residential, and possibly commercial uses such as retail and community serving storefront uses. The bus yard will occupy most of the building below 75 feet in height while the commercial uses may occupy select areas of the ground floor and the residential uses will occupy select areas of the building below 75 feet in height and above the bus yard.

The Facility shall be designed to optimize modern and efficient bus operations in accordance with the Division 3 - Design Criteria Document and to incorporate residential and commercial uses and infrastructure into a cohesive building design. Each component shall be designed to meet its programmatic and other requirements and to function independently while being part of a harmonious building design.

For efficiency, identity, and wayfinding the bus, residential, and commercial uses should be organized in a simple and clear manner and should be easily distinguished from one another. For pedestrian safety, the residential entrances and commercial storefronts should be separated to the extent feasible from the bus entrances and exits.

To contribute to the urban context and complement surrounding uses, active ground-floor uses such as retail and community serving storefront uses are desired on Bryant and 17th Streets.

To optimize bus operations, incorporate residential and commercial uses, and enhance the urban context provide at a minimum:

- Bus and loading entrances and exits on Mariposa Street.
- At least one primary residential entrance and active ground-floor uses on Bryant Street.
- Active ground-floor uses on 17th Street.
- At least one primary residential entrance on Hampshire Street.

# The New Potrero Yard Design Guidelines

## 3.2 Height, Bulk, and Open Space<sup>6</sup>

Consider how the building's massing is perceived from distant views such as from Dolores Park, Corona Heights, and Potrero Hill as well as from the close-in, street-level perspective of the surrounding neighborhood. Develop a clear design concept with a massing that provides visual interest, breaks down the building's height and bulk, and minimizes shadows on Franklin Square.



Figure 5. Different volumes breakdown building scale. Example: Five88, San Francisco, CA.



Figure 6. Different volumes breakdown building scale. Example: Avalon Hayes, San Francisco, CA.



Figure 7. Expressed stair and perforated metal facade provides visual interest. Example: Center Street Parking Garage, Berkeley, CA.

<sup>6</sup> Building heights (the vertical distance by which a building rises above a point) shall be measured from the midpoint of the Mariposa Street as described in the SUD.

# The New Potrero Yard Design Guidelines

The building shall not exceed 150 feet in height.

The—up to 75 feet tall—bus yard may be built to the property line but it should not appear monolithic. Reduce the scale of this mass by breaking it down into several volumes with plane changes and recesses while avoiding inactive or hidden spaces. Consider using an entrance alcove or plaza centered on the York Street axis to modulate the Mariposa Street facade and respond to the end of York Street.

The building above 75 feet in height shall step back from the property line and the overall massing shall step down from the south (Mariposa Street) side to north (17th Street) side. The building above 75 feet in height shall step back 10 to 20 feet on the south, west, and east frontages and 60 to 70 feet on the north frontage as described in the SUD to provide visual relief and mitigate shadows cast on Franklin Square.

The building above 75 feet in height shall vary in height and layout to provide visual interest and reduce the apparent building mass. The building above 115 feet in height shall have separate masses as described in the SUD. Consider locating these masses asymmetrically on the southern portion of the Site clear of the York Street right-of-way axis.

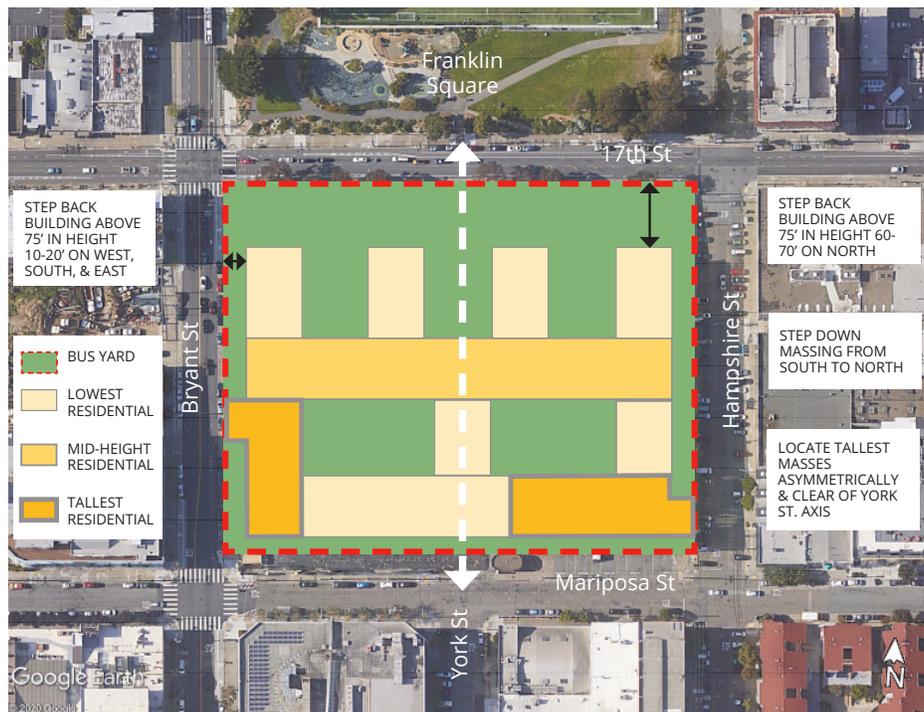


Figure 8. Diagram, which is based on the Reference Concept, illustrates the bulk requirements.

# The New Potrero Yard Design Guidelines

Use open spaces to modulate the building massing and use the building massing to shape open spaces that optimize solar exposure and protection from prevailing winds.

Open spaces, including those on the roof of the bus yard, should be attractive spaces for enjoying the outdoors, gathering, and recreation.

Provide separate open space areas that are easily accessible by the SFMTA employees and housing residents.

Open spaces should be visible and well illuminated with no hidden corners and should have seating and other elements, including a children's play area to enliven them. Locate seating in sunlit and shaded areas that are protected from wind.

Integrate landscape and stormwater management into the open space design. Support water and local biodiversity conservation by using San Francisco Bay Area native plant species and consider creating a pollinator habitat.



Figure 9. Housing podium open space with mix of seating areas. Example: Dr George W. Senior Residence & Senior Center, San Francisco, CA.



Figure 10. Open space with mix of private and shared spaces. Example: Avalon Dogpatch, San Francisco, CA.



Figure 11. Open space with mix of seating areas and landscaping. Example: Family House, San Francisco, CA.

# The New Potrero Yard Design Guidelines

## 3.3 Wall and Roof Treatment

The overall design should be a unified and cohesive composition that has a hierarchy and rhythm of architectural elements that have a pedestrian scale, provide visual interest, and are compatible with the surrounding context.

The design shall not have long expanses of flat, undifferentiated, or blank walls. Articulate the overall building massing into separate volumes and modulate these volumes with different materials and features such as recesses, bay windows, balconies, cornices, etc. The building articulation shall not rely on the use of surface applied elements, but use volumetric massing to create a hierarchy and rhythm that has a richness suitable to the surrounding neighborhood.

Differentiate bus, residential, and commercial components within the overall composition by the use of different materials, opening patterns, and/or features. Materials should be durable with an integral color such as concrete, masonry, glass, or factory finished metals.

Integrate wind mitigation measures into to the overall design.

The color scheme should be unified and enduring, but not bland. For example the bus yard accents could use the SFMTA and Muni color palette and the residential accents could reflect the Mission neighborhood's rich and varied color palette.

Design all facades and roofs with care and consistency. Consider approaches, such as views into the bus yard and public art installations, to supplement active ground-floor uses and provide visual interest on all four facades, including the Hampshire Street facade.



Figure 12. Unified composition with hierarchy and rhythm of architectural elements. Example: 1100 Ocean Avenue, San Francisco, CA.



Figure 13. Variations of materials and planes provides visual interest. Example: Drs. Julian + Raye Richardson Apartments, San Francisco, CA.



Figure 14. Bay window tile color derived from local color accents. Example: La Fenix at 1950 Mission, San Francisco, CA.

# The New Potrero Yard Design Guidelines

Also consider ways to treat the building corners, especially the corners on Bryant Street. For example a commercial use at the development's northwest corner at Bryant and 17th Streets could activate this location and link active uses on Bryant and Mariposa Streets.

Provide intentional facade terminations at the bus and the residential roof lines and use these to reinforce the building massing and design intent. Use bus yard facade terminations to help define the predominant streetwalls.

The Project roofs will be visible from near and far vantage points and should be considered the “fifth facade”. Both occupied open spaces and unoccupied roofs should be designed with care. Consolidate rooftop equipment in fully screened areas and integrate these into the overall design.



Figure 15. Stacking elements creates a rhythm and glazed ground floor engaging entry. Example: 1601 Mariposa St., San Francisco, CA.



Figure 16. Mix of rich materials and elements creates visual interest and configuration a strong indoor-outdoor connection. Example: Five88 Mission Bay Blvd., San Francisco, CA.

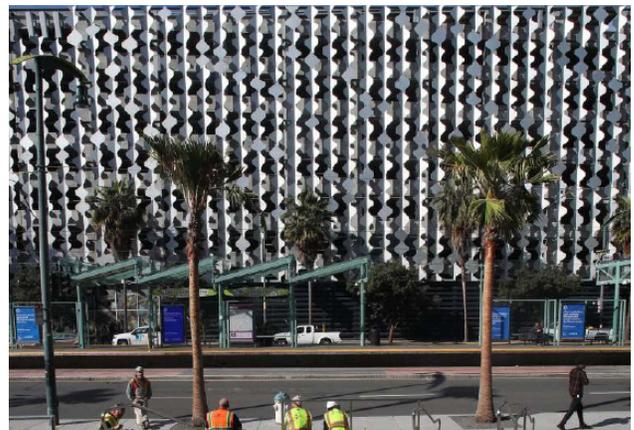


Figure 17. Porous facade. Example: 1630 Third St Parking Structure, San Francisco, CA.

# The New Potrero Yard Design Guidelines

## 3.4 Lighting, Signage, and Public Art

Carefully integrate lighting, signage, public art, and other elements into the building design.

Lighting should be provided to support pedestrian comfort and safety along sidewalks and throughout open spaces. Lighting should provide general illumination and highlight pedestrian entrances, storefronts, and bus entrances and exits. Lighting should be shielded to mitigate light pollution.

Signage should be provided to aid in way-finding, but it should not be the primary means to identify entrances. Signage should be integrated into entrances and storefronts, and be made of high quality and durable materials. Rectangular internally illuminated signs surface mounted to the building walls are not allowed. Consider ways to creatively incorporate the SFMTA and Muni logos and color palettes into the bus yard signage.

The Project has a public art requirement. While developing the design concept, consider opportunities to incorporate public art that celebrates—without being kitschy—the SFMTA’s bus operations and the neighborhood’s rich history and arts community as well as other ideas that the San Francisco Arts Commission (SFAC) may identify. Work with the SFAC and the artist(s) to thoughtfully integrate public art into the Facility and/or streetscape design.



Figure 18. Lighting and signage integrated into entrance design. Example: Family House, San Francisco, CA.



Figure 19. Art mural. Example: Vida Building, San Francisco, CA.



Figure 20. Art installation. Example: Kinetic Umbrellas, Project Artaud, San Francisco, CA.

# The New Potrero Yard Design Guidelines

## 3.5 Ground Floor Uses

The bus yard, residential, and commercial entrances should be located as described in Section 3.1 and should be easily seen and distinguished from one another.

- As described in the Better Streets Plan and Guidelines ([www.sfbetterstreets.org](http://www.sfbetterstreets.org)) the design of the ground floor uses and right-of-way, including allowance of curb cuts and placement of utilities, has significant impact on the street environment. Decisions regarding street design must consider and prioritize pedestrian safety, enjoyment, and comfort. Reducing driveways reduces the number of conflict points between pedestrians and vehicles and can dramatically improve safety. Maximum widths of industrial curb cuts serving two-way traffic should be 32 feet, though exceptions are permissible if bus or delivery vehicle turning templates require additional width due to the adjacent public street dimension. Where possible, curb cuts should be separated by a minimum dimension of 5' to provide safe waiting space for pedestrians. Vehicular entrances and exits should be kept to the minimum required for efficient and safe operations and should have a warning system. No more than four curb cuts with a total width of 230' shall be allowed on Mariposa Street, and less is desired. In addition one 32 foot wide curb cut for a second floor emergency bus exit shall be allowed.
- Bus and loading vehicular entrances and exits should have a warning system.
- The bus yard pedestrian entrance for the SFMTA employees and visitors should be easily identified to foster identity and way-finding.
- Residential entrance lobbies should be inviting and expressed prominently at the building exterior to foster identity and way-finding.
- Commercial spaces should have inviting storefronts with clear or lightly tinted glazing, high ceilings, and layouts that are flexible to support retail shops, cafes, small scale PDR, and/or community services such arts or educational spaces. The storefront entrances should be at grade and engage the sidewalk so that activity can spill out onto the sidewalk to support typical operations, special events and circumstances such as Covid-19.
- Pedestrian entrances should have weather protection and be well illuminated.
- Emergency exit alcoves should be integrated with entrance and storefront alcoves where possible. Any equipment rooms that must front the sidewalk should be integrated into the overall design.
- Where the bus yard fronts the sidewalk, provide views into the bus yard for visual interest.



Figure 21. Bryant Street frontage illustration prepared for community engagement planning workshop to show possible Project attributes.

# The New Potrero Yard Design Guidelines

## 4 Streetscape Design Guidelines

The SFMTA led the passage of the The San Francisco Better Streets Plan which aims to improve the quality and character of sidewalks and streets and make them more usable, greener, and safer for all modes of travel.<sup>7</sup>

The plan identifies Bryant, 17th, Hampshire, and Mariposa Streets as mixed-use streets that should have 15 foot wide sidewalks with (building) frontage, through-way, furnishing and (curb) edge zones. In addition 17th Street, which has a bike lane, is a green connection street that links parks, the waterfront, and open space and Hampshire Street is used by bicyclists as an alternative to the busier Bryant Street.<sup>8</sup>

As the City's policy leader and implementer of award-winning streetscapes, the SFMTA is committed to excellent streetscape design. The streetscape should be an exemplar of design that:

- Enhances the Project vision and building design and supports and augments active ground-floor uses.
- Supports SFMTA fleet usage and fosters bicycle and pedestrian activity and safety.
- Integrates sidewalk elements to create a safe, convenient, and inviting public realm

<sup>7</sup> Mayor Gavin Newsom's introductory letter to the Better Streets Plan:  
[https://sfplanning.org/sites/default/files/archives/Better-Streets/docs/Better-Streets-Plan\\_Final-Adopted-10-7-2010.pdf](https://sfplanning.org/sites/default/files/archives/Better-Streets/docs/Better-Streets-Plan_Final-Adopted-10-7-2010.pdf), accessed 09/08/2023

<sup>8</sup> Planning Department's Green Connections Final Plan:  
<https://sfplanning.org/project/green-connections>, accessed 09/08/2023

<sup>11</sup> SF Better Streets | A guide to making street improvements in San Francisco:  
<https://www.sfbetterstreets.org/>, accessed 09/08/2023



Figure 22. Streetscape zones. Example: San Francisco, CA.



Figure 23. Streetscape with cafe seating in frontage and furnishings zones. Example: San Francisco, CA.



Figure 24. Streetscape with bike racks, street trees, and parking meters integrated in furniture zone. Examples: San Francisco, CA.

# The New Potrero Yard Design Guidelines

and needed outdoor space due to Covid-19.

Provide at least one bike parking area and one seating area on each frontage. Locate these in relation to the bus yard and residential entrances and the commercial storefronts and to maximize physical comfort considering solar orientation, wind, and noise.

Provide, in accordance with the San Francisco Street Design Advisory Team (SDAT) recommendations, bulb outs, pedestrian ramps, residential loading zones for pick-up/drop-off and package delivery, pedestrian lighting to enhance pedestrian access and safety.

Preserve healthy mature street trees where possible and provide new street trees that will have minimal impact on the trolley bus overhead contact system (OCS) where appropriate.

Integrate stormwater management into the streetscape and support water and local biodiversity conservation by using San Francisco Bay Area native plant species.

Consider opportunities to integrate public art into the streetscape.

Carefully design sidewalks to reduce clutter and integrate signage, lighting, bike racks, seating, landscaping, stormwater management, and possible public art. Consolidate OCS, lighting, and signage poles or replace OCS poles with catenary attached to the building.



Figure 26. Parklet with planter that provides a buffer from street traffic. Example: San Francisco, CA.



Figure 27. Public art bench. Example: Chinatown, San Francisco, CA.



Figure 25. Special Tree Grates. Example: Valencia Street, San Francisco, CA.

# The New Potrero Yard Design Guidelines

The SFMTA is committed to encouraging sustainable modes of travel. The Project will include a robust Transit Demand Management (TDM) program. Transit Demand Management (TDM) elements that support active (walking and biking) and high occupancy vehicle transportation (bus, shuttle, van pool) use should be located for easy access and use and integrated into the design, rather than added as an afterthought.



Figure 29. Bike Storage, Example: Ashby BART Station



Figure 28. Mariposa Street frontage illustration prepared for community engagement planning workshop to show possible Project attributes.

- 1 SFMTA lobby
- 2 Bus maintenance entrance
- 3 SFMTA office and training
- 4 Internalized bus circulation
- 5 Allow visibility (pedestrian safety)
- 6 Improved streetscape

---

# Division 3: Design Criteria Document



# Potrero Yard: 3-Level Bus Facility Design Criteria Document

San Francisco Municipal  
Transportation Agency

October 2024





# INTRODUCTION



<b>TABLE OF CONTENTS</b>
--------------------------

## Table of Contents

<b>Section 1</b> - Introduction
<b>Section 2</b> - Space Needs Program
<b>Section 3</b> - Design Criteria Narrative
<b>Section 4</b> - Performance Requirements
<b>Section 5</b> - Requirements for Bus Yard Component Space Modules
<i>Section 5.1 - Office Modules</i>
<i>Section 5.2 - Parking</i>
<i>Section 5.3 - Bays and Shops</i>
<i>Section 5.4 - Fare Box and Clipper Card Reader Repair Shop</i>
<i>Section 5.5 - Service and Clean</i>
<i>Section 5.6 - Parts</i>
<i>Section 5.7 - Maintenance - Administration</i>
<i>Section 5.8 - Operations - Administration</i>
<i>Section 5.9 - Transit Services (MRO)</i>
<i>Section 5.10 - Shared</i>
<i>Section 5.11 - Training</i>
<b>Appendix A</b> - 3-Level Maintenance Equipment Manual
<b>Appendix B</b> - SFMTA OCS Design Criteria
<b>Appendix C</b> - SFPUC Application for Electrical Service (For Reference)
<b>Appendix D</b> - Traction Power Feeder Map
<b>Appendix E</b> - Sample Route Schedules
<b>Appendix F</b> - Security Sensitive Information Process Regarding Traction Power Standard Specifications
<b>Appendix G</b> - Design Criteria Paratransit (For Reference)
<b>Appendix H</b> - PG&E System Impact Study Report for Mixed Use Service Application (For Reference)
<b>Appendix I</b> - SDAT Review Letter 1.19.2023 (For Reference)
<b>Appendix J</b> - Geotechnical Baseline Report

Abbreviations		ABBREVIATIONS	
A	= Amperes	Btu	= British Thermal Unit
AABC	= Associate Air Balance Council	CA	= Compressed Air
AAMA	= American Architectural Manufacturer Association	CAL	= California Green Building Standards Code
AC	= Air Conditioning	Green	= California Green Building Standards Code
AC/DC	= Alternate Current/Direct Current	CAT	= Collision Avoidance Technologies
ACS	= Access Control Server	CBC	= California Building Code
ADA	= American Disabilities Act	CCTV	= Closed Circuit Television
AEP	= American Electric Power	CE	= Computer Equipment
AFF	= Above Finished Floor	CEC	= California Energy Code
AHJ	= Authority Having Jurisdiction	CF	= Contractor Furnished
AHRI	= Air conditioning Heating & Refrigeration Institute	CFC	= California Fire Code
AISC	= American Institute of Steel Construction	CFM	= Cubic Feet Per Minute
AISI	= American Iron & Steel Institute	CFR	= Code of Federal Regulations
Alum	= Aluminum	CG	= Chassis Grease
AMCA	= Air Movement & Control Association	CI	= Contractor Installed
ANSI	= American National Standards Institute	Circ	= Circulation
ANSI/		CMC	= California Mechanical Code
AWC	= American National Standards Institute/ American Wood Council	CMU	= Concrete Masonry Unit
ANSI/		CO	= Carbon Monoxide
IWCA	= American National Standards Institute/ International Window Cleaning Association	CO2	= Carbon Dioxide
ASCE	= American Society of Civil Engineers	COMM	= Communication
ASCE/		CPAA	= Concrete Polishing Association of America
SEI	= American Society of Civil Engineers/ Structural Engineering Institute	CPC	= California Plumbing Code
ASHRAE=	American Society of Heating and Refrigeration Association of Engineers	CPVC	= Chlorinated Polyvinyl Chloride
ASJ	= All Service Jacket	C.R.	= Changing Room
ASME	= American Society of Mechanical Engineer	CSA	= Civil Structural Architectural
ASTM	= American Society for Testing & Materials	CWA	= Common Work Area
ATF	= Automatic Transmission Fluid	DASMA	= Door and Access Systems Manufacturers Association
AWWA	= American Water Works Association	dB(A)	= Decibels, A-Weighted
BACnet	= Building Automation and Control Network	DC	= Direct Current
BAS	= Building Automation System	DCM	= Design and Construction Management
BEB	= Battery Electric Buses	DCOF	= Dynamic Coefficient of Friction
BICSI	= Building Industry Consulting Service International	DCD	= Design Criteria Document
BRBF	= Buckling Restrained Brace Frame	DDC	= Direct Digital Controls
		DEF	= Diesel Exhaust Fluid
		Demo	= Demolition
		Div	= Division
		DX	= Direct Expansion
		EC	= Engine Coolant
		EFCO	= Economy Forms Company
		Elec	= Electrical
		EMCS	= Energy Management Control System
		EMS	= Energy Management System
		EMT	= Electrical Metallic Tubing
		EO	= Engine Oil
		EPDM	= Ethylene Propylene Diene Monomer
		ESFR	= Early Suppression Fast Response
		EV	= Electric Vehicle
		fc	= Foot Candle
		f'm	= Compressive Strength
		F/Btu	= Fahrenheit/British thermal unit
		FACP	= Fire Alarm Control Panel
		FDC	= Fire Department Connection
		FEVE	= Fluoroethylene Vinly Ether
		FPS	= Feet Per Second
		fy	= Force to Yield
		GFI	= Ground Fault Interrupter
		GO	= Gear Oil
		GPF	= Gallons Per Flush
		GPM	= Gallons Per Minute
		GSF	= Gross Square Feet (within the exterior face of exterior walls)
		GS6	= General Schedule 6 Form
		H2	= Hydrogen
		H2O	= Water
		HCFC	= Hydrochlorofluorocarbon
		HDPE	= High Density Polyethylene
		HET	= High Efficiency Toilet
		HFHC	= Hydrochlorofluorocarbons
		HO	= Hydraulic Oil
		HP	= Horse Power
		HPC	= High Performance Computing
		HVAC	= Heating, Ventilation and Air Conditioning
		IBC	= International Building Code
		ICC	= International Code Council
		IFC	= Industry Foundation Classes
		IGMAC	= Insulating Glass Manufacturers Association of Canada
		IGCC	= Insulating Glass Certification Council
		IDF	= Intermediate distribution frame
		IES	= Illuminating Engineering Society
		IPLV	= Integrated Part Load Value
		J-STD	= Joint Standard

ABBREVIATIONS			
Abbreviation			
K	=	1,000 Pounds	OC = Overhead Cabinet
ksi	=	Kilopound per square inch	OCS = Overhead Contact System
kVA	=	kiloVolt Ampere	OF = Owner Furnished (same as City Furnished, in all instances)
LAN	=	Local Area Network	OI = Owner Installed (same as City Installed, in all instances)
lb	=	Pound	OSHA = Occupational Safety and Health
LCC	=	Low Cost Carriers	OS&Y = Outside Stem & Yoke
LED	=	Light Emitting Diode	PA = Public Address
LEED	=	Leadership in Energy and Environmental Design	PC = Personal Computers
LEL	=	Lower Limit Explosive Limit	PCI = Pre-Construction Information
LLWA	=	Lower Level Work Area	PDA = Preliminary Development Agreement
LSIG	=	Long time, short time, instantaneous, ground	PDI = Plumbing and Drainage Institute
Max	=	Maximum	PDI-WH = Plumbing and Drainage Institute-Wall Hydrant
MaP	=	Maximum Performance	PDR = Production Distribution Repair
MCB	=	Motor Coach Buses	PES = Portable Equipment Storage
MDF	=	Main Distribution Frame	PLC = Programmable Logic Controller
Mech	=	Mechanical	PM = Preventive Maintenance
MERV	=	Minimum Efficiency Reporting Value	PPC = Principal Project Company
MIG	=	Metal Inert Gas	PPG = Pittsburgh Plate Glass Company
Min	=	Minimum	PROM = Programmable Read-Only Memory
MME	=	MUNI Metro East	PS = Power Steering
MOH	=	Friedrich Mohs scale of mineral hardness	psf = pounds per square foot
MPOE	=	Main Point of Entry	PSI = Pounds Per Square Inch
MR	=	Low temp liquid, emulsion, vapor, permeable air membrane	PSIG = Pounds Per Square Inch Gauge
MRO	=	Maintenance, Repair, & Operations	PVC = Polyvinyl Chloride
MSS	=	Manufacturers Standardization Society	PVDF = Polyvinylidene Fluoride
MTC	=	Main Telecommunication Center	RDC = Reference Design Concept
MS/TP	=	Master Slave/Token Passing	RFID = Radio-Frequency Identification
MUD	=	Mixed Use Development	RFP = Request For Proposal
MW	=	Megawatt	RLWP = Roof Level Work Platform
NEBB	=	National Environmental Balance Bureau	SCADA = Supervisory Control and Data Acquisition
NEC	=	National Electric Code	SDI = Steel Door Institute
NEMA	=	National Electrical Manufacturers Association	sf = Square Feet
NFPA	=	National Fire Protection Association	SFFD = San Francisco Fire Department
NFRC	=	National Fenestration Rating Council	SFPUC = San Francisco Public Utilities Commission
NO2	=	Nitrogen Dioxide	SGCC = Safety Glazing Certification Council
NRCA	=	National Resources Conservation Authority	SHGC = Solar Heat Gain Coefficient
			SNMP = Simple Network Management Protocol
			STC = Sound Transmission Class
			Struc = Structural
			TABB = Testing, Adjusting, and Balancing Bureau
			TB = Trolley Buses
			TBD = To Be Determined
			TBS = ToolBox Storage
			TC = Task Chair
			TCNA = Tile Council of North America
			TCP/IP = Transmission Control Protocol/Internet Protocol
			TIA/EIA = Telecommunication Industries Association/Electronic Industries Alliance
			TIG = Tungsten Inert Gas
			TMS = The Masonry Society
			TPO = Thermoplastic Polyolefin
			TPSS = Traction Power Substation
			TR/TC = Telecommunications Room/Telecommunications Closet
			Typ = Typical
			UC = Used Coolant
			UL = Underwriters Laboratories
			UNO = Unless Noted Otherwise
			ULWP = Upper Level Work Platform
			UO = Used Oil
			UPS = Uninterruptible Power Supply
			USGBC = United States Green Building Council
			UV = Ultraviolet
			V = Volts, Alternating Current
			VAV = Variable Air Volume
			VCT = Vinyl Composite Tile
			VFD = Variable Frequency Drive
			VLAN = Virtual Local Area Network
			VLM = Vehicle Lift Module
			VOC = Volatile Organic Compound
			VSS = Video Surveillance System
			W = Water
			WAN = Wide Area Network
			WC = Water Closet
			WDMA = Window and Door Manufacturers Association
			wg = Water gauge
			WWF = Windshield Washer Fluid

## SECTION 1 - INTRODUCTION

## 1.0 INTRODUCTION

The San Francisco Municipal Transportation Agency (SFMTA) has engaged a consultant team led by Hatch Associates Consultants (the Hatch Team) to analyze the feasibility of developing non-transit uses above or adjacent to the SFMTA's bus maintenance and storage yards. The Potrero Yard Bus Facility Design Criteria Document has initially focused on joint development opportunities at the Potrero Yard, which will be the first of the SFMTA's older bus yards to be rebuilt.

SFMTA has directed that any joint development at Potrero Yard must not impede the core transit function of the facility if rebuilt. The integration of joint development with the reconstruction of the Potrero Yard has been an integral part of these activities and also for the Project's procurement.

Potrero Yard (located at 2500 Mariposa Street in the Mission District and opened in 1915) currently serves as one of two SFMTA Electric Trolley Bus (Trolley Bus) Operations and Maintenance facilities. The existing two-level facility includes bus parking, service (fare recovery and wash lane), and a ten-lane maintenance facility at grade, accessed via Mariposa Street. The second level includes bus operations space, non-revenue vehicle parking, trolley bus parking, a tire bay/shop, and a body bay/shop accessed via 17th Street. The Potrero Yard Modernization Project will demolish the existing facility and construct a new, expanded bus maintenance and operations facility on the site. The new facility will serve the existing Trolley Bus Fleet and will be the SFMTA's first purpose-built battery-electric bus facility. The facility will also house the SFMTA's transit operator training classrooms, as well as Street

Operations, the SFMTA's street incident response team.

The Design Criteria Document prescribes technical, functional, and performance requirements for the Potrero Yard Bus Component's building systems including architectural, civil, structural, equipment, mechanical, electrical, and plumbing. This document is attached to the Potrero Yard Division 3 (*Design Criteria Document*) of the Technical Requirements. The Design Criteria Document was prepared by transit design specialist HDR | Maintenance Design Group (HDR | MDG) in close coordination with urban design specialist SITELAB Urban Studio, transit operations specialist CHS, and real estate advisory firm Hatch (the Hatch team). Technical building and building system requirements for the Housing and Commercial Component are not addressed here, but can be found in Divisions 4 (*Design Criteria for the Housing and Commercial Component*) and Division 6 (*Program for the Housing and Commercial Component*) of the Technical Requirements.

## 1.1 Sources Consulted

The Bus Facility Design Criteria Document is informed by discussions with the SFMTA subject matter experts during the Potrero Yard Design Charrette held on January 31 through February 2, 2018 as well as the Hatch Team's review of the following studies, reports, and analyses prepared by or on behalf of the SFMTA.

- SFMTA Facilities Framework Addendum (10/6/17)
- SFMTA Master Plan Report (7/28/17)
- SFMTA Transit Fleet Management Plan (2014, amended 2017)
- SFMTA Zero Emission Bus Rollout Plan (2021 draft)

Follow up in-person interviews with the SFMTA also took place in September 2018 and December 2018, with a conference call also held in November 2018. Between 2018 and publication in 2021, SFMTA staff were consistently consulted to finalize details and review drafts of this document.

## 1.2 Design

Following in-depth discussions with SFMTA staff on required bus program, overlain with HDR's industry best practices recommendations, the SFMTA and the Hatch team produced a Reference Design Concept (RDC) that is generally consistent with the Technical Requirements which is Document 1 (*Reference Design Concept*) of the Reference Documents. The RDC is one expression of general conformance to this Design Criteria Document.

Tables 1.A and 1.B identify the quantitative capacity of bus fleet vehicles and square footage summaries in the RDC. All required bus storage programming numbers are based on a design capacity representing the bus storage number the facility can accommodate using parking spaces and several (approximately half) of maintenance bays. The SFMTA refers to this design capacity methodology as "planning capacity." Table 1.A lists the 2030 programming bus capacity numbers. Table 1.B contains the 2030 overall programming square footage numbers.

The following is a list of Design Principles established during planning:

- Minimize impact of bus circulation on the neighborhood.
- Provide improved efficiency and seismic performance.

SECTION 1 - INTRODUCTION

TABLE 1.A - POTRERO YARD PROGRAM SUMMERY AT SUBSTANTIAL COMPLETION OF THE INFRASTRUCTURE FACILITY\*

	TROLLEY BUS		TOTAL	MAINT.	BUS : BAY
	40'	60'	BUSES	BAYS	RATIO***
Potrero Bus Yard	153	93	246	13	19

\*All figures are planning capacities and represent the fleet mix at Potrero Yard when the Yard is completed in 2026. The fleet mix will ultimately transition to 100 percent battery electric.

\*\*\*Ratio is total for all Repair Bays and Preventive Maintenance Bays based on a ratio of 17:1. Does not include speciality bays like tire bay, body bay, and chassis wash bay.

TABLE 1.B - REFERENCE DESIGN CONCEPT PROGRAM SUMMARY AREA (SF)

	PARKING	MAINT. BAY/SHOPS	SERVICE & CLEAN	PARTS	MAINT. ADMIN	OPS.	TRANSIT SVCS.	SHARED	TRAINING	BODY/ PAINT	TOTAL
Potrero Bus Yard	299,215	48,252	10,921	8,806	9,423	14,017	8,519	15,390	17,819	---	432,362

- Promote mixing and socializing across divisions.
- Provide well laid out Dispatch and check-in spaces.
- Facilitate good relationship between operators, supervisor, and dispatch spaces.
- Enhance ability for on-time pull-out.
- Provide flexibility in bus parking and crush capacity.
- Enhance good communication between functional areas.
- Efficient and safe movements of vehicle and pedestrians.
- Incorporate daylight as much as possible given the site and building constraints.
- Create good line of sight from Dispatch to pull-in and pull-out of buses, including design options such as:
  - ✓ Windows with direct or indirect views of interior bus operations.
  - ✓ Use of technology such as cameras for improved security and more efficient operations.

- Utilize durable, easy to clean casework.
- Provide adequate lockers and space – well lighted and ample clearance between lockers.
- Provide a facility that is welcoming, uncluttered, appreciated, presents a discrete public face, and instills employee pride and ownership

1.3 Report Overview

This Bus Facility Design Criteria Document consists of five sections, which are described briefly here.

*Section One - Introduction.* This section describes the background of the project and provides an overview of the Bus Facility Design Criteria Document.

*Section Two - Space Needs Program.* This section presents a detailed listing of space requirements for Parking, Bays and Shops, Service and Clean, Parts, Maintenance, Operations, Shared Areas, and Training.

Programmed spaces are further defined by their quantity, area, and any remarks significant

to design. Information began and then was updated using information from the 2017 SFMTA Facilities Framework Addendum, published in October 2017.

*Section Three - Design Criteria Narrative.* This is the first of two design criteria sections. The Design Criteria Narrative presents a narrative version of the functional.

*Section Four - Performance Requirements.* This section describes the requirements per design discipline.

*Section Five - Requirements for Bus Yard Component Space Modules.* This is the second of two design criteria sections. This section presents a graphic version of the functional and performance requirements and is organized by functional space as presented in the Space Needs Program.

Appendices:

- Appendix A: Maintenance Equipment Manual
- Appendix B: SFMTA OCS Design Criteria
- Appendix C: SFPUC Application for Electrical Service (For Reference)

**SECTION 2 - SPACE NEEDS PROGRAM**

Appendix D: Traction Power Feeder Map  
Appendix E: Sample Route Schedules  
Appendix F: Security Sensitive Information  
Process Regarding Traction Power Standard  
Specifications  
Appendix G: Design Criteria Paratransit (For  
Reference)  
Appendix H: PG&E System Impact Study  
Report for Mixed Use Service Application (For  
Reference)  
Appendix I: SDAT Review Letter 1.19.2023 (For  
Reference)  
Appendix J: Geotechnical Baseline Report

The Design Team prepared the Design Criteria Document, Maintenance Equipment Manual, Building Drawings, and Equipment Drawings to Reference Design Concept prepared by the SFMTA prior to the Project's procurement, CEQA Project Description, and the basis for the programmatic and functional requirements for the Project's procurement. The Maintenance Equipment Manual is included as Appendix A in this Design Criteria Document.

**1.4 Acknowledgments**

The Hatch Team would like to acknowledge the efforts and contribution of the SFMTA staff members during the development of the design charrette process and input to matters related to the development of the Bus Facility Design Criteria Document. This continued enthusiastic participation and dedication will ensure the realization of the Potrero Yard program.

**SECTION 2 - SPACE NEEDS PROGRAM**

**2.0 INTRODUCTION**

This section presents the Space Needs Program for the Potrero Yard. The Space Needs Program defines the minimum space requirements for efficient operations. The program is summarized at the end of this section, and includes projected square footage needs for building and exterior areas.

All required programming numbers are planning, not crush, capacity. The Space Needs Program was used as the basis to develop the Reference Design Concept that, which is Document 1 (*Reference Design Concept*) of the Reference Documents.

All spaces in the proposed bus yard concept should be within 10% +/- of the programmed square footages listed in Table 2.E.

**2.1 Staff Summary**

Minimum facility staffing levels that are either required or planned by the SFMTA are crucial to planning efforts when determining the size of support facilities and developing occupancy levels. Table 2.A shows the summary of facility staffing levels.

**2.2 Vehicle Parking Summary**

The following Table 2.B is the summary of vehicles.

**TABLE 2.A - POTRERO YARD PROGRAM STAFFING SUMMARY AT SUBSTANTIAL COMPLETION OF THE INFRASTRUCTURE FACILITY\***

Function	Potrero Staff
Bays & Shops	10
Service & Clean	37
Parts	21
Maintenance - Administration	10
Mechanics & Technicians	90
Operations - Administration	22
Operators	684
Transit Services	192
Shared	1
Training	63
<b>TOTAL</b>	<b>1,130</b>

**TABLE 2.B - POTRERO YARD PROGRAM VEHICLE SUMMARY AT SUBSTANTIAL COMPLETION OF THE INFRASTRUCTURE FACILITY\***

Function	Scenario 1 Potrero Vehicles
40' Bus	153
60' Bus	93
Large Non-Rev Vehicle	5
Standard Non-Rev Vehicle	84
Transit Services	68
<b>TOTAL</b>	<b>403</b>

\*All figures are planning capacities

\*\*An estimated 10-20 NRV spaces may be considered for BYC Transportation Demand Management programming

<sup>1</sup>The square footages in the Drawing Package may not match exactly those of the Program, but the Program has guided the formulation of the Drawing Package.

**SECTION 2 - SPACE NEEDS PROGRAM**

**2.3 Planning Ratio**

Table 2.C lists only the key/major planning ratios. For a complete list of the square footages for each type of use, refer to the Space Needs Program in Table 2.E.

TABLE 2.C - PLANNING RATIO	
SPACE	RATIO OR SPACE STANDARDS*
Bus Repair Bay (20' x 75')	1 bay for every 20 buses to be maintained
Preventive Maintenance (PM) Bay (20' x 75')	1 bay for every 50 buses to be maintained
Tire Bay (20' x 75')	1 bay for every 125 buses to be maintained
Minor Body Repair Bay (20' x 75')	1 per facility
Chassis Wash Bay (25' x 75')	1 bay for every 200 buses to be maintained
Service Position (20' x 70')	1 bay for every 75 buses
Bus Washer (20' x 100')	1 bay for every 150 buses
Water Reclamation (15' x 60')	1 per facility, handles multiple bus washers
Tool Box Storage	24 square feet (sf) per Maintenance Technician
Tire Storage	5 sf per bus for 1 tire per bus
Parts Storage	20 sf per bus with High Density Storage System

\*For Potrero Yard, all bays are designed to be used by both 40' and 60' buses.

**SECTION 2 - SPACE NEEDS PROGRAM**

**2.4 Space Standards**

Space standards were applied to the Space Needs Program and generally apply to the Offices, Shops, Bays, and Vehicle Parking Areas. Area requirements in Shops and Storage Areas were derived from functional requirements and equipment space needs. The space standards listed are the minimum required space square footages. The space standards listed in Table 2.D were utilized to develop the facility program and overall area requirements. The space standards are based on functional needs and requirements.

TABLE 2.D - SPACE STANDARDS	
AREA	SIZE
<b>SHOPS &amp; STORAGE:</b>	
Common Work Area	500 sf
Trolley Bus Electronics Shop	1,000 sf
Portable Equipment Storage	600 sf
Tool Storage	150 sf
Tire Shop	600 sf
Lube Room	400-600 sf
Compressor Room	200 sf
Bench Shop	300 sf
Cleaning Equipment Storage	200 sf
Battery Storage	200-300 sf
Parts Window	200 sf
Shipping and Receiving	600 sf
Loading Dock	900 sf (15 x 60)
<b>PARKING:</b>	
40' Transit Bus	540 sf (12 x 45)
60' Bus	780 sf (12 x 65)
Large Non- Revenue Vehicles	420 sf (12 x 35)
Standard Non-Revenue Vehicles	200 sf (10 x 20)
<b>CIRCULATION:</b>	
Aisles for 90 degrees turns	65' turning into parking lanes or service
Aisles for 90 degrees turns	70' turning into maintenance bays
Bypass Lane	20' wide
One Way Ramp	15' wide
Forklift Circulation	10' wide

**SECTION 2 - SPACE NEEDS PROGRAM**

**2.5 Circulation Factors**

Circulation factors have been applied to interior building spaces; exterior circulation is unnecessary as the Potrero Yard will occupy the entire site. The space requirements shown for each function are net usable area.

**2.6 Interior or Building Circulation**

Circulation factors are applied to the program as a percentage of the total building square footage. These factors account for miscellaneous building spaces such as hallways, stairwells, wall thickness, structure (Circ/Mech/Elec/Struc - Net:Gross), and access requirements. The following is a list of the minimum required factors that have been applied to the program:

- Parking 75%
- Bays and Shops 20%
- Service and Clean 10%
- Parts 10%
- Maintenance - Admin. 35%
- Operations - Admin. 35%
- Transit Services (MRO) 35%
- Shared 35%
- Training 35%

**2.7 Minimum Design Requirements**

- Total Bus Parking Planning Capacity is 246 trolley buses.
- The full space needs program shall be accommodated on four levels and a basement, to the extend a basement is needed.
- Unique 100 percent drive-through, bus maintenance facility that include:
  - ✓ 70-foot internal drive aisle
  - ✓ Ten Bus Repair Bays
  - ✓ Five PM/Inspection Bays
  - ✓ Tire Bay(s), Shop and Storage

**SECTION 2 - SPACE NEEDS PROGRAM**

- ✓ One Miscellaneous Body Repair Bay
- ✓ Support Shops and Storage Areas,
- ✓ Parts Storage Warehouse with dedicated delivery dock
- ✓ One Bus Washer per bus parking level
- ✓ Dedicated Mechanical Systems Yard with a water reclamation equipment area.
- The top and bottom 40 feet of the ramp shall be a maximum 5 percent slope with the remainder of the ramp at a maximum slope of 10 percent.
- There is vertical space available over shops, offices, and other spaces within the maintenance areas not requiring 20-foot clearances.
- Access to the upper level joint development uses shall be provided via appropriate vertical circulation access points that preserve the SFMTA facility's security and that are safe and functional for the joint development opportunities.
- Bus turning radius has been evaluated within the building. The site and street bus turning radius shall be reviewed for conformance to performance base throughout design and construction.
- The Principle Project Company (PPC) must apply and show turning templates on drawings, and it has to be agreed upon that they are sufficient and work for circulation. SFMTA reserves the right to request a turning simulation to demonstrate that vehicles can maneuver safely if turning template is tight.
- The following uses had been envisioned on the basement and must be included on the site:

- ✓ SFMTA loading
- ✓ Full building waste management and pickup
- ✓ Access to lower-level work areas
- ✓ Car-share spaces
- ✓ No public access
- Staff work areas shall be located in an above-grade, naturally lit location while accommodating the required spaces and adjacencies. To the extent feasible, include access to private outdoor spaces from staff break areas and rest spaces.

**2.8 Space Needs Program & Summary**

A summary of the Space Needs Program is provided below. The summary tables include projected square footage needs for building areas, parking, and staff totals.

These projected space needs are subtotaled into net square footage requirements. The detailed Space Needs Program begins with the identification of each space by name and a space standard (if applicable). The space column represents spaces required to accommodate the fleet and operation for the final build out.

Table 1.B gives an overall square footage for each large area indicated. Table 2.E is a detailed program for each space required. Table 2.E totals are not identical to the actual square footages within the RDC but the design of the RDC was informed by Table 2.E.

The above minimum requirements notwithstanding, the design shall meet all other program, functional, and space requirements within a maximum square footage deviation of ±10% applied to each function as shown in Table 2.E- Space Needs Program.

## SECTION 2 - SPACE NEEDS PROGRAM

**2.9 Battery Electric Bus Fleet Infrastructure**

In accordance with the CA Air Resources Board Innovative Clean Transit legislative mandate, the SFMTA is transitioning its fleet to battery-electric buses. Potrero Yard currently operates a fleet of trolley buses, and the new facility will need to account for the existing fleet, the future battery-electric fleet, and the future transition between the two propulsion technologies.

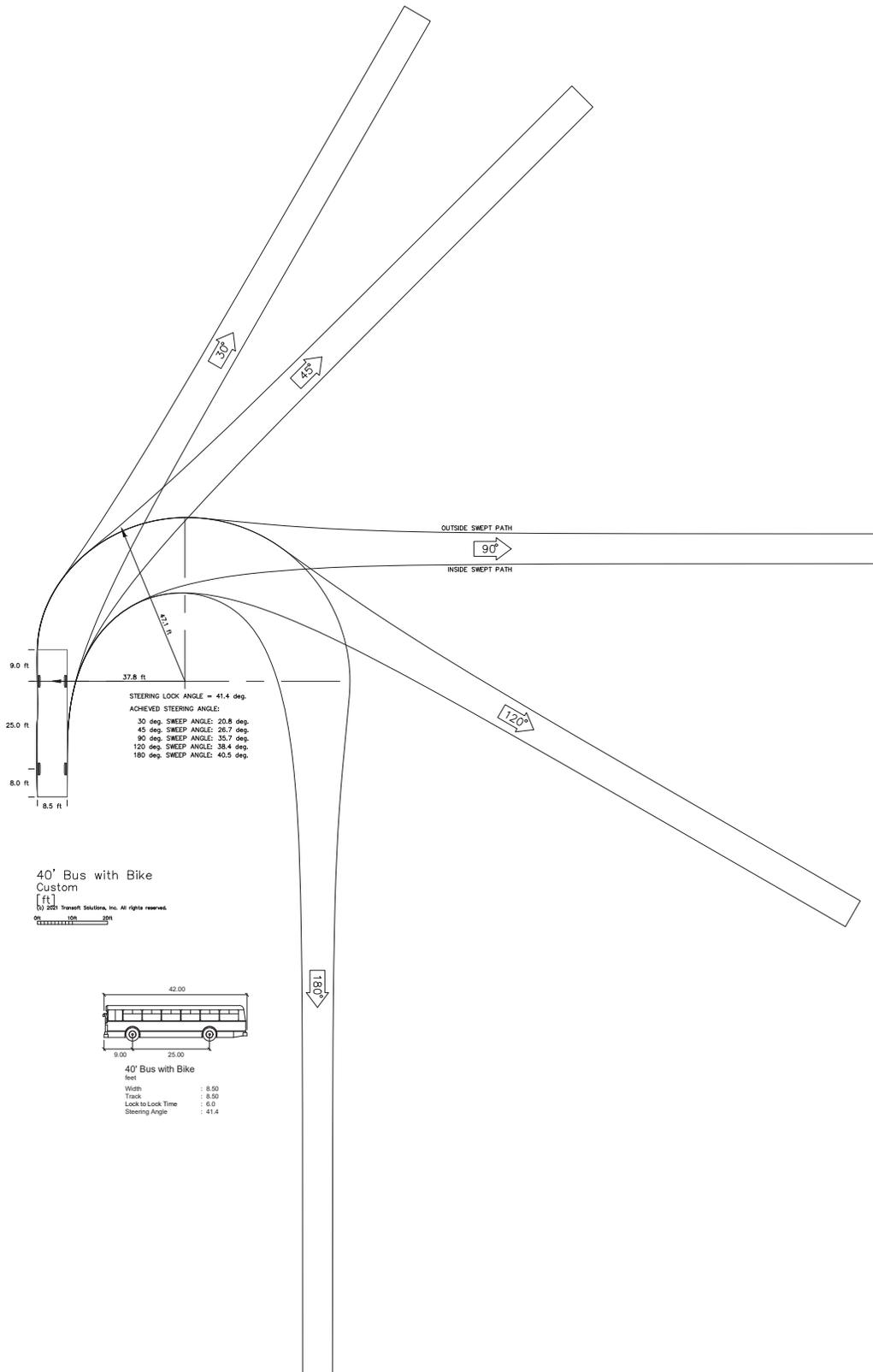
While compliance with this DCD is required and mandated, design and implementation of BEB infrastructure is envisioned as more of a progressive design process. Refer to Division 5 (*Battery-Electric Bus Supplemental Criteria*) of the Technical Requirements for BEB requirements and considerations.

**2.10 Minimum Clearance and Design Requirements**

The following are minimum clearance and design requirements for the different levels of the Bus Yard Component:

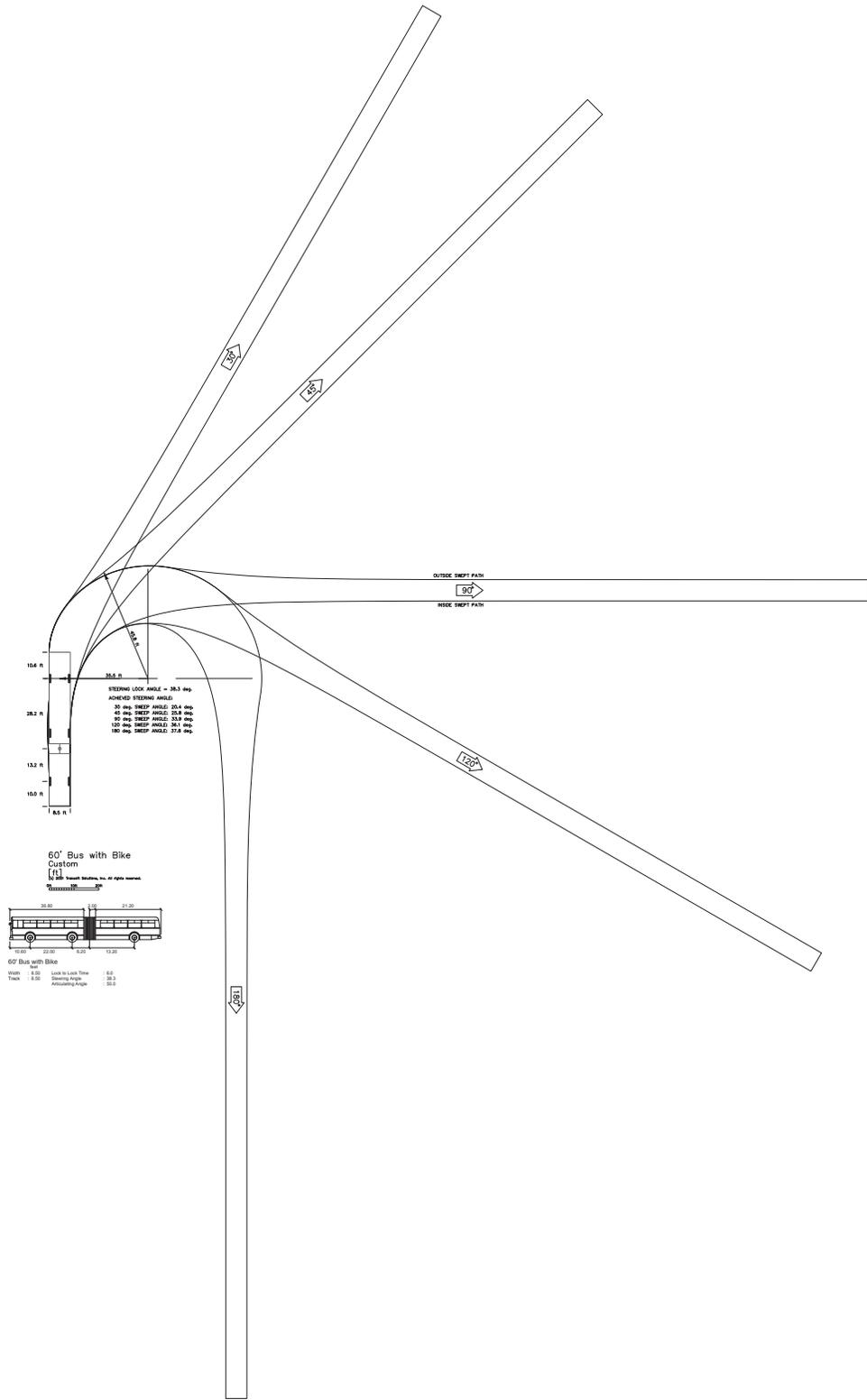
- For the minimum drive aisle for bus turning, see Table 2.D.
- The minimum turning radii for buses is 36'-43', depending on degree of turn. See 40' and 60' turning template models in Exhibits 1 and 2.
- Vertical circulation for under the catwalks is 20 feet.
- The bus floor levels of the Bus Yard Component should be designed for the full bus live load, regardless of whether the floor plans indicate other non-bus uses.
- Vertical clearance listed in the DCD is the minimum clearance height to any structure, system, building components or equipment, or fixtures.

EXHIBIT 1



40' Bus with Bike Rack  
 Scale - 1:20

EXHIBIT 2



60' Bus with Bike Rack  
Scale - 1:30

SECTION 2 - SPACE NEEDS PROGRAM

TABLE 2.E - SPACE NEEDS PROGRAM											
SCENARIO 2 POTRERO											
FUNCTION	SPACE STANDARD			STAFF OR VEHICLES	NUMBER OF SPACES	UNIT SIZE (sf)	SUBTOTAL (sf)				COMMENTS
<b>PARKING</b>											
40' Bus	12	x	45	153	153	540	82,620				The number split between 40' and 60' buses may be modified based on the BEB technology. Reference the E-Bus Performance Requirements Document. Five of these spaces should be provided adjacent to the maintenance bays & shops for down bus parking.
60' Bus	12	x	65	93	93	780	72,540				The number split between 40' and 60' buses may be modified based on the BEB technology. Reference the E-Bus Performance Requirements Document. Five of these spaces should be provided adjacent to the maintenance bays & shops for down bus parking.
<b>TOTAL BUSES</b>				<b>246</b>							
Large Non-Rev Vehicle	12	x	35		5	420	2,100				Operations and maintenance; All non-revenue vehicles will be electric vehicles
Standard Non-Rev Vehicle	10	x	20		84	200	16,800				Operations and maintenance; All non-revenue vehicles will be electric vehicles
Large Non-Rev Vehicle	12	x	35		3	420	1,260				Transit Services (MRO); Sprinter Command Vehicles; All non-revenue vehicles will be electric vehicles
Standard Non-Rev Vehicle	10	x	20		65	200	13,000				Transit Services (MRO); 45 pickups and 20 sedans; All non-revenue vehicles will be electric vehicles
Stationary Engineer Non-Revenue Vehicle	12	x	35		1	420	420				F250 with crew cab
Building Maintenance Non-Revenue Vehicles	12	x	35		3	1,260	3,780				For FIT/B&G
<b>Assignable Area</b>							<b>192,520</b>				
<b>Net: Gross (75%)</b>							<b>336,910</b>				
<b>BAYS &amp; SHOPS</b>											
Running Repair Supervisor	64			3	3	64	192				Workstation, Shared office with PM Supervisor
Control Room - Clerk	64			2	2	64	128				Workstation, Shared Office
Floor Supervisor	64			2	2	64	128				Workstation, Shared Office
Preventive Maintenance Supervisor	64			2	2	64	128				Workstation, Shared Office with RR Supervisor
Electronic Supervisor	64			1	1	64	64				Workstation
60' Bus Repair Bay	75	x	20		10	1,500	15,000				Mix of parallelogram and inground lifts; one shared with Minor Body Repair Bay
60' Bus Preventive Maintenance	75	x	20		5	1,500	7,500				All pit and roof level bays
60' Bus Tire Bay	75	x	20		2	1,500	3,000				Two, if space allows
60' Bus Minor Body Repair	75	x	20		2	1,500	3,000				Shared with a Repair Bay
60' Bus Chassis Wash	75	x	25		1	1,875	1,875				
<b>TOTAL BAYS</b>					<b>20</b>						
<b>TOTAL BAYS &amp; SHOP STAFF</b>					<b>10</b>						

**SECTION 2 - SPACE NEEDS PROGRAM**

TABLE 2.E - SPACE NEEDS PROGRAM												
SCENARIO 2 POTRERO												
FUNCTION	SPACE STANDARD			STAFF OR VEHICLES	NUMBER OF SPACES	UNIT SIZE (sf)	SUBTOTAL (sf)					COMMENTS
Common Work Area					2	500	1,000					
Portable Equipment Storage					2	600	1,200					
Tool Box Storage			24		1	2,160	2,160					Total Mechanics and Technicians listed under Maintenance Admin
Tool Storage					1	150	150					Access off of Shop floor
AC Shop/Storage					1	500	500					
Battery Rebuild Shop					1	500	500					
Tire Shop					1	600	600					
Tire Storage			5		1	1,065	1,065					5 sf per total bus number
Lube Room					1	600	600					
Compressor Room					1	200	200					
Minor Body Shop					1	400	400					With workstation
Electronic Shop Workstations			30		4	30	120					Workstations, adjacent to Electronic Bench Shop
Electronic Bench Shop					1	600	600					Space for six electric benches test equipment space
Telecommunication Room					1	100	100					
<b>Assignable Area</b>							<b>40,210</b>					
<b>Net: Gross (20%)</b>							<b>48,252</b>					
<b>FARE BOX &amp; CLIPPER CARD READER REPAIR SHOP</b>												
This section of the space needs program is not included in the Reference Design Concept. Developer's bus yard design submission must include a Fare Box & Clipper Card Reader Repair Shop.												
Manager				1	1	120	120					Private Office
Fare Box Staff				12	12	64	768					Shared Office with space for shared computers
Incoming & Outgoing Device Storage					1	350	350					
Shop					1	300	300					
Storage					1	200	200					Secure
Parts Storage					1	600	600					
<b>Assignable Area</b>							<b>2,338</b>					
<b>Net: Gross (20%)</b>							<b>2,806</b>					
<b>SERVICE &amp; CLEAN</b>												
Service Supervisor Office			64	2	2	64	228					Shared Office with space for shelves
Service Position	20	x	70		3	1,400	4,200					
Bus Washer	20	x	100		2	2,000	4,000					
Water Reclamation					1	900	900					
Cleaning Equipment Storage					3	200	600					
<b>Assignable Area</b>							<b>9,928</b>					
<b>Net: Gross (10%)</b>							<b>10,921</b>					
<b>CLEANING STAFF</b>												35
<b>CLEANING STAFF TOTAL</b>												37

**SECTION 2 - SPACE NEEDS PROGRAM**

TABLE 2.E - SPACE NEEDS PROGRAM						
FUNCTION	SPACE STANDARD	SCENARIO 2 POTRERO			SUBTOTAL (sf)	COMMENTS
		STAFF OR VEHICLES	NUMBER OF SPACES	UNIT SIZE (sf)		
<b>PARTS</b>						
Parts Supervisor	120	1	1	120	120	Private Office
Parts Lockers	7		15	7	105	
Break Room			1	200	200	
Gender Neutral Restroom				100	100	
Parts Storage	20		1	4,920	4,920	Freight elevator adjacent to Parts Storage. Freight elevator shall have access to all bus levels.
Battery Storage			1	300	300	Adjacent to Parts, temp controlled to 60 degrees
Parts Shopkeeper	64	5	5	64	320	Workstation
Parts Window			1	200	200	
Staging			1	600	600	Located in Basement; secured from any publicly accessible and joint development spaces
Receiving Office			1	300	300	Two workstations, file cabinets, valuable items storage
Shipping & Receiving			1	600	600	
Dock			1	900	900	
<b>Assignable Area</b>					<b>8,665</b>	
<b>Net: Gross (10%)</b>					<b>9,532</b>	
<b>PARTS STAFF</b>			<b>21</b>			

**SECTION 2 - SPACE NEEDS PROGRAM**

TABLE 2.E - SPACE NEEDS PROGRAM						
FUNCTION	SPACE STANDARD	SCENARIO 2 POTRERO			SUBTOTAL (sf)	COMMENTS
		STAFF OR VEHICLES	NUMBER OF SPACES	UNIT SIZE (sf)		
<b>MAINTENANCE</b>						
<b>ADMINISTRATION</b>						
Superintendent	224	1	1	224	224	Private Office
Assistant Superintendent	120	1	1	120	120	Private Office
Senior Controller	120	1	1	120	120	Private Office
Administrative Assistant	64	2	2	64	128	Workstation
Hoteling - Workstation	64	4	4	64	256	Workstation
Support Shop	64	1	1	64	64	Workstation
Copy/Supply			1	120	120	
Records Storage			1	200	200	
Archive Record Storage			1	200	200	
Library/Online Resources			1	172	172	Two - 36 sf Workstations and bookshelves
Telecommunication Room			1	100	100	
Kitchenette/Vending			1	375	375	
Break Room	25		1	1,250	1,250	Sized for 40-50 people
Training Room	25		1	500	500	Sized for 15-20 people
Uniform Alcove	1		147	1	147	
Men's Restroom/Shower			1	1,000	1,000	
Men's Locker	7		147	7	1,029	Total Maintenance and Clean Staff within Restroom/Shower
Women's Restroom/Shower			1	500	500	
Women's Locker	7		37	7	257	25% of total Maint. staff; within Restroom/Shower
Gender Neutral Accessible Locker/Shower/Restroom			1	150	150	
Custodial			1	100	100	
<b>Staff &amp; Assignable Area</b>					<b>7,012</b>	
<b>Net: Gross (Plus 35%)</b>					<b>9,467</b>	
<b>MAINTENANCE ADMIN STAFF</b>		<b>10</b>				
<b>MECHANICS</b>		<b>75</b>				
<b>TECHNICIANS</b>		<b>15</b>				

**SECTION 2 - SPACE NEEDS PROGRAM**

TABLE 2.E - SPACE NEEDS PROGRAM											
SCENARIO 2 POTRERO											
FUNCTION	SPACE STANDARD	STAFF OR VEHICLES	NUMBER OF SPACES	UNIT SIZE (sf)	SUBTOTAL (sf)	COMMENTS					
<b>OPERATIONS</b>											
<b>ADMINISTRATION</b>											
Superintendent		224	1	1	224	224					Private Office
Assistant Superintendent		120	2	2	120	240					Private Office
Operations Supervisor		100	8	1	100	100					1 per 50 operators, huddle space for 4 person meeting. These Operations Supervisors are not included in the Reference Design Concept
Trainer		64	2	2	64	128					Shared Office
Yard Starter Office		120	2	1	120	120					Located at bus exit
Receiver		120	1	1	120	120					Private Office
Dispatch		36	6	4	36	144					Workstation
Administrative Assistant		64	2	2	64	128					Shared Office, Adjacent to Superintendent and Assistant Superintendent
Hoteling - Workstation		64	4	4	64	256					Workstation
Union Office		224	2	1	224	224					Shared Office with 3 workstations
Copy/Supply				1	120	120					
Records Storage				1	400	400					
Uniform Storage				1	80	80					
<b>OPERATORS</b>			<b>684</b>								
Operator Check-In				1	500	500					
Kitchenette/Vending				1	600	600					Separated from the Break Room
Break Room				1	2,000	2,000					Access to exterior space via green space on the roof
Lockers		3		714	3	2,142					Locker for all Operation staff
Locker Changing Area				2	36	72					Located adjacent to Operator Lockers
Recreation Area				1	875	875					
TV Room				1	450	450					
Quiet Room				1	500	500					Dividing wall in center of space; one side for sleeping space and one side for quiet space
Telecommunication Room				1	100	100					
Men's Restroom/Shower				1	870	870					Shower to include changing area
Women's Restroom/Shower				1	870	870					Shower to include changing area
Gender Neutral Accessible Locker/Shower/Restroom				1	150	150					
Custodial				1	100	100					
Staff & Assignable Area			714			11,513					
Net: Gross (35%)						15,543					

**SECTION 2 - SPACE NEEDS PROGRAM**

TABLE 2.E - SPACE NEEDS PROGRAM						
FUNCTION	SPACE STANDARD	SCENARIO 2 POTRERO			SUBTOTAL (sf)	COMMENTS
		STAFF OR VEHICLES	NUMBER OF SPACES	UNIT SIZE (sf)		
<b>TRANSIT SERVICES (MRO)</b>						
Operations Manager	120	2	2	120	240	Private Office
Transit Manager II	64	3	3	64	192	Shared Office
Transit Operations Specialist	64	20	8	64	512	Shared Office
MRO, Street Operations	30	160	10	30	300	Workstation
Junior Management Assistant	48	4	4	48	192	Workstation
Conference Room	20	1	1	600	600	Sized for 30 people, dividable with Training Room
Training Room	25	1	1	700	700	Sized for 20 person with component space, dividable with Conference Room
Break Room	15	1	1	300	300	Sized for 20 people
Lockers	7		192	7	1,344	Large lockers with electrical charging
Locker Changing Area			5	36	180	Located adjacent to Lockers
Transit Operations/Equipment Storage/Component Rebuild Assembly			1	200	200	Unconditioned space located adjacent to Transit Services Vehicles for chains, hotsticks, and cones
Telecommunication Room			1	100	100	
Men's Restroom/Shower			1	600	600	
Women's Restroom/Shower			1	600	600	
Gender Neutral Accessible Locker/Shower/Restroom			1	150	150	
Custodial			1	100	100	
<b>Staff &amp; Assignable Area</b>		<b>192</b>			<b>6,310</b>	
<b>Net: Gross (35%)</b>					<b>8,519</b>	

**SECTION 2 - SPACE NEEDS PROGRAM**

TABLE 2.E - SPACE NEEDS PROGRAM											
SCENARIO 2 POTRERO											
FUNCTION	SPACE STANDARD	STAFF OR VEHICLES	NUMBER OF SPACES	UNIT SIZE (sf)	SUBTOTAL (sf)	COMMENTS					
<b>SHARED</b>											
Lobby			1	400	400						
Medium Conference Room	25		2	250	500						Sized for 8-10 people
Large Conference/Small Training	25		2	500	1,000						Sized for 15-20 people
Fitness	80		6	80	480						5-6 pieces of equipment/floor space
Facilities Stationary Engineer Office/Shop			2	288	575						These Facilities Stationary Engineers are not included in the Reference Design Concept
Transit Maintenance Engineer			2	200	200						These Transit Maintenance Engineers are not included in the Reference Design Concept
Building Maintenance Storage			1	600	600						
Sheet Metal Shop			1	1,400	1,400						
Telecommunication Room			1	100	100						
Main Point of Entry			1	200	200						
Main Telecommunication Room			1	200	200						
Bicycle Parking			1	250	250						Room with hooks, Class 1, ratio in SF planning code
Revenue Office			1	120	120						IT space, workstation, fare box storage; two vaults located outside space
Meet and Greet			1	100	100						At entrance of site
Security Office			1	250	250						
Gender Neutral Accessible Restroom			5	100	500						Adjacent to Security Office and two on each parking level
Trash/Recycling/Compost Compactor			1	600	600						Spread through building and compactors
Hazardous Waste			1	200	200						
Community Room			1	1,200	1,200						
Low Voltage Room Allowance			1	1,000	1,000						Subject to change based on the results of the ongoing electric study for battery electrical buses
Electrical Room Allowance			1	1,500	1,500						Subject to change based on the results of the ongoing electric study for battery electrical buses
Mechanical Room Allowance			1	2,000	2,000						
Emergency Generator			1	500	500						
Lactation Room			1	300	300						
<b>Assignable Area</b>			<b>4</b>		<b>14,175</b>						
<b>Net: Gross (35%)</b>					<b>19,136</b>						

SECTION 2 - SPACE NEEDS PROGRAM

TABLE 2.E - SPACE NEEDS PROGRAM											
SCENARIO 2 POTRERO											
FUNCTION	SPACE STANDARD	STAFF OR VEHICLES	NUMBER OF SPACES	UNIT SIZE (sf)	SUBTOTAL (sf)						COMMENTS
<b>TRAINING</b>											
Reception			1	120	120						
Manager	224	1	1	224	224						Private Office
Superintendent	224	1	1	224	224						Private Office
Assist Superintendents	120	4	4	120	480						Private Office
Supervisors	64	2	2	64	128						Workstation
Clerical Staff	64	3	3	64	192						Workstation
Team Leader	64	6	6	64	384						Shared Office with storage space
CAT Training	64	2	2	64	128						Shared Office
Instructors	30	43	15	30	450						Shared Office
IT Office	120	1	1	120	120						Private Office
Classroom A	25		1	25	1,250						Sized for 50 People/ Dividable
Classroom B	25		1	25	1,450						Sized for 50 People and components
Classroom C	25		1	25	500						Sized for 20 people
Classroom D	25		1	25	500						Sized for 20 people
Conference Room A	25		1	25	250						Sized for 10 people; dividable
Conference Room B	25		1	25	250						Sized for 10 people; dividable
Simulator Room			3	500	1,500						Sized for three students, one instructor station in each
Computer Lab			1	720	720						Sized for 25 computer stations
Handouts Storage			1	120	120						

SECTION 2 - SPACE NEEDS PROGRAM

TABLE 2.E - SPACE NEEDS PROGRAM										
SCENARIO 2 POTRERO										
FUNCTION	SPACE STANDARD	STAFF OR VEHICLES	NUMBER OF SPACES	UNIT SIZE (sf)	SUBTOTAL (sf)					COMMENTS
<b>TRAINING (CONT.)</b>										
Training Aid Storage			1	800	800					Includes chair and table storage
Uniform Storage			1	120	120					
Records Storage			1	200	200					
Records Archive Storage			1	200	200					
Copy/Supply			1	120	120					
Telecommunication Room			1	100	100					
Kitchenette/Vending			1	200	200					
Breakroom			1	500	500					Sized for 25 people
Operator Locker		3	50	3	150					
Instructor Locker		3	43	3	129					
Lactation Room			1	300	300					
Men's Restroom/Shower			1	570	570					
Women's Restroom/Shower			1	570	570					
Gender Neutral Accessible Locker/Shower/Restroom			1	150	150					
Custodial			1	100	100					
<b>Staff &amp; Assignable Area</b>			<b>63</b>		<b>13,199</b>					
<b>Net: Gross (35%)</b>					<b>17,819</b>					
<b>BUS TOTAL</b>					<b>479,100</b>					
<b>VEHICLE CIRCULATION (will vary depending on site configuration, number of levels, and number of ramps required)</b>										

**SECTION 3 - DESIGN CRITERIA NARRATIVE**

**3.0 PURPOSE & INTENT**

The purpose of this chapter is to define the goals developed throughout the SFMTA Potrero Yard Planning Study, which includes the reconstruction of the Potrero Yard and the joint development opportunity of non-transit uses above the Bus Yard Component. Guided by planning, compliance, and general site criteria, simple narratives are included to provide an overview of specific systems and assemblies that the Facility requires. The intent of these narratives is to present an easy to understand, non-technical explanation of how this Facility is required to function and includes considerations from the SFMTA employee and stakeholder input.

**3.1 Planning Criteria**

Table 3.A provides a description of the primary planning, building quality, and transit objectives for the Bus Yard Component.

**3.2 Compliance**

The Project shall comply with all applicable governing codes and ordinances that regulate building construction, site design, life safety, fire protection, accessibility, energy, and environmental requirements as well as the Project Specific Design Criteria as follows (or those which are applicable at the time the design is initiated). Applicable codes to which the project must adhere are included in Table 3.B.

**TABLE 3.A - PLANNING CRITERIA**

Design Life	99 years
Quality	The planning, design, and construction of the facility shall be high quality and long-lasting, have the necessary spaces and systems to function well, provide a safe and healthy work environment, and be economical and resource efficient to operate and to maintain.
Planning	The facility layout shall have a logical and efficient organization and flow to allow easy and safe access and circulation for staff, vehicles, and service providers. The layout shall be open and modular with the structure located to support building and equipment loads.
Flexibility	The facility shall be designed to be flexible. Vehicle parking, service, and maintenance spaces shall have an open and modular layout to accommodate 40- and 60-foot motor coaches, trolley buses, and future electric buses. Staff areas shall be designed with an open plan with modular partitions and furnishings that can accommodate staffing and programming needs over time. Training spaces shall be modular co-located spaces with movable partitions to accommodate a wide range of group meeting needs (i.e. one large group, several small groups, etc.)
Space Utilization	The facility shall include all required spaces and assignable square footages (area inside room or boundary) in Section Two of the Facility Program as well as minimum dimensions and clearances as defined in the Space Standards. Bus areas shall be planned to maximize fleet capacity, where possible sharing circulation between functions such as parking and maintenance bays.
Workspace	Workspaces shall be designed based on needs to be highly functional spaces with quality environments that support staff health, safety, and productivity with good day lighting, good ventilation, and durable finishes. If feasible, provide direct access to green space on the roof for employee use and enjoyment.
Safety	The facility shall have the best practice safety features including fire life safety systems; adequate means of egress and way-finding components to exit discharge; fall protection; eye and ear protection; unobstructed circulation and equipment clear space; easy to use fluids collection; and good ventilation with positive pressure in staff areas.
Security	The facility shall have passive and active security. The site shall have limited vehicular and pedestrian entries that are easy to find and visible. The facility shall have card readers at all exterior entries, suite entries, and support spaces. Security camera system shall be installed to monitor all exterior access and interior areas.
Emergency Response	The SFMTA Emergency Response Plan includes emergency transportation after a disaster and then owl service (late night service) plus several additional routes in the first stage of recovery. The number of buses needed during the initial response depends on the disaster. The first stage of recovery requires approximately 250 buses and 680 operators. Please see Section 4.8.1 for more information on the expected resilience and recovery time of Potrero Yard following a major disaster.
Future Electric Buses	The facility shall build in infrastructure for battery-electric buses, using overhead fast-charge in accordance with Refer to Division 5 (Battery-Electric Bus Supplemental Criteria). The trolley bus parking spaces will be transitioned to battery-electric charging spaces over time in accordance with the transition plan approved in the Project Agreement.
Window Cleaning	The facility shall have a window cleaning regime which includes regular use of non-aggressive cleaning products. The use of aggressive or corrosive cleaning products shall be avoided. Regular window cleaning shall happen every 12 months, but not exceeding 18 months, unless undue soiling is apparent in which case the cleaning intervals should be reduced. For the Potrero Facility, the use and contract with a company that specializes in this type of cleaning is required.

**SECTION 3 - DESIGN CRITERIA NARRATIVE**

The Building Code and Zoning Requirements include, but are not limited to the following. The PPC is solely responsible for compliance with all applicable codes.

TABLE 3.B - BUILDING CODE & ZONING REQUIREMENTS	
Authority Having Jurisdiction:	City and County of San Francisco
Zoning Code:	San Francisco Administrative Code (Planning Code)
Applicable Codes (Adopted):	ASHRAE- 62.1, 90.1, 189.1 California Building Standards Code (with local amendments) California Electrical Code (with local amendments) California Energy Code (with local amendments) California Existing Building Code (with local amendments) California Fire Code (with local amendments) California Green Building Standards Code (with local amendments) California Historical Building Code (with local amendments) California Mechanical Code (with local amendments) California Plumbing Code (with local amendments) California Reference Standards Code (with local amendments) Department of Justice ADA Standards for Accessible Design NFPA Codes- 13, 30, 30A, 33, 88A, 110, 111, 704, 720 San Francisco Code Amendments, State Amendments, Ordinances, and Law
Occupancy Group:	S-2, B, R-2, M
CONSTRUCTION TYPE/ HEIGHT & AREA (SEE ICC TABLE 503; ICC TABLE 504.3)	
Type I-B Max.	150'-0" / _Floors @ _sf ea. Per ICC 2016; 85' per San Francisco Municipal Code
Fire Protection:	Sprinkler System

<sup>4</sup>The joint development square footages presented in this table are based on preliminary models prepared by the consultant team (The Hatch Team). The ultimate size and form of the joint development component of the project are subject to change.

**SECTION 3 - DESIGN CRITERIA NARRATIVE**

**TABLE 3.B - BUILDING CODE & ZONING REQUIREMENTS (CONT.)**

**FIRE RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS, FOR TYPE 1-B CONSTRUCTION (ICC TABLE 601)**

Structural Frame Including Columns, Joists, & Girders	Supporting Floors - 2 hours Supporting Roof ONLY - 1 hour
Bearing Walls Exterior	(per ICC Table 602) - 2 hours
Bearing Walls Interior	Supporting Floors - 2 hours Supporting Roof ONLY - 1 hour
Non-Bearing Walls & Partitions Exterior	(per ICC Table 602) - 1 hour
Floor Construction Including Supporting Beams & Joists	2 hours
Roof Construction Including Supporting Beams & Joists	2 hours

**OCCUPANCY SEPARATION, FIRE BARRIERS, FIRE PARTITIONS, & REQUIRED OPENING PROTECTIVES, FOR TYPE I-B CONSTRUCTION (ICC TABLE 504.3, TABLE 504.4, TABLE 716.5)**

	PARTITIONS	OPENINGS
Occupancy Separation between (S-2, Bus Repair Garage) & (B, Training Area, Operations)	2 hours	
Occupancy Separation between (S-2, Bus Repair Garage) & (R-2, Residential T.O.D.)	2 hours	
Exit Passageways	1 hour	1 hour
Exit Enclosures	1 hour	1 hour
Vertical Shafts (for 14 stories, 144 feet, 0 inch total height)	1 hour	1 hour

**INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY (SPRINKLERED BUILDING), FOR TYPE I-B CONSTRUCTION (ICC TABLE 803.11)**

OCCUPANCY GROUP	EXIT ENCLOSURES & EXIT PASSAGEWAYS	CORRIDORS	ROOMS & ENCLOSED SPACES
S-2	Class C	Class C	Class C
B	Class B	Class C	Class C
R-2	Class C	Class C	Class C

SECTION 3 - DESIGN CRITERIA NARRATIVE

3.3 General Site Requirements

There are specific site requirements necessary to ensure safe, efficient, and functional facilities that are outlined (and not limited to) the following:

TABLE 3.C - GENERAL SITE REQUIREMENTS

Facility Accessibility	Provide a minimum of two vehicular entries/exits configured such that either could work as the entry/exit if the other is unavailable.
Facility Lighting	Use appropriate and adequate lighting for day to day operations and to ensure high level of surrounding visibility. Transit facility will have movement around and through the facility at all times of day.
Pedestrian Safety & Accessibility	Observe all code and regulation requirements to insure safe and defined pedestrian circulation paths (necessary striping, bollards, curb cuts, etc.); and that paths minimally intersect fleet ingress and egress. The SFMTA staff have made a number of suggestions to ensure that bus/pedestrian conflicts are minimized. While beyond the scope of this document, specific design treatments within the right of way to advance this goal include traffic signal pre-emption for buses; separating entrances to the bus facility and joint development to the greatest degree possible; provide transit lanes for buses to connect to OCS; and striping for on-street parking, bicycle facilities, and loading to minimize conflicts with bus movements.
Site Stormwater Drainage	Positive drainage and appropriate stormwater discharge from site and upper exterior/open decks; a stormwater management and pollution prevention plan shall be established. Required per the San Francisco Green Building Code Amendments and GS6 Form for municipal projects and the SFPUC Stormwater Management Ordinance.
Sustainability	Provide as required including the San Francisco Municipal Green Building Code (Environment Code Chapter 7), CALGreen, and the San Francisco Green Building Code. Potrero must be built to a LEED Gold rating.
Parking	(Employee Parking will not be provided)
Security	Provide site video surveillance and building security.
Better Streets	<a href="https://sfplanning.org/resource/better-streets-plan">https://sfplanning.org/resource/better-streets-plan</a>
Mission Area Plan	<a href="https://generalplan.sfplanning.org/Mission.htm">https://generalplan.sfplanning.org/Mission.htm</a>
Mission District Streetscape Plan	<a href="https://archives.sfplanning.org/CDG/docs/missionstreets/MDSP_FINAL_DRAFT_OCT2010.pdf">https://archives.sfplanning.org/CDG/docs/missionstreets/MDSP_FINAL_DRAFT_OCT2010.pdf</a> <a href="https://sfplanning.org/resource/sdat-standard-comments">https://sfplanning.org/resource/sdat-standard-comments</a>
San Francisco's Biking and Rolling Plan: Active Communities	<a href="https://www.sfmta.com/projects/biking-and-rolling-plan">https://www.sfmta.com/projects/biking-and-rolling-plan</a>

**SECTION 3 - DESIGN CRITERIA NARRATIVE**

**3.4 Sustainability Narrative**

Per Table 3.C, the Project must be designed, built, and commissioned in compliance with the San Francisco Municipal Green Building Code (Environment Code Chapter 7) and must achieve a LEED Gold certification (minimum). The following are sustainability strategies that the SFMTA looks favorably on, in addition to all applicable code requirements:

- Innovative and creative storm water management that does not result in square footage loss
- On-site rainwater harvesting and reuse
- Solar panel or other on-site generation
- Commissioning and enhanced energy performance
- Wastewater recycling

In addition, District Utility Systems shall be evaluated as part of the Project’s sustainability strategy, so long as a District Utility model could maintain the SFMTA’s security and emergency backup power requirements. See Division 4 (*Supplementary Design Criteria*) of the Technical Requirements.

**San Francisco Green Code Mandates:**

- Indoor water use reduction
- Construction waste management
- Commissioning
- Storm water management
- Energy performance
- Temporary ventilation and IAQ management during construction
- Low-emitting materials (low VOCs)

**Cal Green Mandates:**

- Light pollution reduction
- No halons in HVAC, refrigeration and/or fire suppression equipment electric vehicle charging.

**3.4.1 Materials**

**Mass walls:**

- Structural concrete walls are beneficial for tempering the temperature fluctuations throughout the day. Reduce mechanical cooling during daytime hours and containing/ emitting heat during cold nights.

**Construction Materials:**

- Select materials and products that minimize resources used, are locally available and produced.
- Use recycled content in all carpet, tile, millwork, and ceiling finishes.
- Use recycled content in all CMU, concrete, and steel structure components.
- During construction phase, divert construction waste from landfill, collect paper, glass, plastic, cardboard, metal, and batteries on site to be recycled.
- Use low VOC emitting paint, coatings, adhesives, flooring, composite wood, and ceiling/wall/thermal/acoustic insulation.
- Use of high fly ash content in concrete
- Use modular furniture systems
- Use certified wood and comply with Chapter 8 of the San Francisco Environment Code.

**Proximity:**

- Use locally harvested and manufacturer materials.
- Plan for Future Use:
  - ✓ Conduct life cycle cost analysis.
  - ✓ Ensure programmatic functionality.

**3.4.2 Water**

**Indoor Water Use Reduction and Grey Water Treatment:**

- In addition to low flow fixtures and rainwater storage, explore the use of gray water treatment and reuse.
- Grey water from lavatories and showers can be treated and used as flush water and/or irrigation water to further reduce the potable water required on site.

**Wash Water Recycling System:**

- Conserves water and reduces wastewater effluent.

**Water Metering:**

- Install sub-meters on systems that have the potential for large consumption (vehicle wash system, irrigation, heating and cooling systems, etc.)

**3.4.3 Energy Efficiency**

**Demand Control Ventilation – CO2 Monitoring:**

- Provide CO2 sensors to be used in densely populated spaces to eliminate over-ventilation and energy waste.

**Air Side Economizers:**

- Economizers shall be incorporated with HVAC units to provide free cooling to the spaces when outdoor conditions permit.

**Reduce Fan Operating Pressure:**

- Select coils and filters with the intent to reduce overall pressure and fan energy. Coils and filters shall be sized for face velocities no greater than 600 fpm. Ductwork pressure drops shall be sized no greater than 0.08 inches wg.

## SECTION 3 - DESIGN CRITERIA NARRATIVE

**High Efficiency Equipment:**

- Selected HVAC equipment shall provide the most efficient heating and cooling for the interior space.

**Improved Building Envelope:**

- Exterior walls and roof insulation value shall have an (R-value) above CALGreen minimum requirements.

**Commissioning:**

- Prior to occupancy, HVAC, plumbing, power, and lighting systems shall be commissioned to confirm operation is in accordance with the design intent.

## 3.4.4 Site/Building

**Water:**

- Stormwater Management
  - ✓ Pre-treat stormwater water to draw out pollutants, reduce peak flow and recharge groundwater.
- Water Conservation
  - ✓ Apply San Francisco standards and best practices where applicable on the site.
- Rainwater Harvesting
  - ✓ Determine if rainwater harvesting, collection, and reuse is feasible on this site and what size cistern is appropriate.

**Vegetation:**

- Sustainable Planting Design
  - ✓ Plant trees for shade over paved surfaces to reduce heat island effect. Preserve trees where possible and plant native trees per LEED and San Francisco Bureau of Urban Forestry requirements.

**Site Lighting:**

- Avoid light pollution by selecting full cutoff fixtures, utilizing LED source for all site

lighting, lighting levels in full compliance with IES recommended lighting levels, by taking advantage of the LED drivers' ability for dimming, and occupancy sensors to reduce lighting levels whenever the site is not fully utilized.

**Health and Well-being:**

- Design for physical activity
  - ✓ Design for physical activity and health of employees workout in the Facility by providing a room and access to planned greenspace.
- Design for optimal social interaction and community engagement.
  - ✓ Provide outdoor and indoor space for employee meals and other activities.
- Wayfinding
  - ✓ Provide clear wayfinding that utilizes multiple best practices to direct employees and the public around the site as appropriate.

**Alternative Transportation:**

- Ensure unhindered access to public transportation.
- Provide bicycle storage/changing rooms.

**Pollution Prevention:**

- Create and implement an erosion and sedimentation control (ESC) plan.
- Filter storm water run-off with an oil/water separator.
- Plan for 100 percent on-site storm water detention, if possible.

**Noise and Vibration:**

- This Facility will be operated year-round, 24 hours a day, 7 days a week. Proper public nuisance notification and sound abatement needs shall be addressed in the design.

Details of the noise and vibration performance criteria are presented in a supplemental document in Division 4 (*Supplementary Design Criteria*) of the Technical Requirements.

**Public Right-of-Way Improvements:**

- The criteria below require consultation with certain City departments in their regulatory capacity. Reference Appendix I: SDAT Review Letter 1.19.2023 (For Reference).

**Curb Extensions (Bulb-Outs):**

- Design bulb-outs at each street corner adjacent to the Project Site, if feasible, to slow turning vehicles and shorten crossing distances while allowing buses and emergency vehicles to safely turn without entering into the opposite travel lane.
- Design bulb-out to ensure bulb-outs curb returns are sweepable with standard City street sweeper equipment and don't compromise the street's capacity for conveying stormwater during storm events.

**Accessible Curb Ramps and Accessibility Requirements:**

- Design accessible pedestrian ramps at all street corners with existing curb ramps at receiving ramps at the opposite end of the crosswalk, including the midblock along Mariposa Street at York Street.

**Loading Zones:**

- Design appropriate accessible passenger and commercial loading zones based on a loading needs analysis and a loading operations plan regarding both off-street and on-street loading operations.

## SECTION 3 - DESIGN CRITERIA NARRATIVE

**Street Trees:**

- Provide street trees along all frontages but avoid placement of trees within 25 feet of the corner property line on approach to enhance pedestrian visibility and safety.

**Street and Pedestrian Lighting:**

- Ensure appropriate illumination levels by upgrading existing or installing new street and pedestrian lighting based on photometric studies.
- Orient streetlights to protect night skies and use energy efficient luminaries.

**Electrical Transformers:**

- Ensure location of transformer room is accessible to the electrical power utility (PG&E and SFPUC) from the public right-of way.
- Ensure location of new underground electrical vaults within the sidewalk does not cause the loss of mature street trees, if feasible.

**Waste Collection:**

- Locate waste collection areas within the Facility based on a trash loading and removal strategy that has been coordinate and reviewed by the waste collection service provider.

**Citywide Bicycle Network / Vision Zero / 17th Street Frontage:**

- Provide a safer active transportation route for employees to get to and from the Facility by providing protected bike lanes on each side of 17th Street which is part of the Mission to Peaks Route of the City's Green Connection Network.
- Provide safe access between the Facility and Franklin Square by providing a Rectangular Rapid Flash Beacon in each direction at the crosswalk on 17th Street at Hampshire.

## 3.4.5 Efficiency and Quality of Operations

**Minimum Performance:**

- Prohibit smoking in the building and locate designated areas 25 feet from entries to comply with code and enhance employee and visitor health.

**Construction Management:**

- Protect stored on-site or installed absorptive materials from moisture damage
- Replace all filtration media prior to occupancy
- Perform building flush-out (14,000 or 3,500 cubic feet) prior to occupancy

**Low emitting materials:**

- Low VOC Adhesives/ sealants, paints, carpet, and composite wood
- Comply with Green seal standard for commercial adhesives
- Anti-corrosive and anti-rust low VOC paints
- No use of urea-formaldehyde resins in laminating adhesives

**Plan for Flexibility:**

- Include flex shop space.
- Create appealing public and private spaces.
- Circulation shall be function and equipment driven.

**Parts Storage System:**

- Optimally utilize the volume of space, minimizing the building area footprint.

## 3.4.6 Electrical

**Power Monitoring for Possible Load Shed:**

- Service feeder main and all sub-distribution switchboard feeder breakers shall include power digital meters for centralized digital remote monitoring of the building's energy usage for trending analysis and management.

**Natural Lighting:**

- Daylight harvesting shall be utilized where possible to provide a better working environment by introducing natural light within the work place.

**On-Site Generation and Storage:**

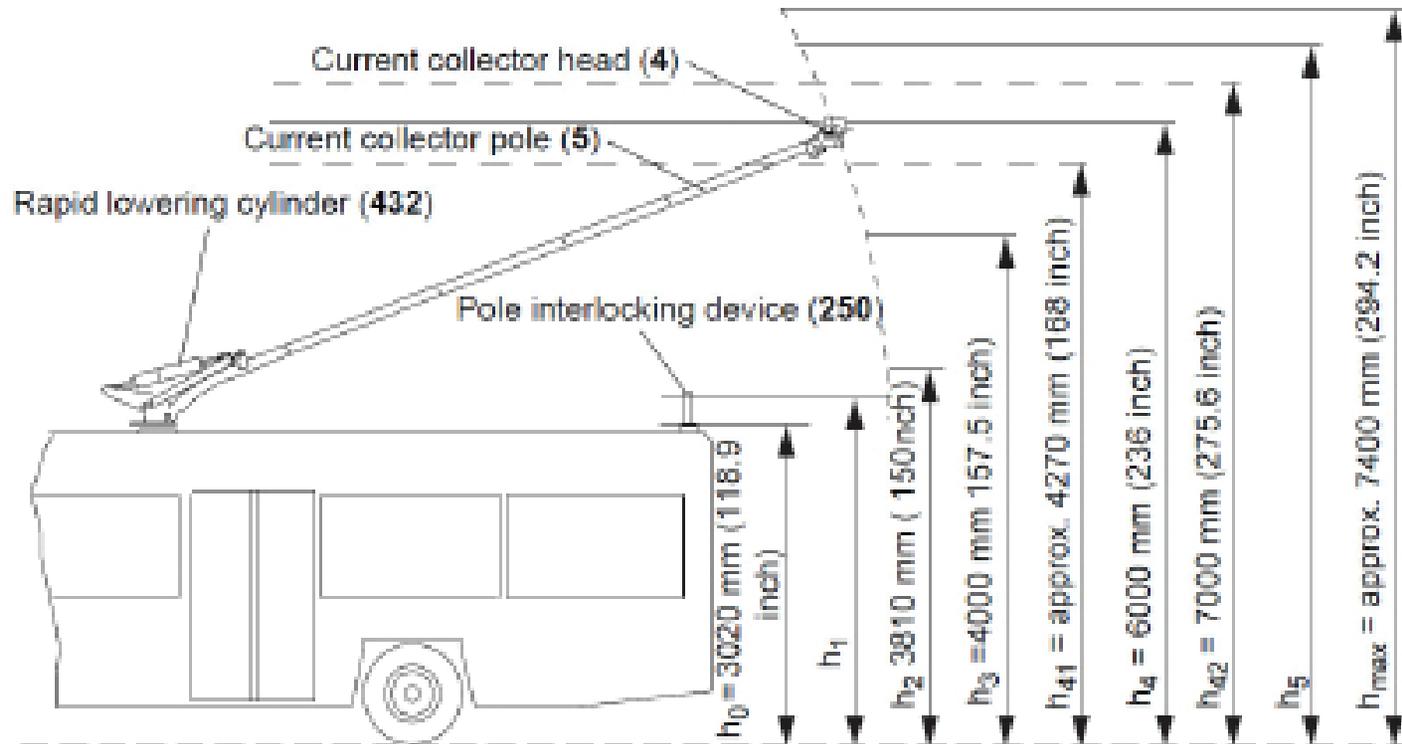
- Include on-site energy generation and storage where possible, including solar panels and battery systems, to assist in overall building electrical demand and/or backup power.

## 3.5 Architectural Narrative

The Project will be a mixed-use, joint development consisting of a bus garage and maintenance facility (the Bus Yard Component) and multiple levels of joint development (the Housing and Commercial Component). In addition, the Common Infrastructure is the collection of elements of the Facility that are shared by the Bus Yard and Housing and Commercial Components. The Bus Yard Component is intended to service, maintain, and store a fleet of 40- and 60-foot buses. It consists of a main building that will house separate operations and training facilities, service and inspection bays, bus washes, bus parking, and the associated ancillary and office facilities.

The Potrero Yard bus garage will have three-levels accessible by a scissor express ramp structure for vehicular circulation. Each of the floor plans have areas designated for vehicle parking, service, and maintenance spaces to accommodate 40- and 60-foot trolley buses and future battery electric buses. A bypass ramp at grade will allow buses to enter the facility from Mariposa Street. Provide bypass access to travel directly to the bus parking spaces.

OCS TROLLEY HEIGHT DIAGRAM



## SECTION 3 - DESIGN CRITERIA NARRATIVE

## 3.6 OCS - Trolley

The Bus facility shall be designed and future-proofed to enable Paratransit development on the podium roof. The bus ramps shall be extend one additional level to access the transit facility roof. Paratransit vehicles (cutaway buses and vans) will use the same entry, ramps, and exits as the 40- and 60-foot-long buses and non-revenue vehicles should MTA decide to provide Paratransit vehicles. PPC shall design building a structural systems to allow extension of the ramp in the future. Reference Appendix G (Design Criteria Paratransit) for Paratransit program and design requirements.

Pigeon abatement is a major concern. Numerous abatement measures, including bird repellent and spikes, bird wire, bird netting, shock flex tracks, lodge design, bird coils, moving owl, and ultrasonic electric devices can be used.

The new Potrero Yard shall comply with the San Francisco Green Building Code requirements. The building shall meet US Green Council (USGBC) and Leadership in Energy and Environmental Design (LEED) requirements, and obtain GOLD certification. In addition, new construction will have electrical infrastructure capable of supplying electricity for electric vehicle charging at 100 percent of new non-revenue vehicle parking spaces. Refer to Division 5 (*Battery-Electric Bus Supplemental Criteria*) of the Technical Requirements for detailed discussion of BEB power needs.

The materials used in the construction of the Potrero Yard Facility shall be attractive and, durable inside and outside the building, complement the context/environment around the site and neighborhood, and meet the design standards of SF Planning and the San Francisco Arts Commission<sup>5</sup>. Reference the Project Design Guidelines for facade, glazing, etc.

Poling and de-poling will happen within the Facility per PNC conceptual design in the recent final 100% SD documents. As the trolley buses enter the Facility, they will transition off-wire to navigate through. Once the trolley bus is parked in a bus parking stall, OCS must be provided above for on-wire connection while stored. When leaving the parking stall, the trolley bus will go off-wire again to navigate through the Facility. Once through the exit of the Facility, the trolley bus will connect back to the wire. OCS wire shall also be provided in all repair bays except the preventive maintenance bays for needed power during maintenance. The mechanism for disconnecting from the right-of-way OCS to the facility (pull-in), as well as back onto the right-of-way OCS from the facility (pull-out), shall be carefully considered by the Project Team and proposed through the Bus Facility Technical Proposal.

Shoe replacement will take place just after the trolley bus enters the Facility at the Meet and Greet area. There shall be access to the roof of the vehicles; via a three-axis lift, elevated platform, or any equal means of access for an employee to be able to safely access the shoes on top of the trolley buses.

Appendix B to this document is the SFMTA's OCS Design Criteria document. For this project, the Project Team shall focus on the first section of the document for relevant OCS requirements. Much of the information in the later sections of Appendix B should be interpreted as reference information. See room data sheets for illustration of OCS in applicable spaces. See also the Traction Power section of this document for information on the electrical connection for the trolley OCS network.

Deviation from OCS criteria, such as use of overhead charging pans in the maintenance bays, or non-tension wire in the parking stalls, is acceptable if full functionality is met. This deviation must be considered through the Alternative Technical Concept process. During construction, the Project Team must work closely with the SFMTA's Transit Division to accept all design drawings, and Muni Construction Support for all right of way work and relevant Clearance Permits.

Trolley pole system inspection and maintenance to be conducted in the Preventative Maintenance (PM) Bays. See diagram below and PM Bay room data sheet for requirements.

## 3.7 Site

The current Potrero Yard, located on a city block bound by Mariposa Street to the south, 17th Street to the north, Hampshire Street to the east, and Bryant Street to the west, sits at the edge of the Mission District and Potrero Hill.

The current site is rectangular in plan and measures approximately 480 feet east to west by 400 feet north to south. On the east side of the site, an approximately 215-foot wide building extends length-ways from the northern site boundary to within 30-feet of the southern boundary. The remaining western portion of the site is occupied by an asphalt and Portland cement concrete (PCC) paved electrified-bus parking area at ground-level.

<sup>5</sup> Please see the adopted Urban Design Guidelines for the City and County of San Francisco at <[http://default.sfplanning.org/plans-and-programs/planning-for-the-city/Urban-Design-Guidelines/Urban\\_Design\\_Guidelines.pdf](http://default.sfplanning.org/plans-and-programs/planning-for-the-city/Urban-Design-Guidelines/Urban_Design_Guidelines.pdf)>.

## SECTION 3 - DESIGN CRITERIA NARRATIVE

The ground-level parking area features numerous ancillary facilities and overhead catenary system (OCS) support poles, guy wires, and live electrical lines. A bus wash station occupies the north central area of the lot and a trash compactor facility occupies the northwest corner of the lot. Access to the ground-level parking area is by an entrance on Mariposa Street.

The ground-level parking area slopes gradually from approximately elevation +54 foot SF-VD13 in the northeast corner to elevation +48 foot SF-VD13 in the southwest corner. The relatively level site has been created by cutting a bench into the natural slope. As a result, along the northern boundary of the site, the elevation of 17th Street is between 10 feet and 23 feet higher than site grade. This difference reduces along the eastern and western boundaries of the site, along Hampshire Street and Bryant Street, respectively, such that Mariposa Street at the southern boundary is at the same grade as the parking area.

The differences in elevation between the site and surrounding streets are accommodated by reinforced concrete retaining walls along the western portion of 17th Street and along Bryant Street, and by integral retaining walls within the building along the eastern portion of 17th Street and along Hampshire Street.

The existing building on the site is predominantly a single-story structure housing a maintenance garage at grade (at Mariposa Street level). The garage area features vehicle service pits for maintenance access to the underside of the buses.

## 3.8 Structural Narrative

The Potrero Yard project will require several considerations in the appropriate selection of a structural system given, among other things, the long spans of the Bus Yard Component and the load requirements for the Housing and Commercial Component above.

Additional geotechnical investigations by PPC are required to inform PPC's structural design for the Project. For the Reference Concept Design, the SFMTA commissioned ARUP/RYCG to perform a preliminary geotechnical analysis for the Project.

## 3.8.1 Structural Summary

This section summarizes the project's structural design standards and outlines the approach for the new structure at the site, with an eye toward earthquake resilience. This approach is developed to provide consistency in design between the existing and new structures throughout the Facility. Items included within this section are Structural design criteria, code analysis, materials, earthquake resilience, and PPC's Geotechnical Baseline Report (see Appendix J).

The concept plan for the rebuild of Potrero Yard involves the demolition of the existing building and all existing utilities serving the existing facilities (including the building, bus wash, and any others) must be demolished, removed, and capped in place unless otherwise noted on the site<sup>6</sup> and the construction of a three-level bus storage and maintenance facility. The maintenance facility will feature vehicle service pits formed by shallow excavations below current site grades and a basement to serve the Facility.

PPC shall accept existing site perimeter retaining walls in their current condition and is responsible for any required due diligence or site investigation required to inform their design and construction. As-built drawings are provided by the City for information only and shall not be relied upon. Shall any existing retaining walls remain in place or be incorporated in the PPC's design, the PPC shall demonstrate suitability and viability of the existing retaining walls and ensure the future design life is commensurate with the new construction.

Design and construction associated with temporary or permanent retaining structures, including the removal, partial re-use or re-use of the existing perimeter walls, shall adequately consider impacts on adjacent property. These include, but are not limited to impacts on:

- Temporary stability
- Temporary street closures and permitting required for proposed works, including impact on MUNI operations
- Buried and overhead utilities
- MUNI lines
- Pavements
- Groundwater levels
- Any other structure, building or utility that may be affected

<sup>6</sup>See Section 4.7.1 for a discussion of the preservation of the façade of the existing Potrero Yard Car House.

**SECTION 3 - DESIGN CRITERIA NARRATIVE**

Ground movements associated with any basement or retaining structure design, including removal, partial re-use or re-use of the existing walls, shall be evaluated. Impact assessments shall be carried out for all structures, buildings, and utilities within movement zone of influence.

The PPC shall be responsible for obtaining any permits and/or easements necessary to perform work outside of the property line, should this be required to complete the reinforcement and/or reconstruction of perimeter retaining walls.

For the Reference Design Concept, a post-tensioned, cast-in-place concrete beam and slab system with concrete shear walls for resisting lateral loads was considered an appropriate design solution; however, this does not preclude alternative solutions such as structural steel framing. In areas that may be accessible to buses, all columns shall be painted yellow and protected by bollards or other means to minimize the risk of damage from vehicle collisions.

**3.8.2 Seismic Resilience**

The desired resilience performance criteria for the Facility in the event of a major earthquake is required for the design of its structural system and other building systems. Details of the resilience performance criteria are presented in a supplemental document in Division 4 (*Supplementary Design Criteria*) of the Technical Requirements.

**3.8.3 General Structural Approach**

The structural design shall be closely coordinated with all other disciplines to ensure that structures perform to their intended purpose over 99 years. The structural design shall incorporate the following principles,

in addition to meeting all applicable code requirements:

- **Strength:** Structures will have adequate strength to support their own weight and the weight of all equipment and vehicles and resist all anticipated gravity and lateral forces.
- **Serviceability:** Structures will be designed to meet day-to-day user needs and be highly functional over their intended service life. Serviceability considerations include:
  - ✓ Floor stiffness to minimize adverse vibration effects to equipment and floors
  - ✓ Durability of structures to resist effects of temperature variation, weather exposure, shrinkage, in-service use, chemical exposure, and corrosion
  - ✓ Resistance to groundwater infiltration and structure buoyancy in high groundwater conditions
- **Load Path:** A clear and identifiable load path will be provided for all gravity and lateral forces to be resolved into the foundations.
- **Constructability:** Structures shall also be designed with consideration given to current construction practices, including items such as:
  - ✓ Placement of formwork
  - ✓ Placement of reinforcing and concrete
  - ✓ Placement of deep foundations, such as driven piles, drilled concrete piers, etc.
  - ✓ Construction joints
  - ✓ Efficient use of materials
  - ✓ Limiting use of field fabrication & welding
  - ✓ Site constraints and existing building structures
  - ✓ Cold and hot weather construction

- **Code Compliance:** Structures will comply with all applicable codes, as described further into this document.

**3.8.4 Foundations**

Shallow foundations bearing on the weathered rock in Zone 1<sup>7</sup> may be possible; however, shallow foundations bearing on the near surface Clayey Sand unit in Zones 2, 3, and 4 are ruled out to avoid excessive differential settlement. Deep foundation solutions are therefore required to transfer building loads to the dense sand layer and the underlying weathered rock in these zones. Deep foundation options identified as suitable for this site include:

- Driven steel H-piles
  - Continuous flight auger (CFA) piles (also referred to as auger-cast-in-place or auger-pressure grouted piles)
  - Concrete-filled steel pipe (CFSP) piles installed with proprietary tips
- The length of the deep foundations/piles/piers will vary with the depth rock profile. Additional information about foundation can be found in PPC's Geotechnical Baseline Report.

<sup>7</sup>Please see PPC's Geotechnical Baseline Report for a full explanation of the composition and location of Zones 1-4.

## SECTION 3 - DESIGN CRITERIA NARRATIVE

**3.8.5 Structural Design Loads**

Loads used in the structural design are noted in Table 4.D, except as further defined in the following sub-sections.

**3.8.5.1 Load Criteria for Suspended Structure Supporting Buses**

To allow for future programming flexibility, the criteria specified in this section shall apply to all suspended floor structures accessible to and having sufficient ceiling heights for buses.

This loading shall apply as a minimum. During the PDA phase, the PPC shall work with SFMTA to confirm the live load criteria that may be specific to the types of buses envisaged in the future for this Facility.

**Floor Live Loads for the Bus Yard Component:**

- For strength considerations, the vehicle live load cases given in AASHTO shall be used. These load cases shall be applied utilizing ASCE7 load combinations and without AASHTO dynamic impact factors. The live load cases shall include concentrated loads considering the AASHTO design truck. Partition loading need not be combined with these loads.

Deflection shall also be checked under live loading. These checks shall utilize the AASHTO live load configurations for deflections, and shall meet deflection criteria as set out by the California Building Code.

These loads shall not be reduced based on supported tributary area. This applies to floor structure and columns supporting a single floor as well as multiple floors containing buses. Live load reductions may be taken as permitted by the code for other types of live load where a structural component supports those types of load in addition to bus loading.

**Seismic Mass:**

- Seismic mass for floors supporting buses shall be derived from the weights of structure and permanent non-structural components in addition to a uniform load associated with the weight of empty parked buses. That load shall be taken as 100 psf. Accidental eccentricity of the mass as required by ASCE7 shall also apply to this load.

**3.8.5.2 Structural Design Criteria for Podium Lid**

The structure supporting the Housing and Commercial Component over the top of the Bus Yard Component is subject to considerations which are unique to this Project. These considerations are described in this section. In this section the structure of the Bus Yard Component is termed the “podium,” and the horizontal structure supporting the Housing and Commercial Component over the Bus Yard Component is termed the “podium lid.” The podium lid is considered to be part of the Common Infrastructure.

**Transfer Structures:**

- It is likely that the column grids for the Housing and Commercial Component and Bus Yard Component will not fully align, and that transfer structures will be required at the podium lid. The following criteria shall be met for such structures.

Vertical seismic accelerations shall be included in all load combinations involving seismic loading for transfer structures. Vertical seismic accelerations shall be derived from a site-specific vertical response spectrum or from ASCE 7 Section 11.9. The transfer structure shall remain elastic under this loading. Reinforcing steel in concrete transfer structures shall also remain below the yield stress.

Transfer structures that support columns which are part of the lateral force resisting

system for the structure above the podium are discouraged. If such transfers are unavoidable, they shall be designed to resist overturning forces based on the capacity of the supported seismic system using expected material properties as defined by ASCE 41, in addition to gravity loading and vertical seismic accelerations. In addition, the flexibility of transfer structures shall be considered in evaluating the seismic behavior of the structure above.

Live load deflection in the residential structure shall include the cumulative deflection due to all live loads supported by the transfer structure, including permitted live load reductions. This deflection shall not exceed  $\frac{3}{4}$ ” for the building interior and  $\frac{1}{2}$ ” at the building perimeter. Levelness and flatness requirements for floors supported by transfer structures shall consider deflections locked into the structure due to the construction sequence.

Transfer structures shall not support areas which are accessible to buses.

**Water-Tightness Considerations:**

- For portions of the podium lid that are subject to exterior exposure, special consideration shall be given to water-tightness in order to protect the operations of the Bus Yard Component and the Common Infrastructure. Three levels of protection shall be incorporated: (1) a watertight barrier shall be provided on top of the structure, (2) the structural concrete mix shall be specified for low permeability, and (3) the structural design shall minimize cracking. The latter two requirements are described below in more detail.

## SECTION 3 - DESIGN CRITERIA NARRATIVE

The concrete mix design shall incorporate the following requirements:

- ✓ The mix shall be proportioned to meet or exceed requirements for exposure category "W1" as defined by ACI 318.
- ✓ The mix shall have a shrinkage limit of 0.045%. Shrinkage testing shall be conducted on the trial mix and also on field cured specimens extracted from each truck at the point of delivery.

The podium lid structural design shall additionally include the following:

- ✓ Minimum temperature reinforcement area shall be 0.60% of the slab cross section.
- ✓ Spacing of control joints shall not exceed 20 feet. The maximum dimension of a concrete pour shall not exceed 120 feet.
- ✓ Waterstops shall be provided at contraction joints.
- ✓ Crack widths under service loading shall be calculated for the top surface of the slab and shall not exceed 0.012 inches.



**SECTION 3 - DESIGN CRITERIA NARRATIVE**

**3.8.6 Applicable Code & Referenced Standards**

The design of structural engineering systems for the Project shall be in accordance with the laws and regulations of the State of California, City and County of San Francisco ordinances, and industry standards, except where more stringent standards are given in this document. In cases where conflicts between the cited documents exist, requirements of the more conservative document will be used.

**TABLE 3.E - STRUCTURAL APPLICABLE CODES**

Governing Agency	City and County of San Francisco, CA
Agency Contact	<a href="https://sfdbi.org/">https://sfdbi.org/</a>
Adopted Building Code	International Building Code 2015 (IBC 2015)
Loads	ASCE 7-16
Concrete and other structures	ACI 318-14
Specifications for Structural Concrete for Buildings	ACI 301-99
Structural Steel	AISC Manual of Steel Construction, 14th Edition
Specification for Structural Joints Using	ASTM A325 or A490 Bolts
Masonry	ACI 530-08/ ACI 530.1-08
Aluminum	Aluminum Design Manual ADM 1-05
Wood	ANSI/AWC NDS-2015
Light Gauge Steel Framing	AISI D100-08, AISI S1000-07
California Building Standards Commission	California Building Code (CBC), Latest Edition
Code of Standard Practice for Steel Buildings and Bridges Design, Manufacture, and Installation of Concrete Piles	ACI 543R-00

## SECTION 3 - DESIGN CRITERIA NARRATIVE

## 3.9 Mechanical Narrative

**General HVAC:**

All HVAC design shall be in compliance with applicable codes and standards (including but limited to): California Building, Mechanical and Fire Codes, with local amendments; NFPA 30A, 75, 88A, 90A, 90B and 91; ASHRAE 1, 21, 52.2, 55, 62.1, 90.1, 111, 135 and 189.1.

The use of combustion-fired equipment (including natural gas, liquid propane gas and fuel oil) is strictly prohibited.

Supply, exhaust, and return ducts shall be designed with a maximum of 0.08-inch water gauge static pressure drop per 100 feet of duct. Supply ductwork serving mechanical air conditioning shall be insulated. Exposed ductwork shall be round or oval, uninsulated and suitable for painting.

Transmission mechanisms of SARS-CoV-2 (COVID-19) are not fully understood and there is evidence for an airborne route to be considered, as the virus remains viable in aerosols for at least 3 hours and that mask usage was the best intervention to prevent infection. Heating, Ventilation and Air Conditioning Systems (HVAC) are used as a primary infection disease control measure. However, if not correctly used, they may contribute to the transmission/spreading of airborne diseases as proposed in the past for SARS. Ventilation and filtration provided by heating, ventilating, and air-conditioning systems can reduce the airborne concentration of COVID-19 and thus the risk of transmission through the air. All ducted supply air systems shall be equipped with MERV-8 pre-filter and 4-inch MERV-13 final filter.

Seismic-restraint systems shall comply with CBC requirements. See Section 4.8.1 for seismic resilience requirements.

## 3.9.1 Mechanical Sustainable Design Systems

Sustainable design requirements and best practices shall be complied with, adopted, and implemented where such requirements are promoted by the United States Green Building Council (USGBC), as defined under the published LEED Standards. The Project must conform to LEED Gold Standards. Code required restrictions placed on the use and quantities of toxic and/or environmentally deleterious substances such as Volatile Organic Compounds, (VOCs), that are components in certain sealants and construction materials, and on the use of HCFC refrigerants in HVAC systems, are specific examples of applicability of such sustainable-based Code design requirements. An energy model will be required based on performance approach to confirm compliance with CALGreen/Title 24 and LEED requirements. LEED credit EAc2 Optimize Energy Performance shall achieve a minimum of 12 points. LEED credit EAc5 Renewable Energy v4.1 shall achieve a minimum of 3 points.

Heating and cooling load calculations for the industrial areas shall be performed in accordance with LEED, CALGreen, and Climate Zone 3. The design of the mechanical ventilation systems, heating systems and cooling systems must comply with the respective requirements of the California Mechanical Code (CMC), ASHRAE Standards of Indoor Air Quality and Thermal Comfort, and CALGreen/Title 24 where applicable.

## 3.9.2 Operations Areas

The operations portion, as described in the Space Needs Program, any space needed for operators of the Facility shall be climate controlled by heating and air conditioning capabilities. No more than three offices per thermostat. Ventilation shall be in accordance with ASHRAE 62.1. Exhaust fans must be provided for locker rooms, restrooms, kitchen/break rooms and janitorial areas. A minimum of 1/2 to 1.0 CFM per sf exhaust is recommended for these types of spaces.

## 3.9.3 Maintenance Parking Areas

Filtered and heated ventilation supply air distribution system, plus exhaust, is required to serve the maintenance and vehicle parking areas. Vehicle maintenance and enclosed parking areas must comply with California Fire Code (CFC), California Mechanical Code (CMC) Table 403.7 and NFPA.

## 3.9.4 Building Temperature Controls

Direct digital controls (DDC) and Energy Management Control System (EMCS) are required to comply with CalGreen/Title 24, §102.2, Article 4.5.1. All new DDC/EMCS systems must be able to interface with existing Trane BACNet system or Daikin's VRV/VRS controls.

EMCS shall incorporate integrated hardware and software designed to: perform data acquisition, monitor alarms, provide exception reporting, automate controls, and produce historical records of the buildings or the site.

EMCS shall maintain zone comfort, access the system locally (for each building) and centrally (for the entire site, campus, or portfolio) at the same time, to monitor local and remote alarm systems, and provide graphical

## SECTION 3 - DESIGN CRITERIA NARRATIVE

system displays, graphical analyses, and energy-use summary reports customized to the facility's operations. In addition, the EMCS shall ensure the operation of each buildings' HVAC, domestic hot water, fire alarm, security and lighting systems. The EMCS shall evaluate the energy characteristics of the HVAC, domestic hot water and lighting system and validate that cost reductions are, in fact, being achieved.

**3.10 Plumbing Systems**

Domestic and fire protection water shall be provided to the building from a water line extended from the site service connection. A strainer, lead-free reduced pressure backflow and utility grade remote reading water meter must be provided on domestic water lines serving the building. The backflow relief shall discharge outside of the building. Pipe sizing inside of the Facility shall comply with the requirements in the California Plumbing Code (CPC) and a maximum system piping loss to provide a 10 percent pressure safety factor at full system flow. Velocities within any main or branch of the piping shall not exceed 7-feet per second (FPS). Interior domestic water piping above grade will be Type L copper with copper solder- or pressure-sealed joints. All buried domestic water pipe below slab shall be protected with 20 mil polyethylene tape and pipe sleeve at slab penetration.

The supply line to each item of equipment or fixture must be able to be isolated for repair and maintenance without interfering with the operations of other equipment or fixtures. Water hammer arrestors will be in an accessible location on the domestic water piping system where shock pressures could occur. Water hammer arrestors will be PDI-WH 201 certified.

A high efficiency domestic water heating system will be provided with hot water

recirculation. Per CALGreen/Title 24 standards, a recirculation pump with timer are required to provide sufficient hot water throughout the facility. A thermostatic mixing valve will be installed on hot water systems. Domestic hot water system to be provided with thermal expansion tank, and re-circulating pump, for hot water return system. All hot water piping shall be insulated. The use of combustion-fired equipment is prohibited. High-efficiency, low-flow plumbing fixtures will be employed throughout the building to meet current CALGreen/Title 24 standards. ADA-compliant electric water coolers and toilet room fixtures will be incorporated.

Water closets will be low flow, vitreous china, siphon jet, 1.28 gallon per flush (GPF) maximum; commercial seat with self-sustaining check hinge. Utilize ultra-low flow vitreous urinals (0.125 GPF).

Lavatories will be under-counter or wall-hung mounting, with deck mounted, hydraulic powered, 0.35 GPM infrared faucets, with sensor under spout.

The floor mounted mop basin will be molded stone with wall-mounted chrome-plated service sink faucet with vacuum breaker; ADA compliant handles with maximum flow rate of 2.0 GPM. Break (coffee) and kitchen area sinks will be stainless steel.

A gravity sanitary lateral will handle all levels, except the basement. The basement will have a sewage ejection system consisting of a sump tank, duplex ejector pumps and pits sized to unit pump to a maximum of six starts per hour. Ejector pumps will be connected to standby power. Sanitary waste will discharge to the street main.

All industrial waste, covered parking, deck drains, and site runoff will drain to an appropriately sized oil/water interceptor prior to connecting to the municipal sanitary system. The storm water system will consist of area drains, roof drains and over-flow drains. Reclaimed water will be used for landscaping at new City facilities, as required per the San Francisco Green Building Code Amendments and GS6 Form for municipal projects.

**3.11 Fire Protection Systems**

The PPC shall comply with all requirements and criteria (for safety, security, and reliability) to design, furnish, and install a complete and integrated fire protection system. The hazard and coverage requirements for fire protection systems shall be established in conjunction with the City and Authority Having Jurisdiction (AHJ). Provide fire suppression systems in compliance with San Francisco Building Code, San Francisco Fire Code, NFPA 13, 14, 30A, and 88A. Emergency Responder radio signal shall cover the entire Facility, in compliance with the San Francisco fire code. The need for a fire pump will be determined by the fire suppression designed and available fire water pressure in the existing system.

Electric bus technology is rapidly evolving. The battery chemistries that will be deployed in a future battery electric fleet are unknown. The fire risk and corresponding fire suppression strategies for various lithium ion battery chemistries vary greatly. To ensure that robust fire suppression strategies are in place, the design team responsible for the detailed design of the Facility must include a fire protection engineer, licensed in the state of California, with applicable experience. Furthermore, the design team must coordinate with the SFMTA's fleet engineering division to determine the likely

## SECTION 3 - DESIGN CRITERIA NARRATIVE

composition of the future battery electric fleet, including battery chemistry, capacity, suppliers, size, and charging stations.

For the Bus Yard Component and the Common Infrastructure, a risk analysis shall be conducted to demonstrate to the satisfaction of the City that the required active and passive fire protection systems can be expected to provide a level of performance equivalent to that envisioned by regulatory requirements. For areas where buses are garaged, the number of buses assumed to be involved in a fire scenario shall be rationally justified. The risk analysis shall include the basis for assumptions about fire growth, fire spread amongst buses, and fire department response time. It shall also consider performance of active and passive fire protection systems with respect to a fire scenario which may exceed traditional material performance testing criteria.

The fire protection experts on the detailed design team will be responsible for devising a robust fire protection system for the Facility that minimizes risk to the Housing and Commercial Component. Their review and recommendations will include, but not be limited to, the location, ventilation, and fire suppression systems for the Bus Yard Component and the Common Infrastructure, as well as for the Housing and Commercial Component. Consistent with California Fire Code, Section 1206.2.11.3, minimum continuous ventilation in battery storage rooms shall be the greater of 1 CFM/SF or 150 CFM, and shall follow any additional guidelines within the California Building Code and California Mechanical Code. Current and potential future EV Charging Areas shall include provision for ventilation compliant with California Building Code Section 1202.2 and California Electrical Code Section 625.29. This requires ventilation by parking

space based on the type of charger serving the location. Ventilation requires proper supply and exhaust, which can be achieved through active supply ventilation or direct outdoor exhaust with passive intake.

The final design of the fire protection system shall be completed by a C-16 licensed fire protection contractor based on design criteria developed by the Principal Project Company's Fire Protection Engineer. The design criteria shall be informed by the risk analysis referred to above and by regulatory requirements. The system shall be hydraulically calculated. Sprinkler system occupancy hazard classification, minimum density and maximum sprinkler spacing and standpipe requirements shall be determined in concert with the AHJ. Street hydrant flow test data will need to be determined during the PDA phase.

### 3.12 Electrical

#### 3.12.1 Systems Overview

Basic electrical systems requirements for the Project include powering the mechanical systems, maintenance equipment, convenience receptacle power, interior and exterior lighting systems with controls, an addressable fire alarm system and to provide power to other utilization pieces of equipment through the Facility.

The electrical distribution system shall be set up to allow for charging of the future electric bus fleet and all electric non-revenue vehicles as shown in Table 2.E of Section 2 in the Space Needs Program.

#### 3.12.2 General Facility Requirements

As a municipal City department, the SFMTA partners with the San Francisco Public Utilities Commission (SFPUC) as electrical provider. The SFPUC operates Hetch Hetchy Power, a

Publicly Owned Utility. The SFPUC relies upon PG&E's transmission and distribution grid to serve its customers, for which PG&E receives a fee. This situation, with the lack of designated service territory boundaries between the two utilities, is unlike any other in the country, and greatly limits the SFPUC's visibility into PG&E's grid infrastructure and capacities. PG&E does not provide feeder capacities unless the SFPUC applies for service through the Wholesale Distribution Tariff (WDT), a costly process that requires up to three years for PG&E to perform a System Impact Study to determine the available new load capacity.

Under the WDT, each SFPUC customer intertie point is viewed by PG&E as a utility-to-utility connection. As such, PG&E applies the rules of the WDT to each SFPUC customer connection. Upon completion of the review, any grid or infrastructure upgrades required by PG&E are borne solely by the SFPUC customer.

In March 2021, SFMTA submitted two Wholesale Distribution Tariff (WDT) electrical service applications to the SFPUC. The first application ("Feeder 1") focused on the industrial uses intended for battery electric bus (BEB) charging loads, and the second application ("Feeder 2") focused on the mixed-use housing and retail loads and remaining BEB loads. Both applications and supporting materials were based on a total projected load predicated on the RDC. These two original electrical service applications are attached to this DCD in Appendix C, for reference.

In March 2023, PG&E issued to the project a System Impact Study (SIS) report in response to each of the two WDT service applications. In the time since the original applications were submitted in March 2021 and the SIS reports were issued, SFMTA has determined that the

## SECTION 3 - DESIGN CRITERIA NARRATIVE

transition to BEBs at the Potrero Yard Facility will be deferred to a later date no sooner than 2040 (reference Division 5 Battery-Electric Bus Supplemental Criteria). As a result, the project will proceed DocuSign Envelope ID: 580479DF-30FF-46C3-8388-378A8FFFE7A with one electrical service application for mixed-use that will serve all Project load demands required for the Bus Yard Component, Joint Development Alternative 1 Housing and Commercial Component, Joint Development Alternative 2 Paratransit Component, and Common Infrastructure (reference Division 1 General Provisions, Project Description).

The SIS report for the mixed-use service application is attached to this DCD in Appendix, for reference. While this SIS report reflects an assumed maximum net electrical load demand to be 7.8MW, PPC shall work with PG&E to ensure that the new electrical service enabled through the mixed-use service application provides for the total load demand for the Project and all of its components. To this end, PPC shall ensure that the total load demand for the Project falls within a capacity of 11MW as delivered through this new electrical service.

In the context of all Project load demands being served by one single 11MW electrical service, PPC shall implement the electrical system for the Bus Yard Component in anticipation of Joint Development Alternative 1 Housing and Commercial Component or Joint Development Alternative 2 Paratransit Component developed in future phases and not concurrent with the design and construction of the Bus Yard Component. Implementation of the electrical service infrastructure serving the Bus Yard Component shall be performed in a way that reasonably facilitates and is compatible with future construction phases to

design and build Joint Development Alternative 1 Housing and Commercial Component of Joint Development Alternative 2 Paratransit Component.

PPC shall make provisions for the portion of the total 11MW electrical service that provides DC traction power to the electric trolley buses to be able to be completely isolated from the rest of the Infrastructure Facility electrical distribution, so that SFMTA maintains operations, maintenance, metering, and functionality, with the ability to monitor, isolate, or de-energize at their sole discretion. Reference section 3.12.3 through 3.12.6 in the DCD for further explanation of salvaging and reconnecting the existing traction power feeder B-3 to power the electric trolley fleet in the new Facility.

The SIS report in Appendix H describes the anticipated off-site utility improvements required to be performed. PPC shall perform all work (design, traffic control, demolition, excavation, shoring, trenching, coordination with PG&E construction crews and inspectors, install new / modify existing utility vaults, install conduit, install new duct banks, soil and debris off haul, backfill, paving, sidewalk restoration) and obtain the necessary permits to enable PG&E's design provided in the final Service Agreement. PPC's scope of work will be finalized once PG&E produces and transmits the final service agreement to the project.

Power for the Facility will be 480V/277V, 3 phase, 4 wire, with solid neutral. All equipment with a large electrical load will be served at the highest voltage possible, 480V, 3 phase<sup>8</sup>. A transformer will step down the voltage to 480V.

Power requirements for battery-electric bus charging infrastructure are included in

Division 5 (*Battery-Electric Bus Supplemental Criteria*) of the Technical Requirements. The main electrical room shall be designed to accommodate switchgear and associated electrical equipment to handle the future BEB fleet charging.

The electrical distribution system will be segregated by the type of load; life safety, critical emergency, and optional emergency power loads. Loads shall also be separated by lighting, industrial, receptacle, and mechanical equipment. Provisions to monitor these load through meters shall not be initially installed; however, the design shall allow their installation in the future. An ATS shall be provided for each of the emergency systems provided for the facility. ATS's shall be provided with programmable testing, generator start-up, and connected to a building information system to monitor the status of the emergency system.

CALGreen receptacle control will be achieved by tying receptacle control devices into the lighting system control panel. The Lighting System occupancy sensors will be utilized to turn off 50 percent of the receptacles within a room when the room is not occupied.

Electrical charging for non-revenue vehicles shall be installed in compliance with Department of Building Inspection Form GS6: San Francisco Green Building Submittal Form for Municipal Projects. Initial panel boards in the vicinity of non-revenue vehicle parking, shall be provided with 20 % 40 Amp, 208V single phase spaces for future EV charging stations. Panelboard serving EV charging

<sup>8</sup> See Appendix C and Division 5 Battery-Electric Bus Supplemental Criteria for power needs for BEB fleet infrastructure.

**SECTION 3 - DESIGN CRITERIA NARRATIVE**

shall be a minimum 225 amp bus with a calculated demand load that will allow the future EV loading to be added to the panelboard. EV charging stations shall be installed per SF Environment Code requirements.

**3.12.3 SFMTA Traction Power Network**

The SFMTA's traction power network is comprised of 28 substations and 45 independent feeds, which together deliver Direct Current (DC) traction power to about 500 route miles of overhead catenary system and serve 3 different modes (electric trolley buses, historic streetcars, and light rail trains). The network delivers DC traction power at a nominal voltage of 650 VDC, and the SFMTA electric trolley bus vehicles are suited to run on that system. The total capacity of the traction power network is approximately 180 MW. The SFMTA's utility provider to this network is PG&E.

SFMTA electric power distribution network connects the DC output from various substations through power cables routed in underground duct banks to the overhead contact system.

**3.12.4 Potrero Yard Traction Power System**

The electric trolley buses at Potrero Yard are fed from the Bryant Street substation. One feeder circuit (Feeder B-3) is reserved specifically for electric trolley buses in the yard, and another feeder circuit (Feeder B-7) powers the OCS right-of-way ROW around the yard for service adjustments and transitions. The overall power system feeder diagram and individual diagrams for the on-site feeder and the feeder that circles the right-of-way of the yard are attached and can be found in Appendix D of this Design Criteria Document.

The SFMTA requires that the traction power

system be safely disconnected when the yard is demolished and that the new facility be reconnected to the traction power system to serve the overhead catenary powering and charging the vehicles in the yard and supporting the transition to revenue service in the right-of-way. This section provides relevant information to support that process.

Potrero yard will be expanding the number of electric trolley buses (ETB) stored there as a result of the delayed transition to a full replacement of ETB with battery charging electric buses. To accommodate this change and to ensure reliable power availability in the yard, electrical capacity to power the expanded ETB fleet will be provided by a combination of the reconnected and reconfigured existing traction power Feeder B-3 and utilizing a portion of the new 11 MW electrical service to be delivered through the WDT electrical service application process. The traction power distribution to be provided by the combination of this new traction power feeder distributed from the new 11 MW electric service and the existing Feeder B-3 shall be designed and installed so that the electric trolley bus load is divided approximately equally among these two power source feeders. Each feeder section shall be spatially continuous to minimize interface between the two feeder sections and to minimize areas that would require both feeders to have power switched off and be grounded in order to be made safe. A load rated disconnect switch shall be provided to allow for connection or isolation of the B-3 feeder and the new traction power feeder.

Similar to the new traction power feeder, PPC shall make provisions for the reconnected and reconfigured Feeder B-3 to be able to be completely isolated from the rest of the

Infrastructure Facility electrical distribution, so that SFMTA maintains operations, maintenance, metering, and functionality, with the ability to monitor, isolate, or de-energize at their sole discretion.

Appendix F contains security sensitive information that must follow the required processes and procedures set forth in Appendix F, for access to traction power related specifications.

**3.12.5 Isolating and Disconnecting the Traction Power System for Demolition**

Within the yard boundary, specifically for the feed serving the yard, the process for disconnecting the traction power feed is straightforward because the feeder circuit is dedicated to the yard. Standard process to rack out and lock the feeder, verify de-energization, and place protective ground is required. The PPC shall coordinate closely with the SFMTA on this process.

For work in the right-of-way around the yard, the circuit is a lot more widespread and will require a local isolation. Right-of-way work requires close coordination with the SFMTA. PPC shall submit each phase of design drawings for SFMTA review.

PPC is responsible for designing and performing all traction power disconnection and reconnection procedures, in close coordination with the SFMTA.

**3.12.6 Reconnecting the Traction Power System to Serve the Trolley Bus Fleet**

Upon completion of the Facility, the trolley bus charging function and all transitions to revenue service (navigating from Mariposa Street into the Project Site) must return to the SFMTA traction power system practice. This

## SECTION 3 - DESIGN CRITERIA NARRATIVE

will require close coordination with the SFMTA to ensure a seamless reconnection. The electrical design and built connection must be accepted by the SFMTA to confirm that it meets SFMTA specifications before plugging into new system. To design the reconnection, the PPC shall use the feeder map shown in Appendix D to understand how electricity is currently distributed through the yard. PPC shall follow all California General Orders and references pertaining to electrical utilities, including, but not limited to the list contained in Appendix B: SFMTA OCS Design Criteria.

### 3.12.7 Existing Traction Power Circuit Condition and New Traction Power Circuit Cable Path

The existing traction power distribution circuit servicing Potrero Yard from the Bryant Street Substation is approximately 40 years old. Once SFMTA completes the initial study as described in section 3.12.4, the City will inform the PPC regarding any further site due diligence expected to be performed jointly between the PPC and the SFMTA.

### 3.12.8 Battery Electric Fleet Requirements

The California Air Resources Board Innovative Clean Transit legislation requires all bus public transit fleets in California to convert to clean energy propulsion by 2040. The SFMTA has made an organizational decision to replace our Hybrid Electric and Trolley Electric Buses with BEBs. BEB charging infrastructure is required at Potrero Yard. BEB design requirements and standards are described in Division 5 (*Battery-Electric Bus Supplemental Criteria*) of the Technical Requirements.

Charging infrastructure for the battery-electric buses at the Potrero Facility will be required once the SFMTA transitions from trolley buses. The Potrero Facility shall be designed to enable a fluid, efficient transition. Trolley buses require

an overhead line affixed in some way above the parking lanes. The SFMTA will leave the design solution to the PPC, and requires that the overhead infrastructure for the trolley bus parking spaces shall be designed to ensure seamless transition from the trolley buses to battery electric buses.

Performance standards and acceptance criteria for charging modules/equipment are described in the E-Bus Performance Requirements Documents. The bus charging solution shall be fed at 480V, 3-phase. The intent is to power multiple units using a single charging cabinet. To facilitate the transition to a battery electric fleet, all bus charging feeders will be run above grade in the ceiling structure or overhead/mezzanine space. Bollards and other physical barriers shall be placed to protect any ground-mounted charging infrastructure.

The facility's overall power requirement shall accommodate a full yard of Battery Electric Buses (213 bus capacity). The final orientation and fleet organization shall be confirmed with the SFMTA at the PDA phase. All battery-electric bus switchgear/equipment shall be provided within the main electrical room. Any power or equipment that cannot be provided due to utility provider requirements must be accounted for in transition planning documents and have adequate space reserved and identified in the main electrical room.

### 3.12.9 Battery Electric Bus Transition

When Potrero Yard fully transitions to battery-electric bus, the battery-electric bus parking lanes and associated infrastructure shall be designed to transition to the new electrical service connection for the building. When this occurs, the traction power feeder to the yard shall again be deenergized. The Principal Project Company (PPC) may consider reuse of

the traction power feeder to provide enhanced emergency backup power, or another building purpose following replacement of the trolley bus fleet with battery-electric buses. The SFMTA will also begin a process in earnest in the coming years to consider the full decommissioning of the trolley bus OCS system, including how the traction power system could be safely repurposed.

### 3.12.10 Fire Alarm System

A fully addressable fire alarm system shall be provided for the Facility. The fire alarm system shall contain sufficient activation devices (i.e., pull stations, smoke detectors, heat detectors, UV/IR detectors, etc.) as required by Code and additional detection necessary to achieve the overall fire safety goals. It shall monitor the building's sprinkler system and provide occupant notification in the case of a fire event. Premise monitoring shall be provided by an off-site entity in accordance with NFPA 72.

### 3.12.11 Lighting

#### *Interior Lighting:*

Lighting systems for the Facility shall utilize LED light sources with dimmable drivers. Daylight harvesting shall be utilized wherever practical. Daylight sensors shall be installed to allow the dimming of the LED lights when there is enough natural daylight within the space. Occupancy and vacancy sensors will be incorporated into a low voltage lighting control system for all interior and exterior lighting systems. All offices and small rooms shall be provided with occupancy sensor(s) as required for full room coverage. The Facility's lighting control shall operate on the following properties:

- An addressable lighting control system shall be provided. The system shall be programmed with normal building operational hours and

**SECTION 3 - DESIGN CRITERIA NARRATIVE**

shall turn the lights on and off in compliance with the hours of operation.

- All regularly occupied spaces such as offices shall be provided with vacancy sensors. All other spaces such as bathrooms, janitor closets, back of house shall be provided with occupancy sensors. All sensors shall turn off the lights after 5 minutes of no occupancy.
- All areas with natural daylight shall be provided with daylight harvesting. Once the sensor picks up enough daylight within a space the lighting control system shall dim the LED luminaries. The luminaries shall be dimmed to a minimum level of 10 percent while maintaining design fc levels.

**Exterior Lighting:**

Site lighting fixtures will be an LED light source with a dimmable driver. The fixtures will be controlled by a programmable low voltage lighting control panel. Luminaries shall be provided with occupancy sensors. The required control of the exterior lighting shall be:

- An addressable lighting control system shall be provided. The lighting control system shall contain an astronomical time clock and input from a photo sensor. The lighting control system will turn on the lights at dusk so that the lights are on at the start of the normal parking lot hours. The lighting control system shall turn the lights off at either the scheduled time, or dawn (whichever is first).
- After 11:00 PM the luminaries shall reduce to 25 percent light output. If a luminaire senses motion, that luminaries shall increase brightness to full bright. After 10 minutes of no motion the luminaries shall drop back down to 25 percent.

- All staff entrances and exits should have pedestrian level lighting for staff circulation safety.

**3.12.12 Emergency Power**

The Bus Yard Component and the Common Infrastructure shall be provided with an emergency generator which will allow the Facility to operate for 24 hours, at limited capacity in the event of a power outage or emergency. The emergency generator must be designed to provide power to Life Safety Loads, Critical Electrical Loads, and Additional Emergency Loads. In addition to this Section, refer to Section 3.8.1 for the resilience and recovery requirements for the Facility, and to Division 5 (*Battery-Electric Bus Supplemental Criteria*) of the Technical Requirements for emergency power requirements related to BEB fleet resiliency.

Generators shall be designed and installed to meet all applicable codes.

The following list of items must be on emergency power (NFPA 110 requirement included):

Life Safety Loads:

- Pathway egress lighting
- Exit lighting
- Fire alarm systems
- Other loads to ensure human life safety

Critical Electrical Loads:

- IT/Data rooms and systems
- Security systems
- Communications systems
- HVAC equipment serving these spaces
- HVAC control system
- Elevator(s)
- Fume ventilation systems

**Additional Emergency Loads:**

- Automatic garage door openers at entrance and exits of the facility.
- Four maintenance bays- SFMTA with the assistance of the PPC to specify which during the PDA phase.

Diesel generators are assumed to be the base case for design and pricing purposes and are a reliable mode of backup power generation but are inconsistent with long-term decarbonization goals for the City of San Francisco and State of California, and create space, maintenance, and hazard impacts for the site.

There are lift safety loads on the generator; the Life Safety Code and NEC requires an uninterruptible fuel source for the generator. Permission is required by local AHJ to verify the generator is uninterruptible.

**3.12.13 Electrical Communications**

**Electronic Communications System Overview:**

Communications systems shall include a Structured Cable System, Public Address (PA) System, and a Telecommunications Grounding Connection. The general systems and basic operations of the communications system are covered in this section.

**Governing Codes:**

California Electrical Code (CEC) provides minimum safety requirements for these systems. Design and installation shall be based on the CEC, BICSI, and IT best practice and manufacturer's recommendations. Structured Cable System pathways shall be based on current telecommunications performance standards.

**SECTION 3 - DESIGN CRITERIA NARRATIVE**

**Public Address (PA) System:**

Amplifiers and speakers shall be provided throughout the Facility and will be accessed through the telephone system or dedicated microphone. PA speakers must be strategically placed within the Facility allowing the PA system to provide uniform sound coverage for all PA announcements.

**Structured Cable System:**

Structured Cable System pathways will be provided for City-provided equipment including, but not limited to: wireless access points (full building coverage), administrative workstations, shop workstations, and fuel stations.

IT space requirements depend on total number and sizes of the workspaces. See Table 3.G for workspace details.

General industry standards shall be followed for wiring and wiring runs. Category 6 cables generally cannot be longer than 100 meters.

TABLE 3.G - NETWORK CABLES

NETWORK CABLE (QTY.)	19" RACKS	SPACE NEEDED
0 - 100	Half rack	3' x 3'
0 - 300	1	10' x 6'
301 - 600	2	10' x 8'
601 - 900	3	10' x 10'
901 - 1200	4	10' x 12'
1200 - 1500	5	10' x 15'

**Telecommunications Rooms:**

The Bus Yard Component and the Common Infrastructure shall have a Main Telecommunications Room (MTC) for the Main Distribution Frame (MDF), security equipment, routers, core switches, and servers. Provide two four inch conduits to the MTC from the

Main Point of Entry (MPOE) to facilitate current program and future growth. The MTC shall include two to four empty network racks for potential equipment. Telecommunications Rooms shall be provided as required to provide connectivity and house the Intermediate Distribution Frame (IDF) for all work stations. TC rooms shall have two-inch conduit paths back to the MTC. All rooms shall be designed for future expansion and be equipped with equipment racks and cable management systems for organized and efficient cable routing. A 48-strand fiber optic cable (single mode) running from MTC to TCs is required.

**Grounding System:**

A telecommunications grounding will be implemented to protect telecommunications equipment. The telecommunications grounding system shall be connected to the Electrical Safety Grounding System.

**3.12.14 Electrical - Security**

**Electronic Security Systems Overview:**

Security Systems include a Video Surveillance System (VSS), and an Access Control System. Security system devices shall be strategically placed throughout the Facility based on the SFMTA input during the PDA phase, best practice, and industry standards.

**Governing Codes:**

The CEC provides minimum safety rules for these systems. Design and installation shall be based on the minimum CEC requirements, best practices, and manufacturer's recommendations. Physical separation between the Bus Yard Component and the Housing and Commercial Component shall be provided to limit access and decrease the security threat to either.

**Systems Monitoring:**

Security Systems will be monitored from the operations or general manager office with exact locations to be determined during the PDA phase. Bus Yard Component will provide cameras and monitoring for the bus yard major entrance and exits. The Housing Components will provide cameras and monitoring for the housing major entrance and exits. Off-site monitoring is a minimum requirement.

**Video Surveillance System (VSS):**

The PPC shall use a SFMTA approved VSS system that interface with our network software, etc. and to provide real time recording of critical areas and the parking areas. Strategically located cameras will be required in designated areas for video monitoring and recording for forensic use. At a minimum, all entrances and exits shall be covered. The cameras shall be IP based (minimum 1080P) and compatible with the SFMTA standards. Camera selection and placement will be determined during the PDA phase in consultation with the SFMTA. Required camera placement and field of view shall be shown on the floorplans. The SFMTA expects that available camera models may improve by the time construction is completed and therefore will do a final review of the camera selection and supporting infrastructure prior to their ordering and installation. The SFMTA maintains a list of approved camera models that have been tested and are approved. The SFMTA will review the VSS halfway through the design.

**Access Control System:**

A card access system shall be provided that is compatible with the existing SFMTA system to allow access to the site gates, building staff entry, and critical areas.

**SECTION 3 - DESIGN CRITERIA NARRATIVE**

The existing SFMTA access control system works as follows. Each SFMTA employee has an access card that is encrypted with a facility code and card number. This information is programmed into a Honeywell ProWatch Data Base by an SFMTA Administrator. The card is then waived in front of a card reader at a door, elevator, or any other location that requires a card reader for access. The card reader reads the information from the access card, and if the employee has access, the door or elevator will open or operate as normal. The door and card reader have wires running to it from the Access Panel usually installed in the IDF closet. The Panel then is tied into the SFMTA network. The power supply is tied into the access panel, and the panel has a relay that pulses the power supply when it receives a positive card read.

**Building Access Doors:**

Entrance into the Bus Yard Component through building doors and at all emergency egress routes that may be shared with the

Housing and Commercial Component shall be controlled by a card reader system. When a valid RFID card is presented to the local card reader at the door, the lock will be opened, allowing ingress. Entrance gates shall also be capable of functioning on a schedule. For example, gates for bus and delivery entry may be left open during business hours for free ingress/egress, but after-hours ingress may be controlled by the card reader system.

**Intercom System:**

The Facility shall be equipped with an intercom system consisting of two-way intercom stations located at locations to be determined during the PDA phase in consultation with the SFMTA. The intercom system shall be IP based and must be compatible with existing SFMTA standards. The intercom system shall be interoperable with the access control system as ingress or egress requests can be made from an intercom station.

**Uninterruptible Power Supply (UPS) System:**

A UPS system shall be provided for security electronics to allow security electronics, network equipment, and phone system to maintain function in the event of a power interruption. This system is on emergency generator power system and a rack mounted UPS with 15 to 30 minute battery back-up for system ride through during power outage events shall be provided. Determine during PDA phase with consultation with SFMTA. Other customized IT systems such as Radio, Computer Aired Dispatching, Fleet Watch, and others shall be addressed in detailed design in coordination with the SFMTA.

**3.13 Solid Waste Disposal**

A single consolidated location for the Bus Yard Component is required in the basement for recycling, composting, and landfill waste. Waste shall be delivered to receptacles through trash chutes running from the Bus Yard Component to the basement. The trash facilities shall include a 30-yard recycling compactor. The basement shall be fully accessible to garbage collection vehicles. The trash area shall be well lit and ventilated to avoid noxious smells. The drawing package shows approximate location for waste area, final sizing, design, and equipment will be determined during detail final design. The waste area must be compliant with Chapter 19 of the Environment Code and the City and County of San Francisco.

This section of the code deals with waste disposal, the three waste streams (recycling, landfill, composting), and compliance monitoring.

TABLE 3.H - RECIPROCATING VS. ROTARY SCREW AIR COMPRESSORS	
RECIPROCATING	ROTARY SCREW
Cost advantage as single-acting, air cooled unit below 30 HP	Used more in 150 PSIG, lubricated air systems above 30 HP
Double-acting units used in 175 PSIG and in non-lubricated applications	Used for constant volume, variable pressure applications
Normally used for heavy duty, continuous service	Oil or water is used for sealing and cooling
High overall efficiency	Must vent reservoir to lower power consumption when unloaded
Operates efficiently at partial loads	Delivers high air volume in a compact space
Saves horsepower under no-load conditions	Smooth pulse-free output
High maintenance costs	Easy to install and maintain
Requires heavy (concrete) housekeeping pad	Low vibration

## SECTION 3 - DESIGN CRITERIA NARRATIVE

**3.14 Compressed Air and Lubrication Distribution Equipment**

The compressed air and lubrication distribution systems are two important aspects of a facility that provide ease of use for the mechanics working in a multi-bay facility. The compressed air and lubrication piping will need to be sized properly to support the shop equipment throughout the facility. The lubrication equipment needs to support the vehicles being serviced for the facility to be most efficient. Table 3.H provides comparison details for reciprocating and rotary screw compressors.

There are several factors to be considered in the appropriate compressed air and lubrication system selection including (but not limited to):

- Number of bays
- Lubrication fluids needed at each location
- Length of longest piping run
- Monitoring technology

**Rotary Screw Compressors:**

These types of compressors use two rotors or helical screws to compress air to produce compressed air. Rotary screw compressors are quieter than piston units, allowing a quieter work environment while operating relatively energy-efficiently. Operating temperatures are at least 100 degrees F cooler than piston units, resulting in longer life. Rotary screw compressors are most efficient when in constant operation because they require approximately six minutes to ramp down from compression duty. During this time, the compressor is not fully loaded but still requires some amount of power input that does not produce any compressed air.

However, the amount of time required to ramp down from compression duty will be reduced to

about 20 seconds when the unit is operated by a variable frequency drive (VFD).

The maintenance (long-term) cost of a rotary screw compressor is one major drawback because the more complex equipment with electronic components requires more regular maintenance compared to piston-type compressors. However, because screw-type compressors do not operate with as much friction as piston-type compressors, the frequency of maintenance is significantly less than piston-type compressors.

**Reciprocating Piston Compressors:**

Piston compressors are typically used for general-purpose applications such as workshop/air, where the air is used for hand-tools, cleaning dust, small paint jobs, etc. It is one of the most commonly used compressor types. Piston compressor are available from 1 HP to about 50 HP. The motors can be duplicated (duplex) in effort to double the power output (horsepower) and can then be configured in a lead-lag operation to ensure equal wear on the motors.

Piston compressors are more economical below 30 HP and work well in maintenance shops as they are more suitable for high pressure (175 PSIG or more) applications.

Piston-type compressors have a simple design and can be more easily fixed by facility maintenance staff compared to a screw-type compressor.

There are a few drawbacks to piston compressors such as excessive noise, high outlet temperature, and high oil content in air piping. These can all be mitigated through engineering a system appropriately.

**Refrigerated Air Dryers:**

An air dryer is an integral piece in compressed air treatment system. Air quality can have a significant impact on compressed air tools and equipment. Properly treated compressed air, and the right air dryer, will improve productivity, system efficiency, and product or process quality. Refrigerated air dryers are specifically designed to handle the high discharge temperatures of piston compressors. The purpose of using a refrigerated air dryer is to remove entrained moisture in the air to prevent corrosion in air tools with moving steel parts. Refrigerated dryers typically provide dew points of 40 degrees F at rated conditions.

A few filters are required to be used in compressed air systems. The particulate air filter is downstream of the compressor and upstream of the dryer. This type of filter removes any dust or particulates in the air. The second filter located downstream from the dryer is the coalescing air filter, which removes the excess oil and water left in the air by the compressor and the dryer.

**Desiccant Air Dryers:**

These types of air dryers do not require power to dry the air, as is the case with refrigerated air dryers. These types of dryers utilize a filter that captures the entrained moisture in the compressed air. Desiccant dryers trap so much of the moisture from the air that they typically reduce the dew point temperature to -40 degrees F.

**Compressed Air Receivers/Tanks:**

Air receivers are pressure vessels that store treated or untreated compressed air. The air stored in these vessels alleviates the frequency of starts required by the compressor whenever compressed air is used. Some reciprocating

## SECTION 3 - DESIGN CRITERIA NARRATIVE

and rotary screw compressors can be mounted on an air receiver, but some are base/floor-mounted.

**Bulk Fluid Storage Tanks:**

Bulk Storage Tanks allow facilities to store large quantities of fluids while meeting required codes with double wall containment. Tanks can be monitored to promote more efficient product inventory control and throughput data. Tanks are available in sizes from 100 gallons to 50,000 gallons based on the frequency that the facility wishes to receive fluid deliveries. These tanks can also be utilized for waste/used fluids such as used oil and used coolant. Tanks are typically stored in a central location along an exterior wall for reduced piping lengths and ease of delivery and extraction of bulk fluids.

The amount of waste from empty bottles and jugs, the amount of time it takes to handle each bottle, and the amount of spilled fluid is greatly reduced when using bulk fluid storage tanks. Bulk fluid storage tanks typically hold amounts of liquid greater than 100 gallons for the use of all mechanics within the building.

A tank level monitor is an integral component of the storage tank and will signal the low-level condition at which point the lubrication distributor would refill the storage tanks. Storage tanks are also equipped with a sensor that signals an alarm to sound in the event of a leak.

Bulk fluid storage tanks are typically double-walled to conform to the code requirement for spill containment. Another method of containing leaks is to provide a recessed concrete pit in the bulk fluid storage room directly underneath the bulk fluid tanks. Whichever method is chosen, 110 percent of the storage capacity of

the tank needs to be contained in the event of a leak, as required by code.

**Delivery Pumps:**

Fluids need to be pumped from the bulk fluid storage tanks to the point of application in the maintenance bays area.

**Piston Pumps:**

Pneumatically-powered piston pumps are powerful enough to transfer the fluid from the storage tank to the point of application, hundreds of feet away. Piston pumps can be mounted directly on top of the tank to dampen vibrations. Piston pumps are loud pieces of equipment (73 - 80 dB(A)). Noise dampening is one reason to enclose the lubrication storage area with heavy walls.

**Diaphragm Pumps:**

Diaphragm pumps can also be used to pump fluid from the bulk fluid storage room to the maintenance bays. These pumps do not offer any mechanical advantage – the pressure of the compressed air supply is equal to the pressure of the fluid at the discharge end of the pump at a low flow condition.

Diaphragm pumps are typically used for diesel exhaust fluid and engine coolant but are also capable of transferring engine oil, hydraulic oil, automatic transmission fluid, windshield washer fluid, diesel fuel, and gasoline.

Another special case involves the pumping of engine coolant when the coolant is provided as a concentrate. A 30-gallon drum of water with a float valve is typically specified when mixing the concentrated engine coolant with the water. The diaphragm pump handles the mixing duty to supply a mixture of coolant to water at the desired ratio.

**Piping:**

The size of each pipe varies according to the distance that the fluid travels from the storage tank to the point of application. To determine the size of the pipe required to ensure that fluid will transfer from the lubrication storage room to the point of application, the lubrication system designer will need to know how many dispensers stemming from the same pipeline header are requested to be in use at any given time. Generally, the pipe size increases as the demand of fluid flow increases. Wall thicknesses also need to be considered when selecting the pipe to provide the rigidity necessary to keep the pipe from bursting. The fluid pressure within the pipe is typically 1,000 PSI and even more for chassis grease.

The cross section of a header can be designed to decrease over the length of the run from the storage tank to the maintenance bays. This will help to decrease the cost of materials and will also ensure an acceptable fluid pressure at the point of application. The lubrication system designer calculates the size of pipe based on fluid mechanics equations.

The pumps are also sized in this way to ensure that the pipe length and the pumps are paired to dispense fluid at the furthest point of application.

The type of the pipe selection varies according to the type of fluid being transferred. Bulk fluid liquids may flow through carbon steel. Compressed air will be routed through copper to prevent corrosion. Compressed air does not require pipe of a high tensile strength because it operates at a comparatively low pressure than other fluids.

## SECTION 4 - PERFORMANCE REQUIREMENTS

**Lubrication/Commodity Hose Reels and Nozzles:**

Lubrication hose reels are stationary units in the bays and piped from bulk storage tanks. These reels are in areas where maintenance and re-filling of fluids occurs, typically overhead on columns or mounted to nearby walls. Technicians can quickly dispense and measure fluids being dispensed into vehicles.

Hoses comprise the final length of fluid transfer material before exiting through the point of application (the nozzle). Hose reels offer the convenience of retracting the hose with no significant effort by the user to move the hoses out of the work space. This eliminates tripping hazards and it decreases the amount of time required to move the hose from the work area.

Multiple hose reels can be grouped in parallel and mounted onto the same bracket. In this case, the reels become a reel bank. Hose reels are typically installed overhead on columns, mounted to nearby walls, or are suspended from the ceiling structure.

**Fluid Management System:**

The volume of several types of fluids that the mechanics dispense can be tracked by use of the fluid management system.

The amount of each type of liquid can be monitored by the Fleet Manager to determine the appropriate time to order more bulk fluid from the distributor. The fluid management system tracks the amount of each dispensed liquid by each individual nozzle.

With the fluid management system, the user can enter the amount of fluid that they would like to dispense from the nozzle. The pump air controls will allow the transmission of compressed air to the pumps by the storage tank to allow pumping to commence.

**Waste Recovery System:**

When mechanics drain fluids such as oil and coolant from vehicles, a mobile receptacle is utilized to collect the used fluid. When the mechanics need to empty these containers, units can be rolled to nearby diaphragm pumps located in the maintenance area and used fluid can be pumped into respective storage tanks in the lubrication storage room. Tank level monitors are typically installed in the tanks to signal an alarm to sound when the tank gets above a certain level. When the tank is full, a used fluid evacuation company can be contacted to remove the used fluid from the storage tanks.

**3.14.1 Equipment Manual**

To provide further specificity and direction, HDR | MDG was asked in the Fall of 2018 to formulate specific equipment recommendations in consultation with SFMTA maintenance staff. Those recommendations are included in Appendix C and are also reflected in the equipment drawings within the Reference Design Concept document.

**4.0 Introduction**

The SFMTA envisions the rebuild Potrero Yard as an asset to the SFMTA's transit facility as well as a well-designed, contextual building that celebrates its core public transit use and sensitively designs interactions between untraditional shared uses. The architectural team designing the Potrero Yard Modernization Project shall have proven aesthetic design experience and talent to develop functionally economical as well as aesthetically attractive buildings. Design of the rebuilt Potrero Yard shall be informed by the Division 2 (*Design Guidelines*) of the Technical Requirements.

Coordinate exterior building design, locations for building functional areas and actual room dimensions by functional relationships, local zoning, codes, regulations, ADA requirements, and equipment.

**4.1 Special Foundations**

Special foundations to support combined building/crane columns, jib cranes, and laterally loaded piers/piles shall have appropriate geotechnical parameters based on soil testing and analysis. The effects of repetitive loads shall be taken into consideration for allowable bearing pressures, both vertically and horizontally. Rotations and deflections shall be limited to differential settlement and total settlement that meets the serviceability requirements of IBC for the given material.

**4.1.1 Slab on Grade**

The slabs on grade shall be placed atop engineered soils as required by PPC's Geotechnical Baseline Report. Provide continuous 15 mil vapor barrier meeting ASTM E 1745 Class A with a perm rating below 0.01 perms, immediately under slab over stone capillary break, under entire slab.

Design and locate joints to control and direct shrinkage cracking of concrete elements per ACI recommendations. Submit joint plan to the SFMTA for review and approval prior to placing exposed slabs and walls.

Concrete Floor Finishing: For all exposed concrete floors provide Euclid Surfex Light-Reflective Dry Shake Hardener sealed with Euclid Euco Diamond Hard or approved equal. The manufacturer's recommendations shall be followed including the use/non-use of fly ash and various troweling methods.

**SECTION 4 - PERFORMANCE REQUIREMENTS**

If Integrally Colored Ground and Polished Concrete is selected as a floor finish, special requirements include:

- In areas where polished concrete floors are to be installed, PPC shall fine grade the sub grade uniformly flat using a laser device as described in “CPAA Recommendations for the Design, Specification, and Placement of Concrete Floor Slabs” from the Concrete Polishing Association of America.
- A below slab vapor barrier shall be installed in accordance with CPAA recommendations and shall meet all properties described therein.
- The mix design, placing and finishing of concrete shall comply with ACI standards and CPAA recommendations.
- Curing compounds and densifiers other than those that are included in the selected manufacturer’s system shall not be used in areas of polished floor.
- Provide the following: Floor Flatness – specified overall value: 50, minimum local value: 35; Floor Levelness: - specified overall value: 30, minimum local value: 20. Flatness and levelness shall be tested within 8 hours after completion of the final troweling operation according to ASTM E1155 – 96 any out of tolerance work shall be remedied.
- Saw cut contraction joints shall be laid out by the Design Team and shall comply with CPAA recommendations.

**4.1.2 Service/Inspection Lower Level Work Area**

Service/Inspection LLWA’s shall be provided a continuous membrane waterproofing system for the pit walls and floors. Provide a gravity perimeter underdrain system.

**4.1.3 Waterproofing and Damp Proofing**

All site retaining walls, below grade walls, elevator and LLWA pits, and or below grade conditioned or occupied spaces, shall be provided a full waterproofing system. Provide drainage board, protection board, waterproofing and footing drains. Insulation, when required, is preferred to be exterior to the structure. Acceptable products include:

- Under slabs on grade: Heavy-duty membrane comprised of an HDPE film, pressure sensitive adhesive and weather resistant protective coating. Preprufe 300R or approved equal.
- On vertical surfaces: Self-adhesive rubber/bitumen polyethylene waterproof membrane meeting ASTM E154 and ASTM D570. Bituthane 3000 or approved equal.
- For sandwich slabs, plaza decks above enclosed spaces and green roofs: Hot-applied rubberized asphalt meeting ASTM E-96, Procedure E and ASTM D-5329. Hydrotech MM6125 EV system or approved equal.
- Water based hydrophobic admixture shall be used in the concrete for construction of the below grade walls and floors forming the elevator, service pits, TPSS basement foundation. Product: Hycrete W1000 (W1002 for air entrained elements) or approved equal.
- Footing drains shall be provided at all waterproof assemblies and below grade foundations. Drains shall gravity drain to the extent feasible. Include below grade floors such as elevator and LLWAs. Rigid slotted PVC footing drains shall be set in a bed of crushed stone (minimum 12 inches of stone outboard and above pipe) wrapped with filter fabric. Drainage board material shall extend into the gravel bedding.

- Provide physical (dumbbell) water stops cast into the work at all concrete joints in assemblies to be waterproofed. Use of expansion/bentonite strip type water stops are permissible with prior SFMTA approval.
- Damp proofing shall be odorless and meet ASTM D-1187 Type II and ASTM D-1227 Type III. It is required at below grade concrete stem walls that do not have a face exposed to view. Karnak Corporation, Karnak 100 Non Fibrated Emulsion Coating, or approved equal.
- Where exposed to view, provide above grade concrete and masonry with a breathable, clear-drying, water-based silicone emulsion. Weather Seal Blok- Guard and Graffiti Control II by Prosoco or approved equal.

**4.2 Shell - Super Structure**

The structural framing shall be designed to include wind and seismic drift.

**4.2.1 Floor Construction**

Floor framing shall be designed for the dead and live loads to be used in the facility. In addition to the standard live loads presented in IBC, floors shall support equipment loading.

Concrete slabs to comply with ACI composite flatness and levelness ratings. The following slabs shall have the ratings listed below:

- Shop and storage areas: Flatness 35, Levelness 25.
- Thin-set tile and resilient floor: Flatness 35, Levelness 25.
- Carpeted areas: Flatness 25, Levelness 20.
- Areas where polished concrete flooring has been selected: Flatness 50, Levelness 30.

**4.2.2 Roof Construction**

Roof framing shall have adequate strength and stiffness to prevent ponding. Equipment

## SECTION 4 - PERFORMANCE REQUIREMENTS

suspended from or set on the roof shall be included in the design of the roof members. Roofs shall have a minimum slope of ½-inch per linear foot or greater as required by the roofing system selected.

Roof access shall be provided for all roofs.

Provide OSHA compliant roof fall protection/restraint system for access to all roof areas. The design shall include the ability for maintenance to provide for safe and accessible cleaning of windows per ANSI/IWCA I-14 Window Cleaning Safety Standards.

## 4.3 Exterior Enclosure

The Potrero Yard, including the roofs, may be visible from both the street level and adjacent development around and above the site. The buildings, facades and roofs shall be visually pleasing. The SFMTA shall accept the project aesthetics prior to submittal for design review to the SF Planning Department. Exterior finishes selected must meet SF Planning requirements.

Sustainability requirements may also drive material choices. Energy Code requirements establish the minimum building envelope performance. In the event of a conflict, the most stringent code will apply. The building enclosure shall be designed to preclude birds or other wildlife from nesting or otherwise taking up residence.

## 4.3.1 Exterior Walls

Exterior materials shall be considered on the basis of durability and appearance with the understanding that a minimum 50 year low maintenance life expectancy and 100 year minimum building lifespan is mandated. The SFMTA prefers the use of materials that require little refinishing or maintenance such as stainless steel, aluminum, glass, materials

with anodized or factory finishes, materials with integral color, brick, terracotta, architectural pre-cast, or architectural exposed concrete.

Synthetic stucco, simulated materials such as river rock or other faux cladding, architectural foam detailing and aluminum, plastic, wood or vinyl siding will not be acceptable. Compliance with the City and County of San Francisco Development Standards is mandatory.

At a minimum, the bottom four feet above grade at vehicle entrances and exits of the building shall consist of a hard material such as masonry or concrete.

Coordinate all elements of the wall assembly, including flashing, trim and transitions between materials to provide a weatherproof installation requiring little maintenance, detailed to limit accumulation of dirt or staining.

## 4.3.2 Water and Air Barrier

Provide City and County of San Francisco Energy Code compliant, fluid-applied, vapor-permeable, water and air barrier membrane system.

**Performance Requirements:**

- Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits. Air leakage testing of the

building envelope air barrier installation, as described in the Energy Code, is required prior to covering the air barrier.

- Membrane Air Permeance: (comply with current City and County of San Francisco Energy Code) Not to exceed 0.004 CFM by sf of surface area 4 at 1.57 pounds per sf pressure difference; ASTM E2178 5.
- Membrane Vapor Permeance: Not less than 10 perms; ASTM E96/E96M; Air Barrier systems other than that listed above will be considered on a case by case basis and require the SFMTA approval.
- Acceptable Product: Air Block 17 MR by Henry Company with associated auxiliary materials to provide a complete system including but not limited to transition membranes, sheathing joint membranes, adhesives and primers, sealants and self-adhesive thru-wall flashing, or approved equal. Obtain complete air barrier system from a single source.

## 4.3.3 Weather Barriers

Non-occupied / non-conditioned locations only: Provide a complete weather resistive barrier for all enclosed spaces and all wall assemblies requiring weather protection.

Provide flexible flashing as required to form a weather tight envelope. All openings to be fully wrapped with waterproof flexible flashing with joints shingle lapped. Seal all penetrations through the weather resistive barrier to create one continuous weather barrier enclosure.

Provide Weather Resistive Barrier as made by Vaproshield, or approved equal.

Provide Waterproof Flexible Flashing Blueskin by Henry, Vycor by Grace or approved equal.

## SECTION 4 - PERFORMANCE REQUIREMENTS

## 4.3.4 Exterior Masonry

The following technical requirements shall be met by the Design Team if masonry is selected as a part of the building enclosure:

**Unit Masonry, General:**

- Unit masonry shall be utilized in a cavity wall that functions as a rain screen. Painted masonry will not be allowed.
- CMU is not permitted for the exterior.
- Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6.
- Where unit masonry is selected as a building material, design the building utilizing masonry module, both in plan and elevation, ensure coursing is designed for either full or half block for overall dimensions, control joints, and at all openings.
- Substrate supports for veneer masonry to have a maximum horizontal deflection of 1/720 of the wall height.
- Where exposed to view, provide above grade concrete and masonry with a breathable, clear-drying, water-based silicone emulsion. Weather Seal Blok- Guard and Graffiti Control II by Prosoco or approved equal.

**Performance Requirements:**

- Provide structural or non-structural unit masonry that develops indicated net-area compressive strengths at 28 days.
- Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

**Concrete Masonry Units:**

- Integral Water Repellent: Provide units made with integral water repellent such as Dri-Block.

- CMUs- Standard, Decorative and Pre-faced: ASTM C 90

- ✓ Ground face may be used for unpainted exposed locations on the interior the maintenance facility.
- ✓ Textured block faces (split face, ribbed etc.) are not acceptable.
- ✓ Painted CMU on the exterior of the building is not acceptable.
- ✓ Concrete Building Brick: ASTM C 55.

**Brick - Clay Face Brick:**

- Facing brick complying with ASTM C 216 SW or hollow brick complying with ASTM C 652, Class H40V (void areas between 25 and 40 percent of gross cross-sectional area). No oversized brick allowed. Norman modules preferred.
- Embedded Flashing Materials- Provide continuous flashings at base of wall, heads of openings and under wall caps.
  - ✓ Metal Flashing: Provide metal flashing complying with SMACNA's Architectural Sheet Metal Manual. Use one of the following:
    - Stainless Steel: All through wall flashings shall be 26 gauge, three way keyed stainless steel ASTM A 240/A 240M or ASTM A 666, Type 304. Where flashing is exposed at the touch zone (less than 9-feet 0-inches) the gauge shall be 24 gauge stainless.
    - Flexible Flashing: Use only with the SFMTA approval.

**Miscellaneous Masonry Design Requirements:**

- Ties and Anchors:
  - ✓ General: Ties and anchors shall extend at least 1-1/2-inches into veneer but with at least a 5/8-inch cover on outside face.
  - ✓ Utilize adjustable type 316 stainless steel ties installed in horizontal joints at not less than one metal tie for 4.5 sf of wall area spaced not to exceed 36-inches o.c. horizontally and 16-inches o.c. vertically. Stagger ties in alternate courses.
  - ✓ Provide additional ties within 12-inches of openings and space not more than 36-inches apart around perimeter of openings.
  - ✓ At intersecting and abutting walls, provide ties at no more than 24-inches o.c. vertically. Acceptable product: Hohmann and Barnard DW-10 or approved equal.
- Weep/Cavity Vent and Drainage Products:
  - ✓ Provide both, weeps at the base of the cavity and a minimum equal number of vents at the top of the cavity. Maintain clear airflow space of 1-1/2-inches minimum to face of insulation. Open head joints with mesh required in lieu of rope, tubes or formed inserts. Vertical compartmentalization is required such that no horizontal brick cavity space is longer than 25-feet. All building corners to be compartmentalized within 4-feet of the corner. Provide flashing (if at a control joint) or additional building insulation to back brick face such as to prevent horizontal air flow within the cavity.

## SECTION 4 - PERFORMANCE REQUIREMENTS

- ✓ Provide mortar mesh at all through wall flashings and lintel locations.
- Control Joints:
  - ✓ Control Joints in brick masonry walls shall be placed at openings, near corners, at wall intersections, changes in wall height and as described in the Brick Industry Association document Technical Notes 18A "Accommodating Expansion of Brickwork".
  - ✓ Control joints in CMU walls shall be placed at/near openings, near corners, at wall intersections, changes in wall height or thickness and as described in the National Concrete Masonry Association documents TEK 10-2C or TEK 10-3.
- Minimum 1-1/2-inch airflow space between masonry and insulation
- Steel Lintels shall be hot dipped galvanized, primed and painted per Prescriptive Specification 90 96 00 High Performance Coatings.
- Precast Concrete Coping, Trim and Cladding.
  - ✓ Precast coping units to be utilized for wall caps on masonry walls and veneer. Coping units to include slope for surface drainage and one inch minimum overhang with cast in drip.
  - ✓ Provide mechanical anchorage utilizing stainless steel materials. Provide sealant joints between all cap units and between adjacent materials.
- Submittals - Material sample(s), mock-ups, shop drawings, anchorage and reinforcing materials.

## 4.3.5 Metal Panels

The following technical requirements shall be met by the Design Team if a metal panel

system is selected as a part of the building enclosure:

**Warranties:**

- Special Warranty: manufacturer agreement to repair or replace components of metal panel systems that fail in materials or workmanship within the specified warranty period. Failures include but are not limited to - structural failures (rupturing, cracking, puncturing); deterioration of metals and other materials beyond normal weathering. Warranty Period: Two years from date of Substantial Completion.
- Special Warranty on Panel Finishes: manufacturer agreement to repair or replace metal panels that show evidence of deterioration of factory applied finishes within specified warranty period – including but not limited to color fading more than 5 Hunter units when tested according to ASTM D 2244; chalking in excess of a No. 8 rating when tested according to ASTM D 4214; cracking, checking, peeling, or failure of paint to adhere to bare metal. Warranty Period: 20 years from date of Substantial Completion.

**Minimum Performance Requirements Common to all panel types:**

- Air Infiltration: Air leakage of not more than 0.06 CFM/sf when tested according to ASTM E 283 at a test-pressure difference of 6.24 lb/sf.
- Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the test-pressure difference of 6.24 lb/sf.
- Thermal Movements: Allow for thermal movements from ambient and surface

temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss for a temperature change range of 120 degrees F, ambient; 180 degrees F, material surfaces.

- Provide a concealed fastener wall system with minimum 22 gauge panels.

**Minimum Finish requirements:**

- Two coat fluoropolymer (AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions), - Kynar 500/ Hylar 5000.
- Metal Wall Panels- Plate (Rain screen type):
  - ✓ Additional Minimum Performance Requirements:
    - Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency and indicate design designations from UL's "Fire Resistance Directory".
    - ✓ Acceptable Products: AEP Span; Prestige Series; Centria: FormaBond or FormaBond II; or approved equal.
- Metal Wall Panels – Insulated:
  - ✓ Additional Minimum Performance Requirements:
    - Structural Performance: Provide metal panel systems capable of withstanding

## SECTION 4 - PERFORMANCE REQUIREMENTS

the effects of the following loads, based on testing according to ASTM E 72:

- Wind and seismic loads per IBC; deflection limits for wind loads no greater than 1/240 of the span.
- ✓ Fire-Test-Response Characteristics: Provide metal wall panels and system components with the following fire-test-response characteristics, as determined by testing identical panels and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
- ✓ Fire-Resistance Characteristics: Provide materials and construction tested for fire resistance per ASTM E 119
- ✓ Intermediate-Scale Multistory Fire Test: Tested mock-up, representative of completed multistory wall assembly of which wall panel is a part, complies with NFPA 285 for test method and required fire-test-response characteristics of exterior non-load-bearing wall panel assemblies.
- ✓ Radiant Heat Exposure: No ignition when tested according to NFPA 268.
- ✓ Potential Heat: Acceptable level when tested according to NFPA 259.
- ✓ Surface-Burning Characteristics: Provide wall panels with a flame-spread index of 25 or less and a smoke-developed index of 450 or less, per ASTM E 84.
- Acceptable Products: MBCI eco-FICIENT panels; Centria Versawall or approved equal.

## 4.3.6 Precast Architectural Concrete

The following technical requirements shall be met by the Design Team if precast architectural concrete is selected as a part of the building enclosure:

**Performance Requirements:**

- A qualified professional engineer shall design architectural precast concrete units.
- Design Standards: Comply with ACI 318 and design recommendations of PCI MNL 120, "PCI Design Handbook - Precast and Pre-stressed Concrete," applicable to types of architectural precast concrete units included in design.
- (As applicable) Calculated Fire-Test-Response Characteristics: Provide architectural precast concrete units with fire-resistance rating indicated as calculated according to ACI 216.1 (for precast concrete) or PCI MNL 124, "Design for Fire Resistance of Precast Pre-stressed Concrete," (for precast pre-stressed concrete) and acceptable to authorities having jurisdiction.
- Precast concrete units and connections to maintain clearances at openings, to allow for fabrication and construction tolerances, to accommodate live-load deflection, shrinkage and creep of primary building structure, and other building movements as follows:
  - ✓ Upward and downward movement of 1/2-inch.
  - ✓ Anchorage: Provide mechanical anchorage utilizing stainless steel materials. Provide sealant joints between all cap units and between adjacent materials.

- ✓ Fabrication Tolerances: Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.
- ✓ Finishes: Exposed faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp.
- ✓ Submittals- Product data and samples, mock up and shop drawings.

## 4.3.7 Sheathing

The following technical requirements shall be met by the Design Team when sheathing is utilized as a part of the building enclosure:

**Performance Requirements:**

- Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- Do not use Plywood Sheathing, Paper-Surfaced Gypsum Sheathing, Cellulose Fiber-Reinforced Gypsum Sheathing, Cementitious Backer Units, Fiberboard Sheathing Extruded-Polystyrene Foam Sheathing or Foil-Faced Polyisocyanurate Foam Sheathing for roof or wall applications unless approved by the SFMTA.
- Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
- Type and Thickness: Type X, 5/8-inch Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M
- Acceptable Products: DensGlass by Georgia-Pacific or approved equal (walls); DensDeck by Georgia-Pacific or approved equal (roof)

## SECTION 4 - PERFORMANCE REQUIREMENTS

## 4.3.8 Cold Formed Framing

The following technical requirements shall be met by the Design Team when cold formed framing is utilized as a part of the building enclosure:

**Performance Requirements:**

- A qualified professional engineer shall design all cold formed steel framing.
- Cold Formed Steel Framing Design Standards:
  - ✓ Floor and Roof Systems: AISI S210.
  - ✓ Wall Studs: AISI S211.
  - ✓ Headers: AISI S212.
  - ✓ Lateral Design: AISI S213.
- AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.
- Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
  - ✓ Upward and downward movement of 1/2-inch.
  - ✓ Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- Fire-Resistance Ratings (where applies): Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- All cold formed framing to be galvanized, minimum G60.

## 4.3.9 Insulation

Provide insulation in walls, roof and under slab to meet or exceed the Energy Code requirements. Provide all insulation in thicknesses, widths, and lengths sized to fit applications and to meet code requirements. Exposed, faced, bagged or scrimmed insulation is not acceptable. All insulation materials integrated into the work shall NOT contain: added urea formaldehyde, nor halogenated flame retardants. All products and their manufacturing processes shall be CFC and HCFC free. Rockwool insulation materials in the form and density appropriate for the application and performance required unless noted otherwise.

- Accessories: Provide fasteners and adhesives required to attach insulation to substrates per manufacturer's recommendations.
- Insulation for Miscellaneous Voids: Spray Polyurethane Foam Insulation (Limited use only for penetration sealing): ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
- Below Grade Insulation: EPS – Expanded Polystyrene. Recycled preferred.(Benchmark Foam, Inc. for reference).

## 4.3.10 Sheet Metal Flashing

Acceptable materials: Stainless Steel ASTM A 240/A 240M Type 316 Finish 2B (bright, cold rolled).

Sheet metal (steel or aluminum) finished with same system as adjacent metal panels or storefront/curtainwall system or as approved by the SFMTA. Finish Warranty Period: 20 years from date of Substantial Completion.

## 4.3.11 Exterior Windows

Daylight glazing shall be incorporated to allow for a reduction in artificial lighting and shall meet or exceed the percentage required by the Sustainability Checklist. Daylighting strategies shall be incorporated in the design of all spaces including shop areas.

All exterior glazing shall meet fenestration performance requirements of the most stringent energy code. Glazing shall be located and designed so as to be accessible for cleaning and window washing attachment systems shall be provided as needed. Window frames shall be prefinished aluminum. Frames are required to be thermally broken.

Provide solid surface window sills, 3/4-inch thickness minimum, at all locations.

## 4.3.12 Glazing

Glazing shall perform successfully within an assembly that complies with the Energy Code, meeting or exceeding in performance the maximum U Value and SHGC for the assembly selected by the Design Team. All glazing shall be captured in a frame assembly. Butt-Glazed lites are not acceptable.

Acceptable manufacturers: Pilkington North America Inc, PPG Industries, Inc, AGC Glass Company North America, Guardian Industries, Saint-Gobain Corporation or approved equal.

The following technical requirements shall be met by the Design Team where glazing is utilized as a part of the building enclosure:

**Warranties:**

- Manufacturer's Standard and Special warranties for each product used.
  - ✓ Warranty Period: 10 years from Substantial Completion.

## SECTION 4 - PERFORMANCE REQUIREMENTS

- ✓ For each glass type and all glazing accessories – Obtain from single source from single manufacturer.

**Performance:**

- General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- Design: Engage a qualified professional engineer, to design glazing.
- Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300 and Design Team Design Team per the applicable codes.
- Provide Float Glass per ASTM C1036.
- Safety Glass: ASTM C1172, and ANSI Z97.1, laminated and tempered as indicated or required by code.
- Heat Strengthened Laminated Float Glass (at overhead conditions including clerestories): Two sheets of heat strengthened 1/4-inch thick (minimum) clear float glass fully-bonded, high-impact, UV-resistant, clear polyvinyl butyl interlayer 0.030-inch minimum thickness;
- Laminated Glass (at skylights): Per DCM “Canopy glazing” Clear float glass with 65 percent VLT white interlayer to reduce glare and minimize visibility of dirt, unless approved otherwise by the SFMTA. Plastic, polycarbonate, fiberglass or similar skylights are not acceptable.
- All tempered glass to be heat soak tested.
- Insulated glazing units: Provide sealed insulating glass: per ASTM E 2190, double pane; total unit thickness of 1-inch minimum. Inner and outer pane types subject to requirements at all glazing in conditioned spaces; Basis of Design: Solarban 70 XL manufactured by PPG or approved equal.
  - ✓ Interpane Space: Dry hermetic air, kept dry with a dehydrating agent; Edge
  - ✓ Seal Construction: Dual seal, silicone foam warm-edge spacer system with high-performance acrylic adhesive structural seal, backed with moisture vapor seal.
  - ✓ Edge seal color to be black.
  - ✓ Super Spacer by Edgetech IG.
- Vision Glass Units Performance: Subject to conformance to requirements, provide sealed insulating glass units with minimum performance values based on units comprising an outer lite of 1/4-inch float glass, 1/2-inch air space and, inner lite of 1/4-inch clear float glass with Low E coating on third surface.
  - ✓ Visible Light Transmittance: 69 percent; Winter Nighttime U-Factor: 0.29.
  - ✓ Shading Coefficient: 0.44; Low Emissivity (Low E).
  - ✓ Glass Low-e Coating: Soft, sputtered applied to third surface; hard, pyrolytic coating on second surface for over-size glass units.
- Provide glazing sealants that are compatible with one another and with other materials they will contact, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience. Comply with sealant and glass manufacturers’ written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
- Structural Silicone Sealant for Glass Joints: Not allowed.
- Provide glazing accessories, including:
  - ✓ Lock Strip Gaskets: ASTM C542, ozone-resistant precision extruded neoprene or EPDM compound. Use gaskets with separate locking strips that are 10-points higher Shore A durometer hardness value than gasket body.
  - ✓ Fabricate gaskets in accordance with recommendations of ASTM C716.
  - ✓ Setting Blocks: Neoprene, EPDM or silicone, 80 to 90 Shore A durometer hardness tested to ASTM D2240. Maximum compression set to ASTM D395 and ASTM C864.
  - ✓ Spacers: Neoprene EPDM or silicone, 40 to 60 Shore A durometer hardness tested to ASTM D2240; quantity and location in accordance with IGMAC standards and as recommended by the frame and glass manufacturer.
  - ✓ Glazing Tape: AAMA 806.3, preformed butyl compound, UV resistant, self-adhering, coiled on release paper, color as selected by Owner’s Representative; Pre-Shimmed Glazing Tape: AAMA 806.3, pre-formed butyl tape, UV resistant, self-adhering, integral continuous serrated synthetic rubber shim and release paper, color: black.

## SECTION 4 - PERFORMANCE REQUIREMENTS

- ✓ Glazing Wedges and Splines: Precision extruded neoprene or EPDM compound, UV resistant, 55 to 65 Shore A durometer hardness.
- Labeling:
  - ✓ Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
  - ✓ Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- Submit: 12-inch by 12-inch samples for each glass type with fabricator product information.

**4.3.13 Storefront**

The following technical requirements shall be met by the Design Team where storefront is utilized as a part of the building enclosure:

- For glazed Aluminum Storefront and Entrances provide self-supporting, factory prefinished, thermally broken, glazed aluminum tube framing system. Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.
- Basis of design: Model 433 manufactured by EFCO for aluminum storefront, or approved equal. Entrance Doors: EFCO D518 HD style or approved equal.

**Performance:**

- General Performance: Aluminum-framed entrances and storefronts shall withstand

movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.

- Test according to ASTM E 330 as follows:
  - ✓ When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
  - ✓ When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
  - ✓ Test Durations: As required by design wind velocity, but not less than 10 seconds.
- Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
  - ✓ Fixed Framing and Glass Area: Maximum air leakage of 0.06 CFM/sf at a static-air-pressure differential of 6.24 lb/sf.
  - ✓ Entrance doors:
    - Pair of Doors: Maximum air leakage of 1.0 CFM/sf at a static-air-pressure differential of 1.57 lb/sf.
    - Single Doors: Maximum air leakage of 0.5 CFM/sf at a static-air-pressure differential of 1.57 lb/sf.
- Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
  - ✓ No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-

air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lb/sf.

- ✓ Maximum Water Leakage: According to AAMA 501.1 no uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

**Minimum acceptable aluminum finishes:**

- Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
- High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF or FEVE resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

**4.3.14 Operable Windows**

The following technical requirements shall be met by the Design Team where operable windows are utilized as a part of the building enclosure:

- Provide operable (casement or awning as approved by the SFMTA) prefabricated aluminum windows with thermally broken frames and insulated glazing to meet Energy Code and sustainability requirements.

## SECTION 4 - PERFORMANCE REQUIREMENTS

All windows shall have stainless steel screens and locking hardware. Finish to be manufacturer's standard Class I, coating that meets AAMA 2604. Clear anodic or two coat fluoropolymer (Kynar 500/ Hylar 5000) acceptable.

- Window performance: Windows shall conform to all AAMA/WDMA/CSA 101/I.S.2/A440-08 requirements for AW grade windows and shall meet all performance criteria of the basis of design product.
- Basis of Design: Series 2700 by EFCO or approved equal.

**4.3.15 Glazed Aluminum Curtain Walls**

The following technical requirements shall be met by the Design Team when a curtain wall system is utilized as a part of the building enclosure:

**Warranties:**

- Special Assembly Warranty: Manufacturer's standard 10 years from date of Substantial Completion.
- Special Finish Warranty: Manufacturer's standard 20 years from date of Substantial Completion.

**Performance Requirements:**

- Analysis and design data signed and sealed by the qualified registered professional engineer responsible for their preparation.
- General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls representing those selected for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

- ✓ Glazed aluminum curtain walls shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
- ✓ Failure also includes the following:
  - Thermal stresses transferring to building structure.
  - Glass breakage.
  - Noise or vibration created by wind and thermal and structural movements.
  - Loosening or weakening of fasteners, attachments, and other components.
  - Failure of operating units.

**Structural:**

- Test according to ASTM E 330 as follows:
  - ✓ When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
  - ✓ When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
- Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
  - ✓ Fixed Framing and Glass Area: Maximum air leakage of 6.24 lb/sf.
- Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
  - ✓ No evidence of water penetration through fixed glazing and framing areas when

tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15 lb/sf.

- Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:
  - ✓ No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 15 lb/sf.
  - ✓ Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- Seismic Performance: Glazed aluminum curtain walls shall withstand the effects of earthquake motions determined according to applicable codes by Design Team
  - ✓ Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement and 1.5 times the design displacement.
  - ✓ Vertical Interstory Movement: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.7 at design displacement and 1.5 times the design displacement.
  - ✓ Energy Performance: Certify and label energy performance according to NFRC. Fixed glazing and framing areas shall have U-factor of not more than that

## SECTION 4 - PERFORMANCE REQUIREMENTS

required by the most stringent Energy Code as determined according to NFRC.

- ✓ Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than that required by the most stringent Energy Code as determined according to NFRC 200.
- ✓ Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 45 as determined according to NFRC 500.
- Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

**Minimum acceptable finishes:**

- Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker
- High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat.
  - ✓ Acceptable manufacturers: Kawneer, EFCO or approved equal.

**4.3.16 Exterior Doors**

Exterior doors must comply with the most stringent energy code requirements for thermal performance and air infiltration. Any stainless steel utilized in doors or door hardware shall be Type 316. Type 304 stainless steel will be unacceptable. Storefront doors shall be utilized at vestibule entrances to administrative and office areas.

All exterior doors, including roof access doors, shall be coordinated with the security/intrusion detection/access control system design for the facility.

**4.3.17 Exterior Hollow Metal Doors and Frames**

The following technical requirements shall be met by the Design Team where hollow metal doors are utilized as a part of the building enclosure:

- General: Maximum-Duty Doors and Frames: SDI A250.8, Level 4.
- Physical Performance: Level A according to SDI A250.4.
- Frames: Metallic-coated steel sheet, minimum 14 gauge. All frames to be fully welded, and of commercial quality cold rolled sheet metal in conformance with ASTM A1008. Exterior frames (frames from conditioned to unconditioned spaces) shall be thermally broken, constructed of hot-dip galvanized steel in conformance with ASTM A-653, G90 coating designation.
- Lites: Exterior hollow metal doors to have insulated glass narrow lites or half lites as directed by the SFMTA.
- Anchors: Masonry Type: Locate anchors not more than 16-inches from top and bottom of frame. Space anchors not more than 32-inches o.c., to match coursing, and as follows: Three anchors per jamb from 60- to 90-inches high.
- Stud Wall Type: Locate anchors not more than 18-inches from top and bottom of frame. Space anchors not more than 32-inches o.c. and as follows: Three anchors per jamb up to 60-inches high.
- Door Hardware: Locking and keying systems shall be fully compatible with the SFMTA standard system.
  - ✓ All exterior doors shall be coordinated with the security/intrusion detection/access

control system design for the facility and shall comply with security standards.

- ✓ Door and Frame Finishes: Doors and frames to be factory primed with galvalume primer compatible with top coats by the same manufacturer and then field painted. Exterior service doors and frames shall be finished with a high performance industrial coating.

**4.3.18 Sectional Doors**

The following technical requirements shall be met by the Design Team if sectional doors are utilized as a part of the building enclosure:

**Special Warranty:**

- Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.
  - ✓ Warranty Period: Minimum Two (2) years from date of Substantial Completion.

**Performance Requirements:**

- Structural Performance:
  - ✓ Design Wind Load: as determined by Design Team per applicable codes.
  - ✓ Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components.
    - Deflection of door sections in horizontal position (open) shall not exceed 1/120 of the door width.
    - Deflection of horizontal track assembly shall not exceed 1/240 of the door height.
    - Seismic Performance: Sectional doors shall withstand the effects of earthquake

**SECTION 4 - PERFORMANCE REQUIREMENTS**

motions determined according to ASCE/SEI 7 and as determined by Design Team per applicable codes.

- Doors:
  - ✓ Sectional door formed with hinged sections and fabricated according to DASMA 102 consisting of minimum 16 gauge galvanized steel exterior face and minimum 26 gauge steel interior face with polystyrene insulation with fire retardant additive to meet requirements of UL R-1894A. R-Value for door shall meet or exceed Energy Code requirements.
  - ✓ Operation Cycles: door components and operators capable of operating for not less than 25,000 cycles.
  - ✓ Air infiltration: Maximum 0.08 CFM/sf.
  - ✓ Track Configuration: Vertical Lift.
  - ✓ Provide replaceable weather seals at jambs, head and sill.
  - ✓ Provide Keyed lock (compatible with the SFMTA system) with interlock switch for automatic operator.
  - ✓ Provide kick plate
- Operator:
  - ✓ Electric Motor Operation: Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second. Operator shall meet UL 325/2010 requirements for continuous monitoring of safety devices.
  - ✓ Usage Classification: Heavy-duty, 25 or more cycles per hour and more than 90 cycles per day.
  - ✓ Motor Exposure: Exterior, dust, wet, or humid.

- ✓ Emergency Manual Operation: Chain type.
- ✓ Acceptable Safety/Obstruction Detection Devices (provide a minimum of one of the following): photoelectric sensor, electric sensing edge, pneumatic sensing edge.
- ✓ Control Station: Interior and exterior, exterior location to be security access controlled.
- Finish: Door to be finished per system HPC-3.
- Acceptable Products: Model 418 by Overhead Door or approved equal

**4.3.19 Exterior Door Hardware**

All door hardware sets are to be reviewed and approved by the SFMTA. Default hardware material to be stainless steel. Alternate materials may be utilized with the SFMTA approval.

At a minimum, provide the following standard sets of hardware for exterior doors (single doors listed – adjust for pairs of doors accordingly):

Storefront doors: Offset Pivots (three minimum), surface mounted closer, push/pull set, exit device (as required by code), weatherstripping/sweep, threshold, entry/exit device (as applies) – the SFMTA standard card reader access control system and/or intrusion detection alarm. For doors without access control provide deadlock and cylinder.

Hollow Metal Personnel door: Hinges (3 minimum), mortise lockset, surface mounted closer, stop, exit device (as required by code), weatherstripping/sweep, rain drip, kick plate, threshold, entry/exit device (as applies), the SFMTA standard card reader access control system (as applies), door contact.

Hollow Metal Service Door (exit only): Hinges (three minimum), mortise lockset, surface mounted closer, stop, exit device (as required by code), weatherstripping/sweep, rain drip, kick plate, threshold, entry/exit device (as applies), the SFMTA standard intrusion detection (as applies),

Provide internal flush bolt for pairs of non-egress doors with an inactive leaf. Provide an automatic flush bolt and coordinator for doors with two active leaves.

**4.3.20 Exterior Stairs**

Exterior stairs shall be constructed of cast in place concrete with non-slip surface finish treads (Light broom finish with grooves cast directly in the treads).

**4.3.21 Exterior Handrails and Guardrails**

All handrails and top guardrails shall be stainless steel 316 with random orbital finish. Intermediate infill of railings may be stainless steel (preferred) or painted steel with highest durability paint system. Where welded wire mesh is used, use stainless steel or steel mesh with each joint welded prior to painting otherwise the joints will not be coated with paint and they will rust.

**4.3.22 Roof Coverings**

Roofing systems selected shall meet the most stringent Energy Code requirements for thermal and air barrier performance and shall meet LEED Gold certification requirements. Roofing must also meet all applicable City and County of San Francisco Building Code criteria as well as general recommendations and guidelines of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manuals. Selection of roofing systems shall be driven

## SECTION 4 - PERFORMANCE REQUIREMENTS

by a requirement for long term durability and appearance as well as sustainable criteria to reduce the Heat Island Effect. Roof deck coverings shall be UL listed Class A or Class B in accordance with the IFC and NFPA. Roofing design shall facilitate adequate shedding and diversion of water from the storm water system to use in landscape irrigation and water re-use systems. Flashing shall be either stainless steel, or steel with a baked on finish or factory finished to match metal panel systems.

If selected, metal panel steep slope roofing shall be of the architectural standing seam type and shall be replaceable without disturbing the building occupants. Metal roofing must comply with the NRCA Waterproofing Manual and the Metal Building Manufacturers Association (MBMA) Metal Roofing Systems Design Manual and provide adequate water-shedding with a focus on diversion of water from the storm water system to use in landscape irrigation or other water reuse systems.

If selected, low slope roofing shall be a single ply system such as TPO or PVC. EPDM, built up or modified bitumen roofing will not be acceptable. Type 316 stainless steel conductor boxes, gutters and downspouts with stainless steel flashing shall be required.

Asphalt or wood shingles and clay tile will not be acceptable roof materials.

The roofing system selected must comply with the insurer's FM ratings for wind, fire and storm warranty. Coordinate roofing system selected with mounting for future photovoltaic requirements.

**4.3.23 Thermoplastic Polyolefin (TPO) Roofing**

Provide a fully adhered roofing system with Flexible Walkways to all roof mounted elements requiring maintenance. Roofing system shall

include substrate board, ASTM C 1177/C, glass mat and slip sheet.

- Basis of design product: Firestone UltraPly™ TPO SA with Secure Bond™ Technology or approved equal.
- Warranty Period: Twenty five (25) years from substantial completion.
- Provide metal termination bars, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories as required.

**4.3.24 Polyvinyl-Chloride (PVC) Roofing**

Provide a fully adhered roofing system with Flexible Walkways to all roof mounted elements requiring maintenance. Roofing system shall include substrate board, ASTM C 1177/C, glass mat and slip sheet. PVC Sheet: ASTM D 4434/D 4434M, Type II, Grade I, glass-fiber reinforced, felt backed, 60 mils thickness.

- Basis of design product: Sikaplan Adhered Energy Smart Roof membrane or approved equal.
- Warranty Period: Fifteen (15) years from substantial completion.

**4.3.25 Standing Seam Metal Roof Panels**

Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weather tight installation. Roof Panels shall be minimum 22 gauge.

- Minimum Finish requirements: Two coat fluoropolymer (AAMA 2605. Fluoropolymer

finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions), - Kynar 500/ Hylar 5000.

- Basis of Design Product: AEP Span Klip Rib or Design Span HP.

**4.3.26 Canopies and Protective Covers**

Provide canopies or protective covers at all entrances to the building. All overhangs and coverings shall be designed to prevent bird nesting and shall have a minimum 1.5 percent slope. Structural performance of canopies shall be determined by a licensed professional engineer and shall withstand the effects of gravity loads and the additional live, roof, snow, seismic and wind loads and stresses as determined by the Design Team per applicable codes.

**4.3.27 Skylights**

Skylights must comply with Energy Code performance requirements and fenestration limitations as well as applicable building code provisions. Openings associated with mechanical equipment or roof access shall comply with all energy that apply to roof coverings. All roof openings shall be coordinated with the security/intrusion detection/access control system design for the facility.

Laminated insulated glass skylights with white translucent interlayer are to be the basis of design. Thermally broken frames and insulated curbs, Preference is for use of clerestory daylighting strategies in lieu of horizontal glazing.

With the SFMTA approval and contingent upon the proposed design, use of factory pre-

## SECTION 4 - PERFORMANCE REQUIREMENTS

engineered, 4-inch thick aluminum skylight with translucent panel, thermal break core, 60 percent light transmission. Kalwall Standard Skylites or approved equal. Kalwall Corrosion-resistant finish with a 10 year finish warranty.

**4.3.28 Roof Accessories**

Pitch pockets and similar configured penetrations are prohibited. Use of sheet metal enclosures similar to NCRA TS-15 detail required.

Horizontal clear space of 24-inches shall be provided between all penetrations, curbs, parapets, similar transitions to allow for sufficient space to properly install, maintain and replace roofing systems.

**General Performance:**

Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

- Roof Curbs and Equipment supports: Prefabricated aluminum, clear anodic finish, internally reinforced and factory insulated units with integrally formed roof deck-mounting flange at perimeter bottom. Provide curbs to minimum height of 12-inches above roofing surface.
- Roof Hatch: Prefabricated aluminum, clear anodic finish, thermally broken roof hatch with integrally formed roof deck-mounting flange at perimeter bottom. Note: a hatchway would be in addition to the required full stair roof access. Hardware: Spring operators, hold-open arm, stainless-steel spring latch with turn handles, stainless-steel butt- or pintle-type

hinge system, and padlock hasps inside and outside. Intrusion detection shall be provided.

- ✓ Safety Railing System: Roof-hatch manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.
- ✓ Provide roof-hatch manufacturer's standard ladder-assist post and attachments.
- ✓ Basis of Design product: Bilco thermally broken roof hatch.

**4.3.29 Roof Access & Safety**

Roof access shall be provided for all roof areas. Fixed metal ladders shall be provided where stair access is not available. Walk pads shall be installed on low slope roofs to allow access to all roof mounted equipment requiring servicing. Mounting equipment on steep slope roofs is discouraged due to the lack of easy access.

- Provide OSHA compliant fall protection systems for all roof areas. If any mechanical equipment is mounted on the roof it must meet the screening and maximum building height requirements allowed by the Bel-Red Ordinance.
- Provide roof to roof access (gangways) from roof areas that are not accessible by fire lane at ground level – coordinate any access requirements with the fire department.
- Changes in level on the roof exceeding 30-inches shall utilize a ladder or over the parapet ladder and platform complying with 29 CFR 1910.27. Ladders shall be constructed

of stainless steel or aluminum. Rungs shall be provided an integral abraded finish. Galvanized or HPC painted ladders are not acceptable.

**4.3.30 Exterior Joint Sealants**

Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience. Joints shall be designed to meet the movement requirements for the installed conditions and shall present an aesthetic appearance that does not detract from the appearance of the building. The durability of the sealant shall also impact selection including aging characteristics and ultra-violet radiation, moisture, temperature, cyclic joint movement, movement during curing, and bio-degradation. Provide sealant backing or bond breaker as needed for specific applications.

Only sealants that have a current Validation Certificate from the SWRI (Sealant, Waterproofing & Restoration Institute) shall be utilized in the project. The Design Team shall confirm that all sealants selected meet the anticipated joint movement, are compatible with the materials they come in contact with and will adhere to the substrate(s) properly. Indicate joint locations, materials and spacing in construction document plans, elevations and details. Utilize sealants as follows:

- Latex (water based) sealants - not allowed on the exterior of the building.
- Acrylic (solvent-based) sealants – allowable for limited movement joints only as approved by the SFMTA.

## SECTION 4 - PERFORMANCE REQUIREMENTS

- Butyl (solvent-based) – acceptable sealant for gutters, foundations and other non-exposed exterior joints.
- Silicone sealants – acceptable sealant for glass to metal framing systems and other porous and non-porous materials such as ceramic or stone panels.
- Polyurethane sealants – acceptable sealant for higher movement joints in concrete, masonry, metals, around window and door openings, expansion joints and other joints as approved by the sealant manufacturer.

Comply with joint sealant manufacturer's written instructions for products and applications indicated, unless more stringent requirements apply. Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

**4.3.31 Expansion Control**

Provide expansion control systems to accommodate building movement resulting from causes such as thermal change, seismic force or wind sway. Submit movement control diagrams addressing full structure. Submit calculations and rationale for joint locations, types and sizes. Expansion control elements shall match or be of a compatible color with the adjacent materials. Any exposed metal plates or covers shall be Type 316 stainless steel.

**4.3.32 Exterior Signage**

Exterior signage shall be designed and constructed per the SFMTA's corporate identify and brand standards. Refer to the Design Guidelines for notes on incorporating the SFMTA and Muni brands within the larger building architecture. The SFMTA shall sign off on all final signage designs. The SFMTA facility signage shall include:

- Customer Signage:
  - ✓ Main Facility Signage: provide at each vehicle entrance to the site.
- Exterior Door Signs: at all personnel and service doors.
- Operational Signage: Provide Operational signage as required per project. Coordinate with the SFMTA Operations.
- A custom designed facility sign shall be provided on the exterior façade of the facility. Sign shall be visible and legible, and be derived from the architectural design of the facility. Facility façade sign shall be illuminated.

Signage shall be designed to be architecturally compatible with the building and shall contribute to the overall character of the facility. Site signage within the facility shall follow the SFMTA standards and shall clearly identify circulation and safety elements as well as hazardous areas.

**4.4 Interior Construction**

Interior partitions in any maintenance and storage or shop areas shall be reinforced concrete masonry or concrete extending to underside of deck. Concrete or concrete masonry units at a minimum height of 8-foot 0-inches above finished floor with metal stud and impact and moisture resistant fiberglass faced gypsum wall board or AC plywood partitions above may be proposed for appropriate areas and will be considered on a case by case basis. Provide masonry control joints at a maximum of 25-foot 0-inches on center in continuous partitions, at maximum one half control joint spacing from both sides of corners, at changes in wall height or thickness, at building movement joints and at all openings.

Partitions in administrative, office, support type areas shall be constructed of metal studs with gypsum board. All interior partitions assemblies enclosing conference rooms, restrooms, offices and all rooms provided with access control shall extend to underside of deck.

Partitions enclosing custodial rooms, sprinkler valve rooms and restrooms shall have a minimum 6-inch high concrete curb. Wall finish shall cover curb in restrooms. Curb may be exposed in other rooms.

Refer to the Room Data Sheets for finishes and furnishings by room type. Joints and gaps at the base and top of the wall shall be sealed as well as joints at ceilings, corners or changes in material. Wall penetrations, including but not limited to ductwork, outlets or j-boxes, shall also be acoustically sealed in these rooms.

Submit for approval by the SFMTA product data, certificates and test reports verifying materials selected conform to performance standards listed in this document.

**4.4.1 Interior Masonry**

Concrete masonry units - Exterior Masonry, for concrete masonry unit descriptions and requirements. All interior CMU must be precision faced with a high performance coating. Outside corners and returns shall be bullnose block profile typical.

**4.4.2 Gypsum Board****Performance Requirements:**

- Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly according to ASTM E 119 by an independent testing agency.
- STC-Rated Assemblies: For STC-rated assemblies, provide materials and

## SECTION 4 - PERFORMANCE REQUIREMENTS

- construction identical to those tested in assembly according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lb/sf.
- Attach all gypsum board to steel stud partitions in accordance with the Northwest Wall and Ceiling Bureau (NWCB) Specification Standards Manual and ASTM C840.
- Paper faced gypsum board will not be allowed.
- Acceptable Interior Gypsum Board: Gypsum Board (office and support areas), Type X: ASTM C 1396/C 1396M, 5/8-inch.
  - ✓ Basis of Design: DensArmor Plus Fireguard High Performance Interior Panel.
- Abuse-Resistant Gypsum Board (corridor/high traffic/circulation areas, locker rooms (when not protected by lockers)): ASTM C 1629/C 1629M, Type X, 5/8-inch.
  - ✓ Surface Abrasion: Meets or exceeds Level 1 requirements.
  - ✓ Surface Indentation: Meets or exceeds Level 1 requirements.
  - ✓ Single-Drop Soft-Body Impact: Meets or exceeds Level 1 requirements.
  - ✓ Basis of Design: DensArmor Plus Fireguard Abuse Resistant Interior Panel.
- Impact-Resistant Gypsum Board (shop , tool box storage rooms, materials handling, shipping areas to 12-feet by 0-inches above finish floor.): ASTM C 1629/C 1629M, Type X, 5/8-inch.

- ✓ Basis of Design: DensArmor Plus Fireguard Impact Resistant Panel.
- Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use; Type X, 5/8-inch.
- Acceptable Tile Backing Panels:
  - ✓ Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges, 5/8-inch thick. Tile backer board not acceptable.
- Auxiliary Materials:
  - ✓ Sound-Attenuation Blankets (required at all interior metal stud and gypsum board partitions and as required by mandated STC ratings in Room Data Sheets, Section Four of the Facility Program): ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
    - Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
  - ✓ Acoustical Sealant: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- Gypsum Board Finish Levels: Finish panels to levels according to ASTM C 840. Finish all exposed gypsum board to a level 5 equivalent finish (use of a high solids primer or skim

coat), ready to receive paint regardless of final finish. All exposed gypsum board is to be primed and painted UNO. Finish shall be established by use of mock-up. Concealed areas may be a level 3 finish and remain unpainted unless vapor control is needed.

## 4.4.3 Non Structural Metal Framing

**Performance Requirements:**

- Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- Comply with requirements in ASTM C 840 that apply to framing installation for gypsum board assemblies.
- Framing System:
  - ✓ Framing Members, General: Comply with ASTM C 754.
  - ✓ Steel Sheet Components: Comply with ASTM C 645 requirements for metal.
  - ✓ Protective Coating: ASTM A 653/A 653M, G60 hot-dip galvanized.
  - ✓ Studs and Runners: ASTM C 645.
  - ✓ Minimum Base-Metal Thickness: 0.0329-inch (22 gauge).
  - ✓ Slip-Type Head Joints: Where required by design conditions, provide one of the following:

## SECTION 4 - PERFORMANCE REQUIREMENTS

- Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
- Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- Firestop Tracks: (where required in fire rated assemblies) Top runner manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- ✓ Provide blocking and Bracing behind all wall mounted items:
  - Flat Strap and Backing Plate: Steel sheet, minimum base-metal thickness: 0.0747 (14 gauge).
  - Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch wide flanges.
- ✓ Acceptable Furring:
  - Hat-Shaped, Rigid Furring Channels: ASTM C 645, minimum .0179 (25 gauge).
  - Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4-inch, wall attachment flange of 7/8-inch, minimum uncoated-metal thickness of 0.0179-inch, and depth required to fit insulation thickness indicated.
- ✓ Suspension Systems:
  - Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch diameter wire, or double strand of 0.048-inch diameter wire.
  - Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16-inch in diameter.
  - Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538-inch and minimum 1/2-inch wide flanges.
- ✓ Furring Channels (Furring Members):
  - Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch wide flanges, 3/4-inch deep.
  - Steel Studs and Runners: ASTM C 645, minimum 0.0179-inch.
  - Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8-inch deep.
- ✓ Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
- ✓ Provide ceiling and wall access doors as required, complete with cylinder locks compatible with bi-lock cylinders. Manufacturer's standard factory applied baked enamel primer and shall be field finished to match adjacent materials.
- Basis of Design: Milco, Cierra or approved equal.
- Ceiling access shall be provided for each room and at each equipment location.

## 4.4.4 Operable Partitions

**Performance Requirements:**

- Seismic Performance: Operable panel partitions shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and as determined by the Design Team per applicable codes.
- Acoustical Performance: Provide operable panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated:
  - ✓ Sound-Transmission Requirements: Operable panel partition assembly tested for laboratory sound-transmission loss performance according to ASTM E 90, determined by ASTM E 413.
  - ✓ Provide minimum STC 52.
- Fire-Test-Response Characteristics: Provide panels with finishes complying with one of the following as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  - ✓ Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - Flame-Spread Index: 25 or less.
    - Smoke-Developed Index: 450 or less.

## SECTION 4 - PERFORMANCE REQUIREMENTS

- ✓ Fire Growth Contribution: Complying with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.
- Operation: Manual, paired panels. Design shall provide for door recess and cover such the door pocket does not intrude into the combined room configuration.
- Panel Construction: Continuous 20 Gauge steel panel faces invisibly welded to minimum 16 gauge one-piece steel frames.
- Finishes: Color and texture chosen by the SFMTA from full range of Manufacturer fabrics.
- Acceptable Products: Moduflex Model 510PP fixed all of the used from 5.5 and on.

## 4.5 - Interior Glazing

Interior glazing shall be installed in prefinished aluminum or painted hollow metal frames. Glazing shall be minimum 1/4-inch thick laminated, heat strengthened glass. Glazing between conditioned and unheated spaces shall be insulated.

## 4.5.1 - Interior Doors

Interior doors in administrative, office type areas shall be solid core wood except where hollow metal (steel) doors are required to meet the fire rating of the partition or where doors are anticipated to receive heavy use such as corridors or restrooms. Office doors shall have minimum 12-inch wide sidelights. Frames for wood doors and sidelights shall be hollow metal. Interior aluminum frame glazed storefront doors shall be used at vestibules in administrative/office type areas. Refer to PR Section 5.3.13 Storefront, for additional information concerning storefront.

Doors in maintenance, shop, support and storage areas shall be hollow metal (steel) as described below. Doors and frames opening into areas of excessive moisture or into a corrosive environment shall be fiberglass reinforced structural shapes designed and finished for these conditions. Refer to PR Section 5.4 for descriptions and requirements on FRP Doors. Doors to mechanical rooms shall be hollow metal (steel) with hollow metal frames identical to those in the shop areas.

Cross corridor doors which are anticipated to remain closed shall have half lites unless restricted to a smaller area by fire ratings. Doors opening into areas in which a person may be expected to be in the area of the door swing shall have half lites.

All personnel doors on accessible routes shall comply with the Americans with Disabilities Act (ADA) Standards.

Where required, interior doors shall be coordinated with the security/intrusion detection/access control system design for the facility.

Locking and keying systems shall be fully compatible with the SFMTA standard system. Interior door hardware finish shall be stainless steel. Stainless steel kick plates shall be provided at all maintenance and shop doors as well as restroom and stairwell doors.

## 4.5.2 - Interior Door Requirements and Warranties

**Regulatory Requirements:**

- Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

- Smoke and Draft Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.
- Wood Doors:
  - ✓ Solid core wood doors clad with wood veneer faces, WDMA premium grade. Veneer to be selected by the SFMTA; book matched. Veneer face assembly-Running match.
  - ✓ Basis of Design: Heritage Collection VT Industries or approved equal.
- Hollow Metal Doors:
  - ✓ Office and Administration areas:
    - Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.
    - Physical Performance: Level A according to SDI A250.4.
    - Minimum 16 gauge.
  - ✓ Shop, Support and Storage areas:
    - Maximum-Duty Doors and Frames: SDI A250.8, Level 4.
    - Physical Performance: Level A according to SDI A250.4.
    - Minimum 16 gauge.
    - Grouted frames will not be allowed.
  - ✓ Louvers: comply with SDI 111C.

## SECTION 4 - PERFORMANCE REQUIREMENTS

- Finish: Doors and frames to be factory primed with galvalume primer compatible with top coats by the same manufacturer and then field painted with a high performance industrial coating as defined in Prescriptive Specification section 09 96 00, High-Performance Coatings.
- Glazing for Wood or Hollow Metal Doors: Provide ¼-inch thick minimum heat strengthened, laminated glass with a lifetime warranty.
- Hollow Metal Frames:
  - ✓ Minimum 14 gauge, fully welded.
  - ✓ Jamb Anchors:
    - Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042-inch thick, with corrugated or perforated straps not less than 2-inches wide by 10-inches long; or wire anchors not less than 0.177-inch thick.
    - Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042-inch thick.
  - ✓ Floor Anchors: Formed from same material as frames, minimum thickness of 0.042-inch, and as follows:
    - Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
    - Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.
- Storefront doors:
  - ✓ Provide compatible non-insulated door from same manufacturer of storefront or curtainwall system selected. Refer to Section 5.3.13 Storefront for additional requirements.
- Overhead Coiling Doors
  - ✓ Insulated, motorized overhead coiling doors may be used at delivery and storage areas where applicable. Slats shall be stainless steel (minimum 22 gauge) or aluminum (minimum 18 gauge) and shall have a factory applied industrial quality finish. Doors must be provided with a lock with a master keyable cylinder that is compatible with the SFMTA standard system.
  - ✓ Warranty: minimum two (2) years from substantial completion.
  - ✓ Design Criteria:
    - Design Wind Load (where applicable): As determined by the Design Team per the applicable codes.
    - Deflection Limits (where applicable): Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
    - Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and the appropriate component importance factor as determined by the Design Team per the applicable codes.
    - Operation Cycles: Door components and operators capable of operating for not less than 10,000 operation cycles (one cycle - door is opened from the closed position to the fully open position and returned to the closed position).
- Air infiltration (applicable between conditioned and heated only spaces): maximum rate of 0.08 CFM/sf when tested according to ASTM E 283 or DAMSA 105.
- Curtain R-value (applicable between conditioned and heated only spaces): as required by Energy Code, minimum R-7.
- ✓ Operator:
  - Electric, Standard duty usage classification; rated for a maximum of 20 cycles per hour.
  - Safety Features: sensor edge and photoelectric eye, emergency manual chain hoist assembly, provide an integral motor mounted interlock system to prevent damage to door and operator.
  - Controls: surface mounted manufacturer standard button control interior, key access exterior.
- ✓ Finish: factory applied powder coat.
- ✓ Acceptable Product: (Insulated) Stormtite 625 by Overhead Door or approved equal; (Non-Insulated) Model 610 by Overhead Door or approved equal.
- Access Doors: Provide ceiling and wall access doors where required for service or maintenance, complete with cylinder locks compatible with the SFMTA standard lock system. Provide fire rated access doors and frames complying with NFPA 80 that are listed and labeled by a qualified testing agency for fire protection ratings required, according to NFPA 252 or UL 10B. All doors to have

## SECTION 4 - PERFORMANCE REQUIREMENTS

manufacturer's standard factory applied powder coated primer and field painted to match adjacent materials.

- Special Door Requirements:
  - ✓ Doors providing access to the Telecommunication Rooms shall have replaceable gaskets, seals and sweeps at the jambs, head and sill to prevent the entry of dirt and debris.

## 4.5.3 - Interior Door Hardware

All door hardware sets and to be reviewed and approved by the SFMTA. Default hardware material shall be stainless steel. Alternate materials may be utilized with the SFMTA approval. Doors in fire-rated openings shall have hardware that is certified by Underwriters Laboratories (UL) or Warnock Hersey (WH).

At a minimum, provide the following standard sets of hardware for interior doors (single doors listed – adjust for pairs of doors accordingly):

- Storefront doors (vestibule): Offset Pivots (3 minimum), closer, push/pull set, stop.
- Personnel door (office area): Hinges (3 minimum), mortise lockset (secure) or mortise latchset (non-secure), stop, silencers.
- Hollow metal door (shop and office area perimeter): Hinges (3 minimum), mortise lockset (secure) or Mortise latchset (non-secure), closer, stop, kick plate or armor plate (materials handling), silencers, exit device (as required by code), entry/exit device (as applies), the SFMTA standard card reader access control system and/or intrusion detection alarm (as applies).
- Hollow metal Stair/Exit Door: Hinges (3 minimum), exit device, closer, stop, kick plate, silencers.

- Restrooms, Locker rooms: Hinges (3 minimum), push/pull, closer, stop, kick plate, mop plate, silencers.
- Custodial Rooms (Janitor Closet): Hinges (3 minimum), mortise lockset, stop, kick plate, mop plate, silencers

## 4.5.4 - Interior Joint Sealants and Firestopping

Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience. Joints shall be designed to meet the movement requirements for the installed conditions and shall present an aesthetic appearance that does not detract from the appearance of the building. The durability of the sealant shall also impact selection including aging characteristics, moisture, temperature, cyclic joint movement, movement during curing, and bio-degradation. Provide sealant backing or bond breaker as needed for specific applications. Provide mildew resistant sealants in wet areas.

Only sealants that have a current Validation Certificate from the SWRI (Sealant, Waterproofing & Restoration Institute) shall be utilized in the project. The Design Team shall confirm that all sealants selected meet the anticipated joint movement, are compatible with the materials they come in contact with and will adhere to the substrate(s) properly. Indicate joint locations, materials and spacing in construction document plans, elevations and details. Utilize sealants as follows:

- Latex (water based) sealants – acceptable for acoustic joints and firestopping systems as tested by UL Classified.

- Acrylic (solvent-based) sealants – acceptable for acoustic joints and firestopping systems as tested by UL Classified.
- Silicone sealants – acceptable sealant for plumbing fixtures, tile and stone applications and other porous and non-porous materials such as ceramic or stone panels.
- Polyurethane sealants – acceptable sealant for higher movement joints in concrete, masonry, metals, around window and door openings, expansion joints and other joints as approved by the sealant manufacturer.

Comply with joint sealant manufacturer's written instructions for products and applications indicated, unless more stringent requirements apply. Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

- Provide UL Classified firestopping systems at all penetrations and joints in or between Fire-Resistive Rated Construction complying with ASTM E 1966 or UL 2079.
- Provide fire-resistive joint systems in smoke barriers with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg.
- Provide flame-spread and smoke-developed indexes for exposed joint firestopping systems of less than 25 and 450, respectively, as determined per ASTM E 84.
- Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install

## SECTION 4 - PERFORMANCE REQUIREMENTS

elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

**4.5.5- Expansion Control**

Provide expansion control systems to accommodate building movement resulting from causes such as thermal change, seismic force or wind sway. Submit movement control diagrams addressing full structure. Submit calculations and rationale for joint locations, types and sizes. Expansion control elements shall match or be of a compatible color with the adjacent materials. Any exposed metal plates or covers shall be Type 316 stainless steel.

**4.6 Interior Stairs**

Communicating stairs in office and administration areas that are expected to be used on a daily basis shall be constructed of painted steel stringers with precast tread/riser units and landings or be fully pre-cast stair runs. The appearance of stairs in these areas shall be of a superior grade as approved by the SFMTA. Steel stairs used solely for egress and in shop and maintenance bay areas shall have precast tread/riser units or concrete filled metal pan treads with closed steel risers. All stair treads shall have a non-slip surface with a replaceable nosing consisting of an inset aluminum extrusion with abrasive anti-slip safety material. Open grating stairs will not be allowed. Epoxy connections for precast concrete treads will not be allowed.

Provide a minimum of one stair with direct access from the shop areas on the ground floor to the roof. This stair should have a fully enclosed interior landing and be protected by an enclosed penthouse with a hollow metal

door. Daylight should be provided within this stairwell to the extent allowable by the design. Exterior shall be provided a landing level with the door threshold. Landing shall be minimum of 5-feet, 0-inches deep and full width of stairwell with a minimum overhead canopy of the same size. Provide lighting, recessed weatherproof receptacle and hose bib at this location. All exterior doors shall be coordinated with the security/intrusion detection/access control system design for the facility.

Provide factory assembled stair units, fabricated by a firm or shop experienced and skilled in custom fabrication and construction of metal stairs and railings (as applies).

- Treads and risers for steel pan stairs: minimum 14 gauge steel.
- Landings for steel pan stairs: minimum 12 gauge.
- Stringers: steel channels or tubes, size and gauge to suite span and stair width.

**4.6.1 Handrail Construction**

All handrails (including supports) and top rails of guardrails shall be stainless steel 316 with random orbital finish.

**4.7 Interior Wall Finishes**

Wall finishes shall be selected on the basis of durability and low maintenance and shall comply with sustainability requirements for low-emitting materials. Finishes shall be aesthetically pleasing and appropriate to the building's function.

**4.7.1 Wall Finish Requirements**

- Paint:
  - ✓ Paint systems shall be designed for application on the partition or wall substrate and shall be designated by MPI (Master Painters Institute) numbers.

All systems shall meet or exceed MPI Premium Grade.

- Tile (excluding shower stalls):
  - ✓ Full wall height. Minimum of two colors to provide field and accent.
  - ✓ Install in compliance with the latest edition of the Tile Council of North America (TCNA) recommendations. For metal stud walls with cement board substrate utilize method W241. For masonry or concrete walls utilize method W211. Provide a waterproof membrane (A118.10) typical.
  - ✓ Glazed porcelain (ANSI 137.1), large format (Minimum 12-inches by 12-inches), 1/4-inch thick minimum.
  - ✓ Provide curved wall/floor cove and inside corners, bullnose, quarter round and any other special shapes required for smooth transitions and ease of cleaning. Color and type shall be chosen from Price Group 2 or greater and approved by the SFMTA.
  - ✓ Grout: low VOC, to inhibit the growth of mold and mildew, and meet ANSI A118.3. Provide Laticrete "Spectra-Loc" or approved equal.
- Tile (Shower stalls):
  - ✓ Full wall height. Minimum of two colors to provide field and accent.
  - ✓ Install in compliance with the latest edition of the Tile Council of North America (TCNA) recommendations. For metal stud walls with cement board substrate and mortar bed floor tile utilize method B415. For masonry or concrete walls utilize method B422. Provide a waterproof membrane (A108.13) typical. Complete

## SECTION 4 - PERFORMANCE REQUIREMENTS

- waterproofing is required including treatment at termination points.
- ✓ Glazed porcelain (ANSI 137.1), large format (Minimum 12-inches by 12-inches), 1/4-inch thick, price Group 2 or greater.
- ✓ Trim units: bullnose at external corners.
- ✓ Grout: low VOC, to inhibit the growth of mold and mildew, and meet ANSI A118.3.
- ✓ Provide Laticrete “Spectra-Loc” or approved equal.
- Wall Protection:
  - ✓ Provide minimum 16 gauge type 316 stainless steel corner guards with minimum 3-inch wings, 4-feet 0-inches high (minimum) at all outside corners. Mounted from top of rubber base, radius corners, beveled pre-drilled holes. Attach with SS screws.
- Stainless Steel Wall Panels: Provide minimum 18 gauge Type 316 with No. 4 satin finish. Maximize panel size for installation location. Screw mount panels unless otherwise directed.

## 4.7.2 Steel Finishes

Exposed structural steel, steel handrails, exposed piping and conduit and associated supports shall be painted construction and finishing.

## 4.7.3 Floor Finishes

Floor finishes shall be selected on the basis of durability, low maintenance and shall be easily replaceable. They shall comply with sustainability requirements for low-emitting materials. Floor finishes are listed by room on the Room Data Sheets found in Section Five. Finishes selected shall require. Provide

stainless steel transitions at all changes in flooring material. Provide maintenance materials for each floor type selected: five (5) full unopened boxes.

## 4.7.4 Floor Finish Requirements

**Natural Concrete:**

- Provide Euclid Surflex Light-Reflective Dry Shake Hardener sealed with Euclid Euco Diamond Hard or approved equal.
- Integrally Colored Ground and Polished Concrete:
  - ✓ Concrete to be mixed, placed and finished in compliance with “CPAA Recommendations for the Design, Specification, and Placement of Concrete Floor Slabs” from the Concrete Polishing Association of America.
- Color, aggregate size and polish level as selected and approved by the SFMTA.
- Mockup: at a location selected by the SFMTA place and finish a 10-foot by 10-foot area in compliance with “CPAA Recommendations for the Design, Specification, and Placement of Concrete Floor Slabs”.
- Installer shall have 5 years minimum experience with work of similar scope and quality and shall be a CPAA certified applicator.
- Acceptable Manufacturer: L.M. Scofield Company. Provide a complete system from one manufacturer including but not limited to colored admixture, curing and sealing compound, chemical hardener/densifier and curing compound for polished concrete.

**Walk Off Mats:**

- Provide walk off mats at all entrances and at transitions between the shop or storage

areas and office/administration areas.

Textured patterned loop, 100 percent type 6.6 nylon. Provide ‘Recourse II’ by Mannington Commercial or approved equal.

- Carpet Tile: Must comply with the specification developed by the San Francisco Department of the Environment, dated June 8, 2018.
- Resilient Flooring:
  - ✓ Rubber Tile: Performance Requirements:
    - Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
    - Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
    - Minimum 0.100-inch (2.54 mm) thick. Seams shall be chemically welded. Rubber tile selected shall be certified compliant with the “FloorScore” standard. Flooring adhesives shall be low VOC and shall meet the Carpet and Rug Institute Standard and “Green Label” program.
    - Provide: Endura Simply Smooth Flexibles by Burke or approved equal.
    - Rubber tile at Fitness area: Resilient Ecofitness Multifunctional Athletic Robber Flooring by Burke or approved equal.
- Linoleum Tile:
  - ✓ Minimum 2.5 mm (0.10-inch) thick, manufacturer standard size (minimum 10-inches by 10-inches).
  - ✓ Type II with polyester backing.
  - ✓ Heat welded seams.

**SECTION 4 - PERFORMANCE REQUIREMENTS**

- ✓ Warranty period: minimum five (5) years from date of Substantial Completion.
- ✓ Basis of Design: Modular Tile Linoleum Tile by Marmoleum or approved equal.
- Resilient Base:
  - ✓ ASTM F 1861 Type TS Rubber, Thermoset, Group I, minimum 4-inches high, 0.125-inch thick Floor Score Certified.
- Porcelain Tile :
  - ✓ Interior floor tile to be unglazed through body porcelain, minimum 1/4-inch thick, price Group 2 or greater. Provide all trim units: cove base, bullnose at external and internal corners, etc.
  - ✓ Install in compliance with the latest edition of the TCNA recommendations. Utilize method F114 with a cleavage membrane.
  - ✓ Tiles shall comply with ANSI A137.1 and have color extending uniformly through the body of the tile and provide a 0.5 percent maximum water absorption in accordance with ASTM C737.
  - ✓ Class Three (3) Commercial Medium to Heavy Traffic classification as rated by the manufacturer when tested in accordance with ASTM C1027-99 for visible abrasion resistance as related to foot traffic.
  - ✓ MOH Scale Rating of 7 or greater.
  - ✓ Slope tile floors to drain.
  - ✓ Provide expansion, control and isolation joints as needed to accommodate movement and maintain tile assembly integrity. Follow TCNA EJ171 Movement Joint Guidelines.
  - ✓ Provide waterproof membrane in shower areas in accordance with ANSI A118.10.
- ✓ Wet Dynamic Coefficient of Friction (DCOF): For tile installed on horizontal surfaces, provide products with the following values as determined by testing identical products per ANSI A137.1 Section 9.6 DCOF: minimum 0.60.
- ✓ Grout: low VOC, to inhibit the growth of mold and mildew, and meet ANSI A118.3.
- ✓ Provide Laticrete “Spectra-Loc” or approved equal.
- Tile and installation requirements for Shower stalls:
  - ✓ Install in compliance with the latest edition of the TCNA recommendations. For tile shower receptor utilize method B415 with a waterproof membrane. Terrazzo tile receptors may be utilized with the SFMTA approval. Complete waterproofing is required including treatment at termination points.
  - ✓ Tiles shall comply with ANSI A137.1 and have color extending uniformly through the body of the tile and provide a 0.5 percent maximum water absorption in accordance with ASTM C737.
  - ✓ Class Three (3) Commercial Medium to Heavy Traffic classification as rated by the manufacturer when tested in accordance with ASTM C1027-99 for visible abrasion resistance as related to foot traffic.
  - ✓ MOH Scale Rating of 7 or greater.
  - ✓ Slope tile floors to drain.
  - ✓ ADA compliant shower stalls shall slope to a trench drain at the back of the stall.
  - ✓ Provide integral soap dish.
  - ✓ Provide expansion, control and isolation joints as needed to accommodate movement and maintain tile assembly integrity. Follow TCNA EJ171 Movement Joint Guidelines.
  - ✓ Provide waterproof membrane in accordance with ANSI A118.10.
- movement and maintain tile assembly integrity. Follow TCNA EJ171 Movement Joint Guidelines.
- ✓ Provide waterproof membrane in accordance with ANSI A118.10.
- ✓ DCOF: For tile installed on horizontal surfaces, provide products with the following values as determined by testing identical products per ANSI A137.1 Section 9.6 DCOF: Minimum 0.60.

**4.7.5 Ceiling Finishes**

Durability and ease of maintenance and access shall drive the selection of ceiling finishes. Sustainability requirements for low-emitting materials and environmental product disclosure shall be followed. Ceilings with recycled content are preferred, but must meet performance criteria listed below. Acoustic properties of materials shall be considered and finishes shall be selected that reduce reverberation and noise to the greatest extent possible.

Coordination shall be required with security and communications systems and ceilings shall be designed to allow or prevent access to critical elements as needed by those systems. Access to mechanical, plumbing and electrical equipment requiring service or maintenance shall be designed into the selected ceiling systems. Ceiling access shall be provided for each room and at each equipment location.

Ceilings in maintenance bays, shops and associated storage, and the truck wash area shall be open to the deck. Exposed structural steel structure and deck, exposed piping, conduit, raceways and shall be painted.

Exposed insulation will not be allowed.

## SECTION 4 - PERFORMANCE REQUIREMENTS

**4.7.6 Acoustical Ceiling**

- Tile size: 24-inches by 24-inches by (min) 3/4-inch
  - ✓ Armstrong Ultima Square or Beveled Tegular or approved equal.
- Suspension system:
  - ✓ Direct-Hung, Double-Web Suspension System: Main and cross runners roll formed from and capped with cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation.
  - ✓ Prelude XL, Exposed Tee or approved equal.

**4.7.7 Gypsum Board Ceilings****Performance Requirements:**

- Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly according to ASTM E 119 by an independent testing agency.
- Attach all gypsum board to supports in accordance with the Northwest Wall and Ceiling Bureau (NWCB) Specification Standards Manual and ASTM C840.
- Paper faced gypsum board will not be allowed.
- Gypsum Board Type X: ASTM C 1396/C 1396M, 5/8-inch.
  - ✓ Basis of Design: DensArmor Plus Fireguard High Performance Interior Panel.

**4.7.8 Interior Signage**

Provide room identification signage for all rooms and spaces within the facility per the SFMTA Guidelines. Signage shall comply with applicable provisions of the ADA guidelines and include room numbers and names. Office

spaces and other spaces as directed by the SFMTA shall have interchangeable inserts. Signage in shop areas to be made of highly durable material and shall be mechanically attached to the wall with non-corrosive fasteners compatible with the material joined (adhesive attachment will be unacceptable). Room identification signage shall be consistent in appearance throughout the building. Wayfinding signage shall be provided to facilitate access to all areas of the building.

Furnish and install all signage, required mounting and associated structural supports or backing for signage. Signage designs and locations shall be coordinated, reviewed and approved by the SFMTA prior to fabrication and installation. An approved sign location plan is required prior to the 100 percent review. The SFMTA interior signage shall include:

- Code mandated signage (including hazardous areas, safety, egress and accessibility).
- Room signage: for all rooms and spaces within the facility.
- Wayfinding Signage: clearly identify circulation routes to all areas of the facility.
- Operational signage: as directed by the SFMTA Operations.

Signage shall be designed to be architecturally compatible with the building and shall contribute to the overall character of the facility.

**4.7.9 Specialties**

- Visual Display Units: Provide visual display units in conference rooms, training rooms, and lunch/break rooms. Provide marker boards and tack boards or combination units containing both marker boards and tack boards. Provide marker boards with chalk trays with lifetime surface warranty.

- Storage Shelving: Provide storage shelving as required in equipment schedule and specified here in.
- Toilet and Bath Accessories: Provide toilet and bath accessories fabricated from stainless steel. Provide paper towel dispensers, waste receptacles, toilet tissue dispensers, soap dispensers, grab bars, sanitary napkin dispensers and disposal units, shower curtains, hair dryers, mirrors, and clothes hooks, as required for convenient and efficient use of toilet and bath facilities. Provide mop sink and mop plus broom holder with shelf in custodial closets.
- Projection Screens: Provide ceiling recess mounted electrically operated projection screen in the Training Room. Screen material suitable for video projector, minimum screen size 5-feet by 7-feet.

**4.7.10 Millwork**

Refer to Room Data Sheets for millwork locations and general requirements. Provide AWI (Architectural Woodwork Institute) custom grade millwork, concealed hinges, and adjustable shelf standards. All hardware shall be stainless steel.

Exposed millwork surfaces shall be ANSI/NEMA LD3 high pressure plastic laminate with plastic laminate covered edges. Melamine interior finish will not be acceptable.

Horizontal surfaces other than countertops, the vertical surfaces, and the edges shall be Grade HGS.

Semi-Exposed Surfaces excluding drawer bodies shall be Grade VGS. The drawer sides and backs shall be solid hardwood lumber. The drawer bottom shall be constructed with hardwood plywood.

## SECTION 4 - PERFORMANCE REQUIREMENTS

Countertop (all locations except Dispatch) shall be constructed with solid surface with integral backsplash. Dispatch countertop shall be minimum 16 gauge in thickness, Type 304 stainless steel, non-directional matte finish and with the eased edge.

Miscellaneous millwork included but not limited to shelving in the maintenance library, media and storage rooms shall be directed by SFMTA. Shelving shall be plastic laminate clad and supported by standards and brackets for the expected loading.

For bonding laminate to core, PVA adhesive for cold press applications shall be machine applied as a consistent, rigid glue line. Use adhesives that comply with VOC content limits according to EPA Method 24, 40- CFR-59, Subpart D, wood glues with VOC content less than 30 g/L. VOC contents of the adhesive shall be 70 g/L or less. Added urea-formaldehyde in materials or fabrication is not allowed in assemblies.

## 4.8 Conveying - Elevators

- Personnel elevators: Provide elevator by Fujitec, KONE, Schindler, Thyssen, Cantonor approved equal. Passenger elevator features:
  - ✓ Capacity: 3,000 pounds.
  - ✓ Speed: per PPC and the SFMTA
  - ✓ Car Interior and Hall Doors and Frames: Stainless steel, minimum 14 gauge. Sound deaden doors and frames.
  - ✓ Emergency Return Unit: A battery powered lowering unit shall be provided to automatically return the elevator to its lowest landing at normal speed in a power failure and allow all passengers to exit safely.
  - ✓ Floor Finish: Per PPC and the SFMTA

- ✓ System Startup: PPC to obtain and pay for permit, license, and inspection fee necessary to complete the installation.
- ✓ Power Characteristics: 480 V, 3 phase, 60 hertz.
- ✓ Minimum Clear Inside Car: minimum 6-feet 8-inches wide by 4-feet 9-inches deep by 8-feet high clear.
- ✓ PPC shall submit 3-inch by 12-inch samples of actual finished material for review of color, pattern, and texture of exposed finishes.
- Freight elevators: Provide elevator by ThyssenKrupp, Otis, Schindler or Kone. Freight elevators shall meet all codes referenced therein. Selection of the elevator type (electric or hydraulic) shall be made based on the required performance and shall be subject to review and approval by the SFMTA.
  - ✓ Access to the freight elevator shall be provided on all bus yard component levels including the basement.
  - ✓ Loading and Capacity: Class C-1, minimum loading capacity of 10,000 pounds, designed to transport a loaded industrial truck with the maximum combined weight of industrial truck and load not to exceed 10,000 lbs.
  - ✓ Speed: 100 feet per minute (minimum).
  - ✓ Clear Inside Dimensions: minimum 8-feet wide by 13-feet 6-inches deep with minimum height to accommodate an electric forklift.
  - ✓ Operation: Simplex.
  - ✓ Emergency Return Unit: A battery powered lowering unit shall be provided to automatically return the elevator to its lowest landing at normal speed in a power failure and allow all passengers to exit safely.
- ✓ Car Interior, Hall Doors, and Frames: stainless steel panels, minimum 14 gauge with No. 4 finish, flooring to be minimum 3/16 inch steel checker plate.
- ✓ Additional features: wire mesh car gate, stainless steel bumpers, buttons for cab protection pads.
- ✓ Provide an associated machine room as required by elevator manufacturer.
- ✓ System Startup: PPC to obtain and pay for permit, license, and inspection fee necessary to complete the installation.
- ✓ Power Characteristics: 480 V, 3 phase, 60 hertz.
- Major elevator components, including driving machines or pump and tank units and plunger-cylinder assemblies (as applicable), controllers, signal fixtures, door operators, car frames, cars, and entrances, shall be manufactured by a single manufacturer. Elevators shall be installed by the elevator manufacturer or an authorized representative who is trained and approved by the manufacturer.
- Elevators shall be fully accessible to individuals with disabilities, meeting all requirements of the ADA Guidelines.
- A minimum 2 year warranty from the date of Acceptance shall be provided in which Manufacturer agrees to repair, restore or replace elevator work that fails in materials or workmanship within the specified period. Failures include but are not limited to, operation or control system failure, including

## SECTION 4 - PERFORMANCE REQUIREMENTS

## 4.9 Plumbing

excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

- Traveler Cable - Systems to elevator shall be provided via a traveler cable meeting the following requirements:
  - ✓ Terminate in a communications compartment/access panel on the rear wall accessible inside the car to hold communications equipment.
  - ✓ Carry compartment power for router and devices.
  - ✓ Wire-way from compartment to devices.
  - ✓ Router inside the communications compartment.
  - ✓ Router consolidates CCTV, ACS, phone if IP Phone.
  - ✓ Traveler cable to include Plastic Optic Fiber (POF) cable for IP communications to the Router. Use a POF fiber bundle in a sheath rated for Continuous-Bending. POF shall be rated for at least 5,000,000 (five million) Continuous-Bending cycles. POF fiber may be multi-mode or single mode. Terminate 1 pair of POF at elevator distribution cabinet and elevator cab systems. Leave remaining pairs unterminated in elevator and in elevator machine room.
  - ✓ Provide four pairs of spare communication wires in addition to those required to connect specified items. Tag the spares in the machine room.

**General:**

The PPC shall design, permit, and construct all plumbing systems. All work shall be in accordance with the California Building and Plumbing Codes with City and County of San Francisco amendments, local codes, and any criteria listed in this document.

The PPC shall be responsible for verifying achievement of goals at each progress design deliverable and at permit.

All water and gas piping penetrations through concrete or masonry shall have a metallic pipe sleeve. Sleeves at floor penetrations shall extend at least 12 inches above slab. Seal all wall and floor penetrations.

Provide pipe labels for all piping every 50 feet and change of direction indicating size, content, and flow of direction.

Seismic-restraint systems shall comply with California Building Code with local amendment requirements. Refer to structural for wind- and seismic-restraint loading requirements.

## 4.9.1 Plumbing Piping

**Potable Domestic Water:**

Potable domestic water mains and new supply lines shall be installed at least 4-foot horizontally from, and one-foot vertically above a parallel pipeline conveying recycled water. The water main shall not be in the bus driveways.

Domestic water piping 3-inches and larger below the slab shall be ductile iron and piping 2-1/2-inches and less shall be ASTM B88 Type K soft copper with no joints or silver brazed joints. Above floor piping shall be ASTM B88 Type L hard copper with lead-free soldered or pressure-sealed joints. Push-on and drilled

joints are prohibited. All buried domestic water pipe below slab shall be protected with 20 mil polyethylene wrap and tape and pipe sleeve at slab penetration. Hydrostatically test water piping to 100 PSI or 150 percent of operating pressure. Maintain pressure for not less than four hours.

Potable domestic water service must comply with the CCSF Plumbing Code and Health Code. Provide with a strainer and lead-free reduced pressure backflow preventer with secondary, utility grade remote reading water meter. The pulse meter shall be connected to the building automation system (BAS). The supply line to each item of equipment or fixture shall be equipped with a shutoff valve to enable isolation of the item for repair and maintenance without interfering with the operation of other equipment or fixtures. Supply piping to reels, wall hydrants and equipment shall be anchored to prevent movement.

Domestic hot water piping shall be insulated.

Domestic water shall be sized to provide a minimum of 25 PSI at flush valves and 15 PSI at other fixtures. Sizing shall comply with the requirements of the California Plumbing code. Velocities with the main and branch piping shall not exceed 6 fps.

Domestic water valves 4-inches and larger shall be OS&Y gate valves type with cast iron body and bronze mounted trim type MSS SP-70 rated for a minimum of 175 PSI. Valves 3-inches and less shall be bronze ball type MSS SP-110 rated for a minimum of 400 PSI. All potable domestic water valves shall be lead free.

Water sub metering shall be installed to monitor consumption of water uses including, but not limited to, individual monitoring of each

**SECTION 4 - PERFORMANCE REQUIREMENTS**

vehicle or equipment wash area, shop area, irrigation system and all exterior hose bibs. Each sub meter shall be connected to the BAS.

**4.9.2 Recycled Water**

Recycled water piping shall be purple PVC or equivalent with SFPUC's City Distribution Division sign off, prior to installation.

The potable water line may be used to feed the recycled water lines(s) until such time that recycled water becomes available. When recycled water becomes available, the cross-connection will be broken by the SFPUC, and the potable and recycled water lines will be totally separated. Before recycled water is delivered to the property, cross-connection and backflow testing will take place to assure separation.

Connect water closet and urinal flushing and wash water system to metered recycled water system. Provide additional pulse meters for the boiler make-up water and wash water systems make-up water. Any irrigation systems shall have a dedicated recycled water tap with a separate meter. All meters shall connect to BAS.

**4.9.3 Sanitary and Oily Waste and Vent**

Sanitary/oily waste and vent piping shall be no-hub cast iron pipe and fittings.

**4.9.4 Storm Drain**

Storm drain piping that is not visible from the exterior of the building shall be no-hub cast iron pipe and fittings. Exterior storm piping shall be stainless steel, unless otherwise authorized by the SFMTA.

**4.9.5 Waste Water Force Main**

Waste water force main piping shall be ASTM B88 Type K hard copper with silver brazed

joints. Above floor piping shall be ASTM B88 Type L hard copper with lead-free soldered joints.

**4.9.6 Plumbing Fixtures**

- Water closets shall be wall mounted with flush valve and elongated bowl and chair carrier. Water closet and flush valve shall be HET at 1.1 GPF with a MaP rating of 1000 as tested by Veritec Consulting, Inc. Flush valve shall be exposed, hydraulically powered, electronic sensor operated type with additional manual flush. Water closets and flush valves shall be suitable for use with recycled water.
- Urinals will be wall mounted flush valve type with carrier. Urinal and flush valve will be HEU at 0.125 GPF. Flush valve will be exposed, hydraulically powered, electronic sensor operated type with additional manual flush. Urinals and flush valves shall be suitable for use with recycled water.
- Lavatory will be white vitreous china, under counter mounted or wall mounted with chair carrier. Faucets will be hydraulically powered, electronic sensor operated, heavy-duty cast brass institutional grade with maximum flow rate of 0.5 GPM. Lavatory faucets shall comply with ASSE 1070.
- Sink in Break Rooms will be double compartment, under counter mounted, 18-gauge stainless steel. Faucets will be manual operated, heavy-duty cast brass institutional grade with maximum flow rate of 1.0 GPM. Sinks shall be provided with garbage disposer.
- Sink in Coffee Bars will be single compartment, under counter mounted, 18-gauge stainless steel. Faucets will be

manual operated, heavy-duty cast brass institutional grade with maximum flow rate of 1.0 GPM.

- Showers will be provided with heavy-duty pressure balancing type mixing valve. Shower heads will be 1.5 GPM flow. Hand held shower heads for the handicapped will be 1.5 GPM flow.
- Electric water coolers will be dual height and constructed of stainless steel lead-free and with an integral filter and bottle filler.
- Wash fountains will be multi-station and constructed of stainless steel or precast terrazzo. Each station will be 0.5 GPM flow.
- Janitor's mop sink will be floor type constructed of precast terrazzo. Faucet will be manual operated heavy-duty cast brass institutional grade, wall mounted with support bracket, vacuum breaker with hose end spout with maximum flow rate of 2.2 GPM.
- Combination emergency/shower eyewashes shall be exposed type with floor flange, galvanized steel piping plastic shower head actuated by a stay open ball valve with rigid pull rod and handle, eyewash with large stainless steel bowl and two soft stream heads actuated by stay open ball valve with push flag. Unit will be provided with manufacturer's recommended thermostatic mixing valve to provide tepid (60 degrees to 90 degrees F) water in accordance with ANSI Z358.1 and local audio/visual alarm tied into the BAS. Minimum size for thermostatic mixing valve will be 44 GPM with a maximum pressure drop of 20 PSI. Pipe sizes will be 1-1/4-inch water inlet and 1-1/4-inch drain. Combination emergency shower/eyewashes

## SECTION 4 - PERFORMANCE REQUIREMENTS

shall be located throughout the maintenance areas in accordance with OSHA eyewash requirements. All emergency showers/eyewashes shall be floor drain.

- Emergency eyewashes shall be exposed type with floor flange, galvanized steel piping with large stainless steel bowl and two soft stream heads actuated by stay open ball valve with push flag. Unit will be provided with manufacturer's recommended thermostatic mixing valve to provide tepid (60 degrees to 90 degrees F) water in accordance with ANSI Z358.1 and local audio/visual alarm tied into the BAS. Minimum size for thermostatic mixing valve will be 5 GPM with a maximum pressure drop of 20 PSI. Pipe sizes will be 3/4-inch water inlet and 1-1/4-inch drain. Emergency eyewashes shall be located on the mezzanines. All emergency eye washes shall be hard plumbed and with floor drain.
- Exposed plumbing fixture trim shall be chrome plated.
- Trap primers shall be ASSE 1018 supply-type, trap-seal primer. Trap seals shall be ASSE 1072 certified waterless in-line drain trap seals at each drain outlet.
- Water hammer arrestors shall be properly applied to the domestic hot and cold water systems for all plumbing fixtures in accordance with ASSE 1010.
- Handicapped plumbing fixtures shall be provided in accordance with ADA.

## 4.9.7 Plumbing Specialties

- Roof drains with overflow roof drains and roof clamps shall be provided. Roof drain system shall be sized for 1.5-inches of rainfall per hour. Storm water piping shall be no-hub cast

iron above grade and HDPE below grade.

- Floor drains shall be provided in Restrooms, Showers, Changing areas, Custodial Rooms (Janitors Closets). Floor sinks shall be provided at each emergency showers/eyewashes, emergency eyewashes and Mechanical Rooms adjacent to water heaters, boilers, air compressors, HVAC units, and pumps. Reduced pressure backflow preventers shall be provided with a floor sink drain. Floor sinks for condensing domestic water heaters and boilers shall have a cast iron body and 13-inch square slotted heavy duty grate with acid resisting epoxy coated interior and top, with anti-splash interior dome strainer.
- Floor drain grates and frames in Restrooms, Showers and Custodial Rooms (Janitors Closets) shall be light duty with nickel bronze or stainless steel 6-inches grates. Floor sinks at mechanical rooms, water heaters, boilers and emergency showers/eyewashes and emergency eyewashes shall have a cast iron body and 13-inch square slotted heavy duty grate with acid resisting epoxy coated interior and top, with anti-splash interior dome strainer. Full grate configuration and emergency showers/eyewashes and emergency eyewashes. Grate configuration for mechanical rooms shall be suitable for installation requirements.
- Floor drains in shop areas subject to wheel traffic shall be heavy-duty with 8-inch nickel bronze or stainless steel tractor grate.
- Trench drains shall be provided in lower level work areas, wash areas and overhead door openings. Grates shall be Load Class D / H-20 rated for extra heavy duty.

- Floor drains and floor sinks shall be provided with trap protection device. Trench drains shall have sediment baskets installed upstream of traps.
- Elevator pits shall be provided with sumps and sump pumps. Hydraulic elevator pumps shall discharge through an oil-water separator before discharge into the sanitary system. Provide a high level alarms for sump pump fail.
- Exterior freeze proof wall hydrants shall be box type and provided around the perimeter of each building at each man door. Non-freeze interior hose bibs shall be provided around the perimeter of the interior shop areas at 150-foot or less intervals, in lower level work areas, Restrooms and Mechanical Rooms.
- Compressed air drops shall be provided as indicated in the design criteria. Compressed air piping shall be Type L copper. Provide full-port, metal ball valves suitable for use with compressed air at all equipment to provide positive shut off, low leakage valves rated at 150 PSI suitable for piping without dielectric fittings. Provide pressure regulators, filters, quick connect couplings and accessories as required. Label piping and pressure test at 200 PSI for four hours.
- Water hammer arrestors shall be provided on the domestic cold and hot water systems in accordance with PDI Standard WH-201. Water hammer arrestors shall be all stainless steel when installed in non-accessible locations. Provide water hammer arrestors at all solenoid valves.
- In the wash bay, provide provisions to safely and easily wash the forehead of the vehicles.

## SECTION 4 - PERFORMANCE REQUIREMENTS

## 4.9.8 Plumbing Equipment

**Domestic Water Heater and Accessories:**

Each building will be provided with a central domestic water heating system located in the Main Mechanical Room. Water heaters will be commercial vertical ASME tank type with 400 series stainless steel or stainless steel alloy tank, 98 percent energy efficiency, low NOx rated, direct vent and sealed combustion chamber, with CPVC combustion intake and stainless steel flue vent piping.

Central domestic water heating systems shall include high/low flow thermostatic mixing valve(s) and a domestic hot water circulation pump(s) to maintain adequate temperature in the hot water circulation system throughout the building. Domestic water heating systems shall heat water to 140 degrees F and thermostatic mixing valve will be provided to temper water supply temperature down to 110 degrees F for distribution. Showers will be limited to 105 degrees F. Hot water circulation will be within a reasonable time frame from the fixture.

Central domestic hot water system shall be provided with in-line domestic hot water circulation pump to provide hot water to the fixtures within 15 seconds.

**Elevator Pumps:**

Each elevator shall be provided with and elevator sump and duplex pump to pump out accumulated water. Pump shall discharge to a minimum size of 6-inch industrial waste sewer pipe.

**Sand and Oil Interceptor:**

All maintenance shop, wash area, etc., floor and trench drains, and elevator sump that have the possibility of receiving oily drainage shall be piped to an exterior sand and oil interceptor

prior to entering the site sanitary sewer system. Oil interceptor shall be sized in accordance with the Plumbing Code. Interceptor shall be precast concrete located in an accessible area for servicing.

**Waste Water Lift Station:**

If the waste water drainage piping systems inside the buildings are unable to connect to the site sanitary sewer piping system elevation, a waste water lift stations shall be provided. Waste water lift stations shall consist of duplex ejector pumps each sized at 100 percent of the peak load in a wet well and a separate valve vault. Duplex pumps shall alternate starts and both have the capability to run simultaneously upon rising level. Pumps shall be controlled by float switches. For ease of maintenance pumps shall be provide with stainless steel rail retrieval system. Waste water lift station shall be connected to the emergency generator. A diesel-fueled engine generator set shall provide power for the emergency/standby system loads.

## 4.10 HVAC

**General:**

The PPC shall design, permit, and construct all HVAC systems. All work shall be in accordance with the City and County of San Francisco, local codes and any criteria listed in this document.

The performance goals depend on the level of insulation added to the building envelope and final glazing choice. The PPC shall be responsible for verifying achievement of goals at each progress design deliverable and at permit. Title 24 requires HVAC design use the 0.4 percent ASHRAE design conditions for the current year. These design conditions may be exceeded for a number of hours per year (due to outside temperatures exceeding

the ASHRAE 0.4 percent design conditions.) While designing to the ASHRAE 0.4 percent conditions by definition indicates that design set points will be exceeded during peak periods, typical design often requires a minimal amount of over sizing so that control is always maintained.

The SFMTA shall assist the Commissioning Provider in the development and implementation of a commissioning plan for LEED compliance.

Seismic-restraint systems shall comply with California Building Code requirements. Refer to structural for wind- and seismic-restraint loading requirements.

Each area within the Bus Yard shall be evaluated for hazardous area classification following NFPA Section 497 and NEC Sections 500-516. HVAC equipment located within each space shall be explosion-proof if relevant for the class designation (Class I, II, or III). Particular areas of concern include those where cleaning or fuel chemicals will be stored or used.

Air handling units may be either indoor or rooftop mounted and shall be located on rooftops or in enclosures with adequate ducting to intake and exhaust to enable effective operation per the manufacturer conditions. Air handlers must incorporate airside economizers as noted in the DCD. The PPC shall propose the area required for air handlers based on ventilation requirements listed in the DCD, and propose locations for air handlers as part of the response.

Exhaust air ducts for air handlers and direct environmental exhaust from maintenance and other spaces shall not terminate within 3' of a property boundary or opening of the building or 10' from a forced air inlet, per CMC Section

## SECTION 4 - PERFORMANCE REQUIREMENTS

502.2.1. Backdraft or motorized dampers are required for all exhaust openings.

Exhaust fans, air handling units, and other mechanical equipment shall be readily accessible for maintenance. Equipment installed above a ceiling must have adequate access through access panels for routine maintenance. Rooftop equipment must be provided with adequate access via a stairwell and at least 5' clearance around the equipment with a walking path. Access shall be limited to only maintenance personnel via secured openings (doors, access panels, etc.). Fans and motors weighing more than 200 pounds shall have full-length hoist rails mounted over the equipment to facilitate service, removal, and replacement.

The Site is located within an area with elevated pollution concentrations designated by the City as an Air Pollutant Exposure Zone (APEZ). As defined in San Francisco Health Code Article 38, this requires residential buildings and other sensitive uses to comply with an enhanced ventilation requirement. All residential units and other sensitive use spaces as defined in Article 38 must be provided with a ventilation system capable of achieving PM2.5 protection equivalent to that associated with MERV 13 filtration, as defined by ASHRAE Standard 52.2.

- RFP phase: Proposers shall indicate in their proposed design how they will achieve compliance with Article 38 requirements and demonstrate how compliance is expected to be met.
- PDA phase: To ensure compliance with the intent of this article, and to limit impact from potential pollution sources generated on-site at the Facility, the design team shall undertake a CFD evaluation of impact to at least one

residential unit per façade. CFD analysis shall indicate the concentration of different particulate matter sizes developed in the unit and determine the equivalent MERV rating based on ASHRAE Standard 52.2. Mitigations shall then be determined to achieve a minimum MERV 13 compliance.

- Based on the results of this analysis during the PDA phase, the PPC shall be responsible for creating a ventilation plan demonstrating compliance with this article, and submitting it to the San Francisco Department of Public Health for review and approval prior to submitting mechanical drawings for approval. Plans must indicate the path of outdoor air and filtration, impact of z-ducts, trickle vents, or other unfiltered air intakes to units, and strategies for common areas of residential units (note that common areas do not require enhanced ventilation if positive pressure is maintained in adjacent units and habitable spaces). The submission shall also include the findings from the CFD analysis.

## 4.10.1 Codes and Standards

The following design conditions apply to all interior building types and uses, unless noted otherwise.

**Load Calculations:**

- Use Radiant Time Series calculation methodology for cooling. Do not use occupancy schedules for cooling system design.
- Do not use internal heating load sources (lights, receptacles, people) when calculating heating system design loads.
- Account for duct leakage in load calculations

- Account for fan heat in load calculations. Model fan static pressure at dirty filter condition.
- Energy modeling programs shall meet all requirements of the USGBC LEED rating program energy modeling requirements. Energy modeling program shall be able to fully simulate all 8,760 hours in a year. The energy modeling program shall be able to separately schedule occupancy, internal loads, lighting, fans, compressors, and other plant equipment. The energy program shall be able to breakout packaged equipment to model supply fan energy separately from packaged energy rates.

## 4.10.2 HVAC Systems for Cooled and Heated Spaces

**Unacceptable Systems:**

- Variable Refrigerant Flow systems are not acceptable because the system is proprietary once a specific manufacturer is selected and installed.
- Systems that utilize electric resistance heating as the primary heating source are prohibited.
- Ground source heat pumps and packaged terminal air-conditioners or heat pumps (PTAC/PTHP) are prohibited.
- Split-systems, except for isolated or remote rooms that require air-conditioning or heating and extending the main air or water distribution service is not cost effective.
- Baseboard, fan coil units or other floor-mounted equipment in occupied spaces. Local vertical fan coil units or heat pumps may be used if they are installed in mechanical closets.

## SECTION 4 - PERFORMANCE REQUIREMENTS

## 4.10.3 System Notes

Systems that use terminal equipment as the primary cooling and air distribution source including, but not limited to fan-coil units, local heat pumps, chilled beams, etc. shall use a Dedicated Outdoor Air System (DOAS) to deliver outdoor air to occupied spaces. DOAS systems shall use exhaust air energy recovery utilizing total energy wheels. DOAS systems may deliver outdoor air to the return side of terminal devices or direct to space. DOAS units shall cool and dehumidify outdoor air to at least a 52 degrees F dew point prior to distribution to terminal devices or spaces. Provide filters upstream of the energy wheel in both airstreams. Outdoor air filters shall be minimum MERV 13. Exhaust air filters shall be minimum MERV 8. Supply fan motors and exhaust fan motors shall be driven with VFDs. Provide airflow stations in both the outdoor airstream and exhaust airstream and adjust fan speeds to maintain design airflow rates as filters load.

HVAC Zones - Up to four offices may be combined on one thermostat controller, provided the offices have identical solar, or the like, heat loading. If a corner office has two different window exposures, then provide a separate zone controller. Each conference room, training room, lounge or other similar room shall have its own zone controller.

## 4.10.4 HVAC Systems for Heated and Ventilated Spaces

**Required Heating System:**

In-floor radiant heating for maintenance bay areas and wash bays. Other storage rooms and shop rooms in the maintenance area may use forced air heat or overhead radiant heat.

**Air Distribution System Design:**

- Louvers:
  - ✓ The mechanical engineer shall select and specify louvers for all air associated with the HVAC system design.
  - ✓ Use wind-driven rain louvers.
  - ✓ Orient louvers so that prevailing winds do not oppose exhaust airflow to the maximum practical extent.
- Duct Design:
  - ✓ All ductwork shall be G90 galvanized steel except in areas where special requirements dictate aluminum or stainless steel duct construction.
  - ✓ Duct construction shall be in accordance with SMACNA HVAC Duct Construction Standards except that minimum duct thickness allowed shall be 24-gauge galvanized steel in all locations.
  - ✓ All duct systems shall be sealed to SMACNA Seal Class A.
  - ✓ Specify ducts to be constructed to the next higher pressure class than the maximum anticipated operating pressure.
  - ✓ Duct systems operating at a pressure class greater than 2-inches (positive and negative) shall be constructed of round or oval spiral seam ducts.
  - ✓ Duct elbows that have an air velocity exceeding 2,000 fpm shall have a radius/width ratio of 1.5. Duct elbows that have an air velocity less than 2,000 fpm shall have a radius/width ratio not less than 1.0. All mitered elbows with a turning angle greater than 30 degrees shall use single wall turning vanes. All tees shall include turning vanes. Branch duct taps shall be use low-loss fittings.
- ✓ Acoustical duct liner shall be flexible elastomeric designed specifically for sound attenuation. Glass fiber or mineral fiber duct liner is not acceptable. Acoustical duct liner in ducts with an air velocity exceeding 2,000 fpm shall utilize double wall duct with a galvanized steel perforated duct liner. Acoustical duct liner in ducts with an air velocity less than 2,000 fpm may use single wall duct.
- ✓ Duct insulation shall be flexible wrap with factory applied FSK jacket. Ducts located in high-abuse areas such as mechanical rooms shall be rigid board insulation with factory-applied ASJ.
- ✓ All dampers that process outdoor air shall use 316 stainless steel dampers. Control actuators shall be mounted outside the airstream.
- ✓ Outdoor air dampers, exhaust air dampers, and control dampers shall meet AMCA Publication 511 Class 1 leakage requirements.
- ✓ Dampers at air-handling units mixing plenums and two-position dampers shall be parallel blade. All other control dampers and balancing dampers shall be opposed-blade.
- ✓ Fire dampers shall be "blades out of airstream" type.
- ✓ Balancing dampers shall be located in duct branch as far from the supply air terminal as possible.
- VAV Terminal Units:
  - ✓ Acceptable types are single duct shut-off and parallel fan-powered. Preference is for single duct shut-off due to additional

## SECTION 4 - PERFORMANCE REQUIREMENTS

maintenance and noise concerns with fan-powered units. Fan-powered units if used shall only use electronically commutated fan motors. VAV units shall be pressure independent.

- ✓ Select VAV units that can throttle to 20 percent of design airflow to reduce unnecessary reheat.
- ✓ VAV units shall be double wall construction.
- Air Terminals:
  - ✓ All diffusers, registers, and grilles shall be aluminum construction.
  - ✓ Select air terminals with a high air diffusion performance index (ADPI) for the specific room.

**Water Distribution System Design:**

- Chilled Water Piping
  - ✓ Up to and including 2-inches – ASTM B88 Type L copper (use ASTM B88 Type K copper below grade)
  - ✓ 2-1/2-inches and larger – ASTM A53 Schedule 40 steel.
  - ✓ Pipe insulation – fiberglass, thickness as required by ASHRAE 90.1. Provide ASJ with vapor retarder on all chilled water piping. Chilled water piping greater than 1-1/4-inches located in unconditioned spaces and in all mechanical rooms shall use minimum 2-inch thick phenolic or 3-inch thick cellular glass. Chilled water piping 1-1/4-inches and smaller shall use 1-1/2-inch thick flexible elastomeric.
  - ✓ Pipe jacket – provide ASJ with vapor barrier in all locations. Provide PVC jacket in mechanical rooms and other areas subject to damage. Provide stainless steel jacket outdoors above grade.

- Chilled Water Condensate Piping
  - ✓ Up to and including 2-inches – ASTM B88 Type L copper (use ASTM B88 Type K copper below grade)
  - ✓ 2-1/2-inches and larger – ASTM A53 Schedule 40 steel.
  - ✓ Pipe insulation – fiberglass with ASJ and vapor barrier or flexible elastomeric. Thickness as required to prevent surface condensation. Provide cleanouts on high ends of condensate piping.
- Heating Water Piping
  - ✓ Up to and including 2-inches – ASTM B88 Type L copper (use ASTM B88 Type K copper below grade)
  - ✓ 2-1/2-inches and larger – ASTM A53 Schedule 40 steel.
  - ✓ Pipe insulation – fiberglass, thickness as required by ASHRAE 90.1. Provide ASJ with on all heating water piping.
  - ✓ Pipe jacket – provide ASJ in all locations. Provide PVC jacket in mechanical rooms and other areas subject to damage. Provide stainless steel jacket outdoors above grade.
- Radiant Floor Heating Piping
  - ✓ Cross-linked high density polyethylene (PEX) manufactured in accordance with ASTM F876 and ASTM F877. Radiant floor tubing shall carry a minimum 30-year warranty.
- Pipe Hangers
  - ✓ Provide clevis type hangers with insulation shield, minimum 12-inches long centered in hanger. Strut systems may also be provided with protective insulation shield.

- ✓ Use pipe rollers, guides, and expansion loops as necessary to accommodate thermal expansion.
- Flow meters, Separators, and Expansion Tanks
  - ✓ Provide in-line electromagnetic type. Provide isolation valves on both sides of meter with minimum straight pipe distance recommended by flow meter manufacturer.
  - ✓ Provide air and dirt separator in chilled water and heating water systems at plant. Provide dirt separator in condenser water system. Provide isolation valves on both sides of separator.
  - ✓ Expansion tanks shall be welded steel closed bladder type, tested and stamped in accordance with ASME SEC VIII, rated for working pressure of 125 PSIG, with replaceable flexible heavy-duty bladder.

**Refrigerant Distribution System Design:**

- Refrigerant Piping shall be ACR copper.
- Pipe insulation – Flexible elastomeric, thickness as required by ASHRAE 90.1. Insulation both suction and gas piping separately.
- Pipe jacket – Provide PVC jacket in mechanical rooms and other areas subject to damage. Provide stainless steel jacket outdoors above grade.
- Use only brazed joints.

## 4.11 Equipment

**General:**

- All motors powered by variable frequency drives shall include a motor shaft grounding ring. All motors shall be premium efficient. Use direct drive motors where available

**SECTION 4 - PERFORMANCE REQUIREMENTS**

- Use electronically commutated motors in small, low power applications where available. Provide minimum 6-inch tall concrete housekeeping pads for major equipment
- Fouling factor for heating water heat-transfer coils shall be at least 0.00025 hr-ft, 2 degrees F/Btu.
- Provide buffer tanks if system water volume is below recommended minimum system values as directed by manufacturers.

**4.11.1 Air-Cooled Chillers**

Provide a factory assembled and tested, positive displacement packaged chiller. Design for primary variable flow to avoid unnecessary constant volume pump energy. Select chillers that maximize IPLV. Select chillers that have minimum turndown of 25 percent or lower. Provide chiller with the following features: Factory installed evaporator flow switch. Provide condenser coil with factory applied coating to protect against salt water corrosion. Air cooled chillers to be provided with these features.

- Microchannel condenser coil
- Low ambient controls to 0 degrees F
- Single point of power and integral disconnect switch
- Factory-insulated evaporator
- Hail guards
- Chiller heater
- Controls transformer

**4.11.2 Central-Station Air-Handling Units**

Central-station air-handling units shall be 18-gauge galvanized steel double wall casing. Casing insulation shall be a minimum R-12 rigid insulation. Insulation shall not be exposed to airstream. The casing air leakage rate shall be no more than 1 percent at 8-inches of water gauge pressure.

Hinged access doors shall be provided in every section requiring routine access for maintenance including, mixing plenums with damper actuators, filter section, access sections for coil cleaning, and fan sections. Provide LED lights in all access sections. Access doors shall be thermally broken and gasket around door perimeter.

Provide base rail and concrete pad combination necessary to support correctly sized condensate drain trap. Minimum base rail height shall be 6-inches.

Provide 4-inch thick MERV 8 pre-filters and MERV 13 pleated final filter. Each filter bank shall have a separate differential pressure gauge and separate analog inputs to BAS.

Provide window and lights in fan sections.

Hydronic coils shall be AHRI rated. Provide coils with thickest fin option. Provide coils with manufacturer applied coating to protect against salt air corrosion. Drain pans in chilled water coil section shall be stainless steel and constructed in compliance with ASHRAE Standard 62.1. Maximum face velocity for chilled water coils shall be 500 fpm.

Air-handling unit fans shall be direct drive plenum type, minimum Class II fan construction. Air-handling units greater than 20,000 CFM shall use at least two supply fans. Select fan and motor with pre-filter and main filter both at dirty filter conditions.

**4.11.3 Heating Water Boilers**

Boilers shall be certified and listed in accordance with AHRI.

UL Compliance: Boilers must be tested for compliance with UL 834, "Standard for Heating, Water Supply, and Power Boilers-Electric" Boilers shall be listed and labeled by a testing

agency acceptable to authorities having jurisdiction.

ASME Compliance: Condensing boilers must be constructed in accordance with ASME Boiler and Pressure Vessel Code, Section IV "Heating Boilers".

Minimum of two boilers each sized at minimum 75 percent of design peak plant demand.

Stage boilers to provide maximum plant efficiency while maintaining minimum recommended flow rates through operating boilers.

Provide boilers to support variable-primary flow system configuration. Provide heating water boilers that do not require constant volume circulators.

Pipe boilers in reverse-return configuration at the boiler plant. Provide balancing valves on the low-pressure side of each boiler. Provide motor-operated isolation valves at each boiler to automatically shut-down flow through non-firing boiler.

Provide control interface to the BAS system.

**4.11.4 Circulating Pumps**

- Use split-coupled vertical in-line pumps
- Provide at least one pump to meet design flow condition and at least one back-up pump for all system types. Program pumps to alternate between operating duty and backup duty to equalize runtime.

**4.11.5 Water-Source Heat Pumps (WSHP)**

Water-Source Heat Pump systems may use either tower/boiler water loop.

WSHP units 6-tons and smaller shall be use two-stage compressors and have an electronically commutated supply fan motor capable of automatically changing fan speed in

**SECTION 4 - PERFORMANCE REQUIREMENTS**

response to space temperature demand. Size WSHP zones to maintain unit sizes no greater than 6 tons.

**4.11.6 Chilled Beams**

Chilled beam systems shall include temperature sensors and control algorithms to prevent condensation.

**4.11.7 HVAC Controls**

All HVAC equipment shall be fully integrated into a Building Automation System (BAS). All control set points shall be able to be viewed and remotely changed from the BAS operator workstation. Control and monitoring points available through equipment manufacturer's controller (including, but not limited to chillers, boilers, packaged DX-equipment, computer room units, etc.) shall be fully integrated with the DDC control system. This shall include all instrumentation and interface points.

All equipment shall operate on the local BAS controller or integrated packaged unit manufacturer's controller. The unit controllers and packaged equipment controllers shall have two way communication with the BAS and allow all control functions, alarms, operating schedules, set points, set point adjustment, optimum start and optimum stop sequences relayed to the BAS using BACnet protocol. The unit controller shall retain programming, schedules, and set points in the event of a power loss. Critical HVAC equipment shall have its control system on backup battery and emergency generator. A diesel-fueled engine generator set shall provide power for the emergency/standby system loads.

Provide control products including controllers, sensors, actuators, control dampers and devices required to make a complete and

functional control system. Provide air measuring stations for outside air intake.

Provide items for operating and controlling heating, cooling, ventilating, systems and equipment for energy management and conservation. Include piping, wiring, conduit, control panels, thermostats, timers, and recording and alarm devices. Interlock controls with site BAS. System and components must be BACnet compliant.

**4.11.8 Energy Metering**

All energy meters shall report both consumption and demand for each system and sub-system listed. Energy data shall be fully integrated into the BAS. The BAS controls contractor shall be responsible for ensuring all connections from the energy meters to the BAS system are made and are fully functional. Provide separate electrical meters for:

Process power loads such as lighting must be metered and monitored by BAS separate from normal building consumption to have a comparable baseline between actual energy consumption and modeled energy.

Provide and monitor heating water system Btu meter for each unique boiler plant. Provide and monitor chilled water system Btu meter if applicable. Water flow meters shall be in-line electromagnetic type.

Provide and monitor domestic water meter(s).

The power monitoring system shall monitor points in power distribution system and be able to provide local and remote readings. The power monitoring system shall, through software on a personal computer workstation and be able to monitor multiple devices at one time. The electronic meters shall provide metering values such as frequency,

current, voltage, power factor, power, demand current and real power, and accumulated real and reactive energy. Meters shall retain historical circuit data, time and date, setup and configuration values, and diagnostics data in the event of a control power failure, without the need for an internal battery. Meters shall be installed in all switchboards, switchgear, emergency power distribution devices and selected panelboards to obtain a clear understanding of the power consumption within the facility. Meter locations shall allow the user to monitor, track and produce reports of the energy usage of the Operations, Operator, SFMTA and any other tenant within the facility. The metering software shall be able to be installed on multiple devices, personal computers, as required.

The monitoring system shall provide the needed information for the PNC to develop and maintain an energy model and energy management plan.

**4.11.9 Systems Testing and Balancing**

Piping and Air Systems Testing, Adjusting and Balancing: Testing, adjusting and balancing agent must be AABC, NEBB or TABB certified. Makeup air units, exhaust fans, and air distribution system to be balanced in accordance with certifying agency standards. All system controls operation to be verified. Assist the Commissioning Provider as needed.

**4.11.10 Building Automated System**

The Building Automated System (BAS) shall be non-proprietary open protocol, BAC-net capable, and designed to be fully interoperable the existing SFMTA network of BMS systems presently functioning in other buildings. The PPC will coordinate with the SFMTA with respect to the SFMTA's established BAS

## SECTION 4 - PERFORMANCE REQUIREMENTS

system architecture, as well as standards and procedures in how to automate, record and track building systems and their performance over time. This shall include the ability for the SFMTA to monitor and manage the Facility's BAS system remotely using any PC that is connected to the SFMTA BAS internal network. The BMS shall be developed in coordination with the Project's Building Information Model (BIM).

## 4.12 Fire Protection

**General:**

The Bus Yard Component and Common Infrastructure shall be fully protected with automatic fire suppression systems including wet and dry pipe automatic sprinklers, in-rack or ESFR sprinklers in high rack storage area, and fire department standpipe hose valve stations, and clean agent gas fire suppression systems.

A minimum of two fire department connections (FDC) shall be provided for the Facility on separate streets in locations approved by the San Francisco Fire Department (SFFD), each FDC shall be located within 100 feet of a fire hydrant. Provide FDC signage as required by the SFFD.

Provide a complete sprinkler system design, including sprinklers, branch lines, floor mains and risers, shown on the drawings. The sprinkler system plans shall include node and pipe identification used in the hydraulic calculations. Shop drawings, seismic and hydraulic calculations shall be provided as specified in NFPA 13 and 14. Fire suppression system permit plans and hydraulic calculations shall be sealed by an appropriately licensed fire protection contractor.

## 4.12.1 Fire Pump

Conduct a fire water flow test prior to design. If the fire flow test demonstrates insufficient water supply to satisfy the expected fire suppression demands coordinate with the City necessary infrastructure upgrades. A fire booster pump system shall be provided to supply fire water to the Project.

- A jockey pump shall be provided to maintain the system pressure.
- Fire pump shall be provided with both a test header and a closed test loop with flow meter.
- Fire pump shall be provided with an automatic transfer switch to transfer power from the building emergency generator. A diesel-fueled engine generator set shall provide power for the emergency/standby system loads.

**Sprinklers:**

- Office Areas, Toilet Rooms, Locker Rooms, Lounges, Conference Rooms and similar type areas shall be designed based on Light Hazard Occupancy. The minimum design density shall be 0.10 GPM/sf over the hydraulically most remote 1500 sf with a maximum sprinkler spacing of 225 sf. Hose stream allowance shall be 100 GPM.
- Office Storage Rooms, Custodial Rooms, Mechanical and Electrical Rooms and similar type areas shall be designed based on Ordinary Hazard Group 1 Occupancy. The minimum design density shall be 0.15 GPM/sf over the hydraulically most remote 1500 sf with a maximum sprinkler spacing of 130 sf. Hose stream allowance shall be 250 GPM.
- Shops and Service Areas (Non-Vehicle Maintenance) and similar type areas shall be designed based on Ordinary Hazard Group 1

Occupancy. The minimum design density shall be 0.15 GPM/sf over the hydraulically most remote 1500 sf with a maximum sprinkler spacing of 130 sf. Hose stream allowance shall be 250 GPM.

- Vehicle Maintenance Shops and Service Areas and similar type areas shall be designed based on Ordinary Hazard Group 2 Occupancy. The minimum design density shall be 0.20 GPM/sf over the hydraulically most remote 1500 sf with a maximum sprinkler spacing of 130 sf. Hose stream allowance shall be 250 GPM. The fire system in the main shop shall be designed to shut down the high voltage traction power instantaneously when the sprinkler or standpipe system is activated.
- Loading docks and building canopies with storage or vehicles parked beneath shall be provided with dry pipe automatic sprinkler systems with design based on Ordinary Hazard Group 2 Occupancy. The minimum design density shall be 0.20 GPM/sf over the hydraulically most remote 1950 sf or largest room, whichever is less, with a maximum sprinkler spacing of 130 sf. Hose stream allowance shall be 250 GPM.
- Storage areas with storage 12-feet or less high shall be based on protection of Class IV encapsulated commodities stored on racks up to 12-feet high. Automatic sprinkler design shall be based Miscellaneous Storage, Extra Hazard Group 1, with minimum design density shall be 0.30 GPM/sf over the hydraulically most remote 2500 sf with a maximum sprinkler spacing of 100 sf.
- Storage areas with high rack storage above 12-feet high shall be based on protection of Class IV encapsulated commodities. High

## SECTION 4 - PERFORMANCE REQUIREMENTS

hazard commodities, such as rubber tires, Group A plastics, flammable liquids, idle pallets and similar commodities shall not exceed a height of 5-feet, stored on racks spaced 8-feet or greater apart, with storage up to a maximum height of 20-feet high. Automatic sprinkler design shall be based on in-rack sprinklers accordance with NFPA 13 with a maximum sprinkler spacing of 100 sf for ceiling sprinklers. Comply with NFPA 13 for ESFR coverage if used.

- In addition to the sprinkler systems, Maintenance, Inspection, Service and High Rack Storage (over 12-feet high) Areas shall be provided with a 2-1/2-inch fire department valve stations including a 2-1/2-inch angle valve with a capped outlet for fire department hose connection.
- For dry automatic sprinkler systems, the hydraulically most remote area shall be increased 30 percent.
- Dispatch and IT Server Rooms shall be provided with clean agent fire extinguishing gas system.
- Heads shall be centered in ceiling tiles where acoustical ceiling tile is present. Two-piece adjustable escutcheons and extended coverage heads are prohibited.

**Clean Agent Fire Suppression:**

- Clean agent fire suppression systems shall be provided in Communication Rooms, Data Rooms and Computer Rooms where critical or high cost computer/network equipment is present. Clean agent suppression system shall be either fluorinated ketone (PFC) type clean agent or an inert gas system.

- Provide back-up wet automatic sprinkler systems in rooms with clean agent unless required by AHJ. If wet system is required, system shall be a preaction type dry system.

**Standpipes:**

- A Class 1 Standpipe system shall be provided throughout the Facility for Fire department access. Provide 2-1/2-inch fire department valves in accordance with NFPA 14.
- Initial coordination with San Francisco Fire Department indicated their preference for standpipes to be provided to the roof. Walkways and ladders will be requested to provide access to locations inaccessible to ladder trucks due to the presence of track, OCS wiring, or adjacent buildings.
- Automatic shutdown of OCS power systems shall be provided in response to fire detection or activation of fire suppression system.

**Fire Suppression Piping:**

- Fire water service from the existing site fire water main shall be routed below grade to provide service to each building. Underground fire service from inside 5-feet of the building to inside shall be ductile iron or stainless steel. Underground service shall be wrapped in accordance with AWWA C105.
- Schedule 40 black steel pipe with threaded ends, ductile or malleable iron fittings for piping 2-inch and smaller. Schedule 40 black steel pipe with roll-grooved ends and uncoated fittings for piping 2-1/2-inch and larger. Dry pipe sprinkler system piping shall be Schedule 40, galvanized steel.

**Fire Alarm and Supervisory Systems:**

- Automatic sprinkler water flow alarm(s) shall be provided and connected to the fire alarm

system and transmit a water flow alarm to the Fire Department and building fire alarm. Sprinkler valve tamper switches shall transmit a trouble alarm to the Fire Department and provide a local audible signal. Sprinkler systems shall have inspector's tests stations. Coordinate monitoring of tamper and flow switches with fire alarm contractor.

**4.12.3 Fire Protection Specialties**

Provide firefighting devices and storage cabinets, not including items or devices physically connected to a fire protection system. Include the following:

- Fire Extinguishers (FE) on brackets attached to wall.
- Fire Extinguisher Cabinets (FEC).
- Signage and Pavement Markings.
- Fire Department Key Box. As required by SFFD.

**4.13 Electrical****General:**

- The PPC shall design, permit and construct all power, lighting, control, communications, fire alarm, and security systems as described in all Sections of this Design Criteria. All work shall be in accordance with the listed Criteria. The Electrical Scope of Work shall include, but not be limited to:
  - ✓ Site investigation to examine existing conditions
  - ✓ Coordination with PG&E, the SFMTA representatives, building department, and other AHJ.
  - ✓ Preparation of Construction Documents including drawings, calculations, analyses, protective device coordination, specifications, shop drawings and other

## SECTION 4 - PERFORMANCE REQUIREMENTS

- necessary documents to fully describe the electrical work and to prove compliance with the listed criteria.
- ✓ Design and construction of Electrical components in accordance with listed seismic design requirements.
- ✓ Preparation of forms and exhibits as required to show compliance with prescribed energy and sustainability codes, standards and guidelines.
- ✓ Completion of necessary forms and documentation for electrical permits and energy code compliance as it pertains to the electrical work.
- ✓ Work with the SFMTA IT Department to define the power for systems components. Define requirements for power and communication conduit to meet systems requirements.
- ✓ Coordinate all electrical design work with the mechanical designer(s) and Facility design engineers to ensure all items requiring electricity are connected as well as environmental conditions for equipment such as the UPS batteries are met.
- ✓ Coordinate between the elevator contractor and the electrical contractor work to meet all applicable local/state codes. This shall be delineated in the specifications and the design.
- ✓ Identify general location of equipment to define chases, duct-banks and support requirements to be included in building and structure. Provide information to architects and ensure that space is provided.
- ✓ Testing, coordination, observation, commissioning and reporting.

- ✓ Design and construction of BEB infrastructure, per Division 5 (*Battery-Electric Bus Supplemental Criteria*) of the Technical Requirements.
- ✓ Design and construction of electrical infrastructure and fit-out of electric non-revenue vehicle charging.
- ✓ Coordination, disconnection, and reconnection of OCS Traction Power system to support trolley bus charging.

**Calculations and Analyses:**

- Submit the following calculations and analyses, sealed by a Registered Professional Engineer:
  - ✓ Demand load as calculated per requirements of NFPA 70 Article 220.
  - ✓ Lighting Photometrics: Submit point-by-point calculations for 100 percent of the site and each unique room type in the buildings. Submit separate calculations proving compliance with NFPA 101 for emergency/egress lighting.
  - ✓ Emergency generator – provide calculations proving the capability of the proposed generator to serve the required emergency loads plus 25 percent spare capacity. The analysis shall assume the spare capacity load to be constant kVA load. Analysis shall include starting of motor loads as sequenced by the BAS. Calculations shall assume generator operation with diesel fuel source. A diesel-fueled engine generator set shall provide power for the emergency/standby system loads.
  - ✓ Short circuit – provide calculated momentary (0.5 cycle) fault current values for all 15 kV and 480V busses, and

- 208/240V panels served from 75 kVA or larger transformers.
- ✓ Arc flash (hazard analysis, arc flash boundary, incident energy) – provide calculation results for all busses 150V (AC and DC) and greater.
- ✓ Voltage drop – provide calculations for the main building services, feeders longer than 50-feet, all site lighting branch circuits, and all branch circuits longer than 75-feet or loaded greater than 50 percent of the circuit rating.
- ✓ Protective device coordination – provide time-current curve (TCC) plots showing proper coordination of all panel main breakers with upline devices, coordination of switchboard feeder breakers with main breakers and coordination of switchboard main breakers with 15 kV feeder relaying.
- ✓ Fire Alarm – provide battery capacity calculations proving compliance with NFPA 72.
- ✓ UPS – provide battery capacity calculations.

**Building Electrical Service:**

- 480Y/277V shall be provided for the facility from the utility-owned transformer and electrical service. The service shall be sized using Appendix C as a guide, with final calculations provided and verified by the PPC. The building service shall be rated to carry 150 percent of the building demand load at 104 degrees F maximum, and 86 degrees F average daily temperature. The PPC shall accommodate any required electrical equipment for the building service in accordance with PG&E and SFPUC requirements.

## SECTION 4 - PERFORMANCE REQUIREMENTS

- Low voltage service from the PG&E service equipment to the building switchgear shall be routed in a concrete encased duct bank. Two spare conduits shall be provided.

**4.13.1 Building Power Distribution**

- The building power distribution shall be organized substantially as presented in Appendix C, or as required by the SFPUC or PG&E in response to the Applications for Electrical Service initiated by the SFMTA. The main switchboard shall be rated for 150 percent of the building demand as calculated per NFPA 70 Article 220, 480Y/277V and provided with the following:
  - ✓ Copper phase bussing with a solidly grounded copper neutral bus and copper ground bus.
  - ✓ A main circuit breaker with intelligent solid-state LSIG trip units with data communications.
  - ✓ Fully rated feeder circuit breakers with solid-state intelligent LSIG trip units with data communications to serve the essential loads.
  - ✓ Fully rated feeder breakers with solid-state intelligent LSIG trip units for the shop and building distribution panelboards.
  - ✓ A digital power metering system capable of providing data to the BAS.
  - ✓ A Surge Protective Device integral to the switchboard, sized to protect all facility elements served through the switchboard.
  - ✓ Backup power for switch gear control circuit.
  - ✓ Transformers supplying non-linear loads will be K-rated.

- Building distribution shall be provided via a system of 480Y/277V circuit breaker distribution panelboards and a combination of 480Y/277V and 208Y/120V smaller branch panelboards. Electrical panels shall have copper buses with bolt-in circuit breakers. Plug-in circuit breakers will be allowed for circuit breaker sizes over 100 amperes where a positive locking device is available to retain the circuit breaker in place. Panelboards shall be provided with a main circuit breaker and shall be fully rated for anticipated fault current levels. Panelboards serving non-linear loads shall be furnished with a 200 percent rated neutral bus. Series rated circuit breakers shall not be used. All branch circuit and lighting panelboards shall be fully populated with circuit breakers. 20 percent of the circuit breakers in each panel shall be spares. Distribution panelboards shall have spare spaces amounting to 20 percent of the total breaker space. Conductors for all power circuits shall be THHN/THWN insulation.
- Sub-Metering: Building loads shall be sub-metered for energy consumption. Metering and data collection shall be provided as required for LEED EA Credit "Advanced Energy Metering". Load sub-categories shall also be metered.

**Interior Lighting:**

- All interior and exterior lighting shall employ fixtures with LED light sources. Interior lighting will generally be served at 277V in order to reduce circuit losses.
- Lighting in administrative areas shall typically be provided from LED direct/indirect grid troffers and recessed downlights. All spaces having a lay-in grid ceiling shall employ

recessed fixtures, except spaces with ceiling heights of 9-feet or greater may be provided with pendant/stem mounted linear direct/indirect architectural fixtures.

- Exit signs shall be internally illuminated LED type. The emergency lighting at the exterior egress doors shall be provided to illuminate the path of egress outside of the exit.
- Lighting in the maintenance, shop and warehouse areas shall be LED high-bay fixtures. Maintenance pit lighting shall be enclosed and gasketed 4-foot strip LED fixtures with IP66 rating. Fixtures shall be mounted on or adjacent to the track support structures, with provisions to allow the individual fixtures to be rotated by hand to any angle from +90 degrees to -90 degrees relative to horizontal.
- Individual offices, group offices and conference room lighting shall be controlled with dual-technology occupancy sensors and daylight dimming controls. Lighting in conference rooms and training rooms shall be designed to an average level of 30 foot-candles, and shall be dimmable to 5 percent of maximum output.
- Spaces without occupancy-based controls shall be provided with lighting controls that operate on a scheduled time-of-day basis with one or more override switches to selectively extend lighting past the scheduled shut-off time. All controls shall conform to ASHRAE 90.1 guidelines.

**Engine Generator:**

- A diesel-fueled engine generator set shall provide power for the emergency/standby system loads. The presence of life safety loads requires the generator to be diesel

## SECTION 4 - PERFORMANCE REQUIREMENTS

powered. Generator set capacity shall be 125 percent of the calculated demand of the designated emergency loads. Provide a storage tank with a capacity to store 24 hours of fuel at a generator output of 100 percent of nameplate rating. See Section 4.8.1 for the resilience and recovery requirements for the facility. Provide the following accessories and options:

- ✓ IBC seismic certification.
- ✓ Corrosion-resistant sound attenuating enclosure.
- ✓ Lead-acid starting battery.
- ✓ Remote control/annunciator panel having all capabilities of the local control panel. The remote panel shall be located interior to the East in a normally-occupied space.
- ✓ Control panel shall have network communications capability.
- ✓ Engine block heater, jacket type heater for starting battery.
- ✓ Alarms for low LP fuel tank level.
- ✓ Alarm for low battery voltage.
- ✓ Alarm for battery charger failure.

The code-required emergency power for the lights will be provided from the generator. In addition to the emergency lighting load and other life safety loads, it is anticipated that the generator may be designed to carry additional loads within the facility. IT/communications systems, some HVAC loads, some bus charging loads, and some industrial equipment loads may be connected to the generator. The exact composition of the emergency loading will be coordinated with the SFMTA during the design phase. This loading will drive the generator sizing to handle the load and methods of facility operation in accordance with the SFMTA requirements. Some luminaries

may be connected to the generator to provide operational lighting in the event of a power outage.

Items that must be on emergency power:

**Life Safety Loads:**

- Pathway egress lighting
- Exit lighting
- Fire alarm systems
- Other loads to ensure human life safety

**Critical Electrical Loads:**

- IT/Data rooms and systems
- Security systems
- Communications systems
- HVAC equipment serving these spaces
- HVAC control system
- Elevator(s)
- Fume ventilation systems

**Additional Emergency Loads:**

- Automatic garage door openers at entrances and exits of building.

**Optional Emergency Loads:**

- Compressor(s) and dryer(s).
- Lube pumps - the SFMTA with the assistance of the design team to specify during the PDA design phase.
- Four maintenance bays - SFMTA will the assistance of the design team to specify during the PDA design phase.
- Section 4, Sitework, describes the SFMTA coordination underway with PSE to provide separate power feeders to the East site and the E335 TPSS.

**Automatic Transfer Switches/Load Bank:**

- Multiple automatic transfer switches (ATS) shall be provided to transfer loads between the normal power system and the emergency

power system. Loads shall be assigned to the ATS in accordance with NEC Article 700. Provide a load bank to allow exercising the generator under load without interruption of the building emergency loads. The load bank shall be sized at 100 percent of the maximum generator rating and shall have a step load capability in increments of 25 percent, 50 percent, 75 percent and 100 percent of the load bank rating. A diesel-fueled engine generator set shall provide power for the emergency/standby system loads.

**UPS System:**

- Loads which cannot tolerate more than a ¼ cycle interruption shall be provided with internal or dedicated battery backup and/or connected to a central UPS or inverter system. These loads include, but are not limited to:
  - ✓ Fire alarm systems (battery).
  - ✓ CCTV systems (UPS).
  - ✓ Telecommunications equipment (UPS).
  - ✓ Emergency Telephone System (ETEL) (UPS).
  - ✓ AC/DC switchgear controls (battery).
  - ✓ BAS PLC (UPS).
  - ✓ Access control (UPS).
- The building UPS systems shall be sized to serve the anticipated demand load plus spare capacity of 25 percent. The UPS batteries shall be sized to carry the maximum UPS rated load for a period of 90 minutes. The PPC shall submit calculations which support the required size of the UPS and batteries. The UPS input shall be fed from the generator or the secondary utility feed for continued operation following the rated load period of

## SECTION 4 - PERFORMANCE REQUIREMENTS

90 minutes. A diesel-fueled engine generator set shall provide power for the emergency/standby system loads.

**Service & Distribution:**

- Dry-type distribution transformers shall be utilized to provide the 208Y/120V service to the branch panelboards serving the convenience receptacle and small motor loads. All dry-type distribution transformers shall be energy efficient type having the Energy Star rating. Dry-type transformers shall be VPI insulated. Indoor dry-type transformers shall have copper windings, 220 degrees C insulation and shall have a maximum winding temperature rise of 115 degrees C above an ambient temperature of 40 degrees C. Where transformers serve a significant amount of non-linear loads, the transformers shall have a "K" rating to handle the additional heating caused by high-harmonic load content. The neutral of secondary feeders from K-rated transformers shall be sized at 200 percent of the ampacity of the phase conductors.

**Disconnecting Means:**

- Receptacles for all small equipment loads may serve as the disconnecting means. 480V and 208V loads shall be provided with a disconnect (safety) switch with means to padlock disconnect in the off position. All safety switches shall be heavy-duty type. Transformers not located within eyesight of their source panel shall be provided with a disconnect (safety) switch on the primary side of the transformer.
- Motor loads ½ horsepower and larger shall be served at 480V 3 phase. Small fractional horsepower motors shall be served at 120V

1 phase. Shop equipment loads shall be served at 480V 3 phase, 208V 3 phase, 208V 1 phase, or 120V 1 phase as per their requirements. Convenience receptacles shall be served at 120V 1 phase.

- Welding equipment shall be supplied from dedicated panelboards.

**Grounding:**

- A quality single-point grounding system shall be provided in the main electrical room consisting of a main grounding bus bar (MGB) connected to a building counterpoise. The building steel frame, water service entrance pipe (if metallic piping is used, electrical equipment ground conductors, isolated ground conductors, and telecommunications and data system ground shall be connected to the MGB. The Main Telecommunication Room (MTR) and each telecommunications room or telecommunications closet (TR/TC) shall be provided with a copper telecommunications ground bar (TGB). The Main Telecommunication Ground Bar (MTGB) shall be located in the MTR. A #3/0 AWG Telecommunication Bonding Backbone (TBB) shall connect the MTGB, the TGBs and the MGB. Grounding for communication circuits shall be in accordance with TIA/EIA J-STD 607 and Motorola R56 standards.
- All metal raceways shall include an equipment grounding conductor sized in accordance with NFPA 70.

**Lightning Protection:**

- PPC shall perform a risk assessment calculation as shown in NFPA 780, Annex L to assess the lightning risk to the facility. If the risk assessment recommends protection,

provide a UL Master Label lightning protection system in accordance with NFPA 780. Building lightning protection consisting of air terminals and down conductors shall be provided. The building counterpoise shall serve as the grounding electrode. Incoming copper telecommunications wiring shall be provided with individual gas-filled surge arrestors sacrificial pigtail connector to protect communications equipment and wiring for transient surges caused by lightning or other outside disturbances.

**4.13.2 Electrical System Sustainability**

The Project shall comply with all energy and electrical efficiency requirements in the San Francisco Municipal Green Building Code (Environment Code Chapter 7), which shall supersede the narrative provided in this DCD.

**Energy and Emissions:**

- The emergency generator shall be specified to meet EPA emission requirements for gaseous fueled engines.
- A diesel-fueled engine generator set shall provide power for the emergency/standby system loads.

**Energy Efficiency:**

- Lighting shall be designed to minimize the electricity consumption required and will meet or exceed the requirements of ASHRAE 90.1 and state and local energy codes.
- Electrical motors shall be the premium efficiency type.
- Transformers shall meet or exceed NEMA minimum efficiency ratings.
- Lighting controls shall be employed to reduce energy consumption. Vacancy sensors shall be provided in offices, conference room and

## SECTION 4 - PERFORMANCE REQUIREMENTS

other similar areas. Occupancy sensors shall be provided in janitor's closets, bathroom, locker rooms and other similarly occupied spaces. Time of day lighting controls shall be provided to turn lighting off throughout the building at specific times specified by the building or department user. A two hour over ride switch shall be provided to allow the lighting to remain on if someone is working additional hours. Lighting shall be able to be switched to 50 percent level when building cleaning staff is on site so that building lights do not have to be fully energized for this task. If daylighting can be employed, daylighting sensors may be used to reduce the lighting in areas where there is sufficient daylight to perform the required tasks.

**Alternative Energy Sources:**

- Solar Power:
  - ✓ PPC shall integrate a photovoltaic (PV) power system installation, consistent with the Municipal Green Building Code.
  - ✓ The PV system installation shall conform to NFPA 70 Article 690 and requirements of PG&E.
  - ✓ PV system shall supply power to the BYC. PV connection to the CIC is also acceptable.
- Battery Storage:
  - ✓ PPC is encouraged to include on-site battery storage to maximum on-site power generation and storage potential to provide emergency backup power for the BYC or the future BEB fleet specifically.

**Commercial Equipment:**

- PPC shall coordinate with third party commercial suppliers of vending machines,

wash soap, fluids utilized in maintenance shops, sand, parts suppliers and any other commercial supplier as indicated by the SFMTA to determine space and access requirements and incorporate this information into the facility layout.

**4.13.3 General Arrangement and Infrastructure Requirements**

- Special attention shall be made to ensure that equipment provided meets the requirements of the SFMTA prescriptive specifications and is fully compatible in form, fit and function with existing equipment as defined. Conduit in interior shop areas, external locations, the storage building or any locations subject to potential damage shall be rigid conduit. Conduit in interior office areas shall be EMT conduit.

**4.13.4 Telecommunication Rooms and Closets**

- The Telecommunication Room for each floor shall be environmentally controlled with HVAC equipment, lighted and fire protected. The Telecommunication Room shall be provided with keycard access and intrusion detection.
- Main Communication Room shall have all HVAC equipment requirements needed to keep the room and systems cool.
- In addition to the Telecommunication Rooms, the PPC shall provide IT closets as required to ensure that raceway runs from data outlet or Ethernet connected equipment to the Telecommunication room or the nearest IT closet is not more than 275-feet.
- IT closets, if provided, shall have louvered doors to facilitate heat transfer from the room. Powered and temperature controlled exhaust fans are required for each IT closet if the IT

closet electronics consumes over 80 watts of power.

- Lighting shall be configured parallel and in the front and back of all PPC and the SFMTA required racks.
- Space and lighting requirements, including clearance in front and back of racks, in the Telecommunication rooms and closets shall conform to the latest version at time of notice to proceed of the Building Industry Consultants Service Industry Transmission Distribution Methods Manual (BICSI TDMM).
- An AC sub-panel with a separate 20A 120V breakers for each equipment rack (five (5) racks per room) shall be provided for the IT room. This sub-panel shall be supplied by the standby power circuit. Four (4) wall mounted 20A 120V convenience receptacles shall be provided in the Telecommunication room and one in each IT closet.
- Cable trays shall be provided along the perimeter of the Telecommunication room and over the planned location of the five (5) racks to support all required cabling systems. Cable trays shall be sized for maximum 40 percent fill; minimum width shall be 9-inches.
- Where ceilings are provided, control conduits and wiring will be run as high above the ceiling as possible to allow easy removal of ceiling tiles without interference due to control or communication subsystems.
- Cable runs above ceilings which are not in cable trays shall be supported by J-hooks specifically manufactured for supporting cable systems.
- For basis of design, the cooling provision of 20 tons shall be used. Actual heat loads and

## SECTION 4 - PERFORMANCE REQUIREMENTS

cooling equipment sizing shall be determined during final design.

- Telecommunications Rooms shall house the incoming telecom service conductors, the PPC shall provide or install IT/ Communications conductors or fiber optic cables, the E750 PPC shall provide and install fiber optic cables, and owner provided telecommunications switch, horizontal cross connects and equipment racks.

**4.13.5 Phone Jacks and Cabling**

- Phone Jacks and Cabling are limited to the communications methods of the FACP to the remote Supervising Station and to the telephone and monitoring of the elevator(s).

**4.13.6 Network Ethernet Switches**

- The PPC shall coordinate with the SFMTA IT prior to design of the Data Room and TR/TCs for the space, power, cooling, bonding and other requirements of the SFMTA IT Network Ethernet Switches and other equipment.
- The SFMTA will install Network Ethernet Switches and other equipment in the Data Room and TR/TCs referenced in this chapter during the warranty period. The PPC shall not invalidate the warranty based on the SFMTA Network Ethernet Switches and other equipment installation.

**4.13.7 IT Servers**

- The PPC shall coordinate with the SFMTA IT prior to design of the Data Room and TR/TCs for the space, power, cooling, bonding and other requirements of the SFMTA IT servers and other equipment.
- The SFMTA will install IT Servers and other equipment in the Data Room and TR/TCs referenced in this chapter during the warranty

period. The PPC shall not invalidate the warranty based on the SFMTA IT Servers and other equipment installation.

**4.13.8 IT Equipment Procurement**

- Customized IT systems such as Radio, Computer Aired Dispatching, Access Control, Cameras, Fleet Watch (including antenna location to capture bus information), and others shall be addressed in detailed design and equipment procurement in coordination with the SFMTA. The SFMTA expects that available IT infrastructure may evolve by the time construction is completed and therefore will do a final review of the IT equipment and supporting infrastructure prior to their ordering and installation.

**4.13.9 Closed Circuit Television System (CCTV)**

- The PPC will work with SFMTA Security staff to ensure all camera locations are correct and that camera views meet their needs. The PPC shall design the quantity and location of cameras for the CCTV system using APTA IT-CCTV-RP-001-11," APTA Recommended Practice for the Selection of Cameras, Digital Recording Systems, Digital High-Speed Networks and Trainlines for Use in Transit-Related CCTV Systems".
- Camera views will be selected based on their function, location and resolution. The PPC shall submit the CCTV design site plan that shows camera locations, coverage, camera function and the camera model for each location. Submittal shall also include required views generated from the project 3D model from each camera location. The camera design layout shall be approved by SFMTA Security staff prior to implementation.

Once the design is approved, no changes shall be made without SFMTA Security staff's acceptance.

- The CCTV system shall be compatible with and integrated into the SFMTA's existing Genetec CCTV system. The PPC's price shall allow for one version upgrade of the cameras beyond software version at time of installation. The PPC shall coordinate with SFMTA to access and update the CCTV central servers.
- The PPC shall provide all raceway, cabling, cameras, and mounting hardware/poles. Cameras shall be mounted in locations where maintenance staff can access without requiring fall protection.
- The PPC shall provide fixed view (unless otherwise identified) CCTV coverage to the following areas at a minimum:
  - ✓ The complete site perimeter shall be covered with cameras installed no greater than 200-feet apart oriented in an overlapping field of view configuration with resolution sufficient for security personnel to determine what is present by class (animal, blowing debris or person).
  - ✓ Entrances and exits into facility site shall be covered. All vehicle and pedestrian access points shall be covered with two dedicated fixed wide angle cameras with a resolution sufficient to uniquely identify an object on the basis of appearance (John, not Tom). One camera will be focused on the individual attempting to access the facility and the other camera will be focused on vehicle license plates.
  - ✓ All exterior building access points including vehicle, and pedestrian, shall be covered from the outside with a resolution

## SECTION 4 - PERFORMANCE REQUIREMENTS

- sufficient to uniquely identify an object on the basis of appearance.
- ✓ The loading dock(s) shall be covered.
- ✓ Parking areas shall each be covered with a minimum of two dedicated fixed cameras with overlapping coverage and shall have resolution sufficient for security personnel to determine what is present by class (animal, blowing debris or person).
- ✓ Note that additional cameras may be required for other systems outside of this CCTV section of the project requirements.
- ✓ Coordinate with the SFMTA security for areas that may require additional cameras due to high probability of intrusions.
- Existing SFMTA camera monitoring stations shall be configured by the PPC.

**4.13.10 Fire Alarm System**

- The Fire Alarm System shall be furnished and installed in the building conforming to NFPA 72. The system shall be looped, Class A, addressable, intelligent and supervised with a Fire Alarm Control Panel located in the main electrical room. The system shall be programmable, configurable and expandable in the field without the need for special tools, PROM programmers or PC-based programmers. Network communications capability over both a LAN or WAN shall be provided.
- The Supervising Station shall be a third party and shall conform to NFPA 72 as accepted by the AHJ and approved by the SFMTA. Communications Methods between the Supervising Station and the SFMTA in compliance with NFPA 72. The fire alarm control panel shall interface with the BAS system for general fire alarms.

- Photoelectric duct detectors will be provided in Air Handling Units when required by code. In accordance with NFPA 72 and the ADA, combination audible/visual notification devices will be installed throughout the facility to provide notification of an alarm. Visual devices shall be synchronized when more than one device is located in a common field of view. Tamper and flow switches shall be provided for the sprinkler system at the fire risers, valve pits and at the zone valves. Weatherproof exterior speakers shall be provided at exterior gathering locations and entrances to the buildings. An addressable analog fire alarm system with voice alarm shall be provided. A graphical annunciator panel showing the building floor plan depicting the location and status of all fire reporting devices shall be provided at the dedicated entrance to be used by firefighting personnel to respond to emergencies. A remote annunciator for the emergency generator set and elevator shall also be provided.
- A diesel-fueled engine generator set shall provide power for the emergency/standby system loads.
- Pull stations shall be provided at exits and spaced so that there are no more than 100-feet of travel from any point to a pull station.
- Analog smoke detectors which allow the fire alarm system to automatically adjust the detector sensitivity shall be used except where nuisance tripping may occur. In areas where smoke detectors would be unsuitable, such as elevator machine rooms, combination heat and rate-of-rise detectors shall be used. Smoke detectors shall be installed in electrical

- rooms, telecommunications rooms, elevator lobbies, yard control, under raised computer floors, and other areas of high importance. Smoke detectors shall be provided in the return air ducts of the HVAC equipment to provide for automatic shutdown of these systems when smoke is detected.
- The fire alarm system shall monitor the automatic fire suppression system for water flow, air pressure (if a dry pipe system is installed), and OS&Y valve position. Water flow detection shall initiate a building evacuation alarm. Loss of air pressure and closed valves shall initiate a trouble signal at the main fire alarm panel and at the annunciator.
- The annunciator shall monitor the position of the elevators and indicate if they are operational.
- Control of the building emergency ventilation (if provided) shall be available at the fire alarm panel and at the annunciator.

**4.13.11 Communications Server and Workstation Network Interfacing**

- Network Interface: Two separate network interface cards (NICs) with 1G bit/sec minimum speed capability each.
- Network Segment Assignment Options:
  - ✓ Define different network segment assignments for each of the NICs.
  - ✓ Define different network segment assignments on the same NIC.

**4.13.12 Outdoor Devices**

- All electronic devices use in an outdoor environment shall be rated to IP66 level, and withstand operating to three standard deviations of temperature maximum and minimums for this region.

**SECTION 4 - PERFORMANCE REQUIREMENTS**

- Rain shields over electronic devices shall be used in most cases of installation for further protection and improved endpoint device function.

**4.13.13 Network Management Capabilities**

- PPC shall implement all devices to be compatible with Standard Network management health status reporting via SolarWinds Event and Log Monitor software, or otherwise directed by the SFMTA. Devices shall be SNMPv3 compatible.
- PPC shall obtain written direction prior to implementing network connection devices, for instruction herein.

## SECTION 4 - PERFORMANCE REQUIREMENTS

**4.14 Wind Study**

- Pursuant to the City's wind ordinance (Planning Code Section 148), the Project is required to comply with wind comfort and hazard criteria set forth by the City. Wind analysis has been completed by the SFMTA for the RDC, which is Document 17 (*CEQA Pedestrian Wind Study*) of the Reference Documents. The RDC wind analysis determined that the Project would require design interventions to meet the wind criteria. The Project will be required to complete an updated wind study based on the PPC's proposed massing for the Facility.

**4.15 Strategies for Stormwater Handling and Treatment/Pre-Treatment**

- Stormwater runoff generated by the Project area must be treated in accordance with the City of San Francisco Stormwater Management Requirements (SMR). The PPC shall create a stormwater management plan meeting the City's SMR that emphasizes use of best management practices (BMPs) on site to mitigate stormwater quality and quantity concerns. Of particular concern, discharge containing oil, sediments, soaps, or other chemicals from the Bus Yard Component shall be captured and means for filtering and treating water prior to discharge shall be incorporated.
- Following the guidance from the City of San Francisco, preference shall be first for rainwater harvesting and reuse, bioretention and infiltration, and permeable pavement to reduce runoff, followed by detention and treatment through lined bioretention or a constructed wetland. The proposed solution shall acknowledge the different sources

of runoff on the site and demonstrate an appropriate management plan for each.

- The size of the Project necessitates compliance with San Francisco Article 12C Non-potable Water Ordinance as well. Based on the Project size, a non-potable water system is required on-site to treat and reuse available greywater, rainwater, and foundation drainage for toilet and urinal flushing. The PPC shall propose where such a system shall be housed and identify which uses within the Facility are required to be served by the resulting treated greywater. This necessarily must integrate the stormwater management solutions with on-site treatment and reuse for a comprehensive water management system for the Project.

**4.16 Evaluation of Life Cycle Cost Analysis**

Decisions impacting resource use, maintenance, and capital cost, such as HVAC system choice, envelope materials and selection, etc., shall be evaluated using a life-cycle cost analysis framework. This approach shall include, at a minimum, the following factors:

- Capital cost
- Energy (electricity, gas, thermal) cost savings
- Water cost savings
- Operations, maintenance, and replacement cost impacts
- Applicable incentives such as tax credits and depreciation benefits
- Space savings

For decisions impacting the Bus Yard Component, the Common Infrastructure, and the Housing and Commercial Component, separate life-cycle cost analysis studies shall be performed indicating the impact to each

component individually. Decisions impacting only one of the components may be evaluated in isolation. The period of evaluation shall be assumed to be no less than 30 years and shall be reviewed and confirmed with the City at the outset of the PDA phase. Life-cycle cost analysis evaluation financial parameters shall be determined by the PPC and shall be reviewed and confirmed with the City at the outset of the PDA phase. Financial parameters shall include discount rate, energy cost escalation, water cost escalation, labor and materials escalation, and applicable tax rate (if depreciation is evaluated for a measure) at a minimum. Decisions shall prioritize life-cycle cost benefit as a key driver of selection.

**SECTION 5 - REQUIREMENTS FOR BUS YARD COMPONENT SPACE MODULES**

This document presents the Requirements for Bus Yard Component Space Modules for the proposed Potrero Yard, by providing both micro and macro level design requirements. The Requirements for Bus Yard Component Space Modules format found in this section consists of Functional Area Modules. The Functional Area Module represents a detailed description of specific design issues for each of the areas listed in Section 2 the Space Needs Program. Reference the Space Needs Program (Section 2.4) for specific data. All Modules and related equipment are for representation purposes only and do not necessarily depict strict design conformance.

**5.0 MODULES**

Each of the building space modules contains information regarding the function of the space, affinities, critical dimension (if any), equipment, furnishings, and finishes related to this operation. Technical considerations for architectural, structural, mechanical, plumbing, and electrical systems are delineated on the facing page. The space is graphically illustrated. Specific layouts of each area will be developed during detailed design. Note that the equipment and furnishings listed are not intended to be all-inclusive. Spaces are separated into groups based upon function.

Not all spaces listed in the Space Needs Program have a room data sheet including Custodial, Telecommunication Rooms, and Restrooms. This is because these spaces are code- or facility-specific, or are continually changing.

The following module colors are used in the room data sheets that follow as well as the Reference Design Concept plan sheets.

- OFFICE MODULES
- PARKING
- BAYS AND SHOPS
- FARE BOX AND CLIPPER CARD READER REPAIR SHOP
- SERVICE AND CLEAN
- PARTS
- MAINTENANCE - ADMINISTRATION
- OPERATIONS - ADMINISTRATION
- TRANSIT SERVICES
- SHARED
- TRAINING

**5.1 Sustainable Design**

There are several sustainable design opportunities that can be implemented at Potrero Yard. The Sustainable Design section outlines potential sustainable design opportunities appropriate for this type of facility. These options are broken into Site Features, Building Design and Materials, Mechanical Systems, Electrical Systems, and Plumbing Systems. The PPC shall also refer to Department of Building Inspection Form GS6: San Francisco Green Building Submittal Form for Municipal Projects for guidance on required measures.

**5.2 Utilities Design**

The utilities for the maintenance facility are numerous and require close attention to detail. The coordination of the HVAC, electrical, and plumbing systems are critical to the proper function of the Shop and the heart of the facility. Providing an organized installation and design of these systems will enhance future system maintenance.

## SECTION 5 - REQUIREMENTS FOR BUS YARD COMPONENT SPACE MODULES

**5.3 Creating Sustainable Facilities**

Sustainability is an essential and fundamental component of the facility. The key sustainability issues that shall be explored in the planning and development of the facility include, but are not limited to, key points included in this section.

**5.3.1 Balance Between Economic and Environmental Needs**

To balance both economic and environmental needs, the facility design shall maximize employee health, safety, and operation efficiencies. This priority shall be considered at all stages of development of the facility.

**5.3.2 Efficient Use of Resource Materials**

Material resources are valuable, and efficient use shall be encouraged in the development and operations of the facility. This can be implemented with reusable, recyclable, and biodegradable materials, as well as mandating the use of products that are extracted, harvested, and manufactured locally.

**5.3.3 Efficient Use of Water Resources**

The facility plan shall encourage efficient use of water resources through resourceful planning. Examples could include implementing an effective storm water management plan and using environmentally compliant wash bays to service all vehicles. Reclaimed water will be used for irrigation at new City facilities, per the San Francisco Green Building Code Amendments and GS6 Form for municipal projects. Low flow plumbing fixtures and sub-metering are also required.

**5.3.4 Energy Efficiency/Renewable Energy Systems**

Renewable energy sources like solar, wind, and daylight harvesting shall be utilized, as well as exploring and promoting opportunities to increase energy savings at the facility through the use of high-performance systems.

**5.3.5 Construction Methods**

Methods of construction of the facility play a significant role in sustaining the environment. Minimizing transportation costs by utilizing local resources and recycling procedures during construction will conserve energy and minimize pollution.

**5.3.6 Sustainable Criteria**

The following is a list of potential strategies that contribute to sustainable building design:

- Operable windows/natural ventilation
- Occupancy sensors, vacancy sensors, lighting controls
- Lighting designed to meet targeted LEED points (Reference the LEED requirements in Chapter 7 of the City and County of San Francisco Environmental Code)
- Daylighting strategies and daylight harvesting
- User-adjustable comfort and lighting controls
- Underfloor ventilation
- In-floor radiant heating and cooling
- Water reclamation system
- Use of reclaimed water for vehicle washing
- Minimal landscaping along the north and south edges

**SECTION 5 - REQUIREMENTS FOR BUS YARD COMPONENT SPACE MODULES**

**5.4 LEED Certifications**

LEED is a green building certification program that recognizes best-in-class building strategies and practices. To receive LEED certification, building projects satisfy prerequisites and earn points to achieve different levels of certification. Prerequisites and credits differ for each rating system, and teams choose the best fit for their project.

Each rating system groups requirements that address the unique needs of building and project types on their path towards LEED certification. Once a project team chooses a rating system, they'll use the appropriate credits to guide design and operational decisions.

SFMTA guidelines are to meet LEED Gold Certification, which shall include achieving a minimum of 12 points under LEED credit EAc2 Optimize Energy Performance and 3 points under LEED credit EAc5 Renewable Energy v4.1.

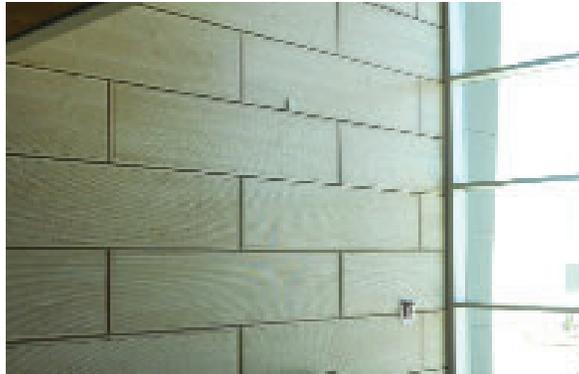
- Platinum 80+ points
- Gold 60 to 79 points
- Silver 50 to 59 points
- Certified 40 to 49 points

**5.5 Architectural Systems**

Design and materials that facilitate sustainability include, but are not limited to:

- Use of durable building materials
- Natural light
  - ✓ Skylights
  - ✓ Clerestory
  - ✓ Roof monitors
  - ✓ Windows in bay doors
- Operable windows for natural ventilation
- Low Volatile Organic Compound (VOC) finish materials

- Use of local building products
- Use of recycled materials
- High R-Value roof and wall insulation
- Insulated bay doors
- Low U-value windows and skylights



**Translucent clerestory windows daylighting**



**Insulated translucent sectional door**



**Solar tube daylighting**



**Light reflective floor**

**SECTION 5 - REQUIREMENTS FOR BUS YARD COMPONENT SPACE MODULES**

**5.6 Mechanical Systems**

Mechanical systems that facilitate sustainability include, but are not limited to:

- Radiant floor slab heating
- Variable air volume air handling units
- Variable frequency drive motors
- High efficiency motors for air handling units and DX compressors
- Economizers for free cooling with 100 percent outside air at air handling units
- Demand control ventilation with CO2 and occupancy sensors for reducing ventilation requirements during unoccupied periods

**5.7 Additional Cost Alternatives**

- Radiant floor slab heating
- Solar Thermal heating for domestic water heater
- High efficiency boiler for hydronic heating loop
- Ground source heat pumps (geothermal)
- Destratification fans

Renewable energy production:

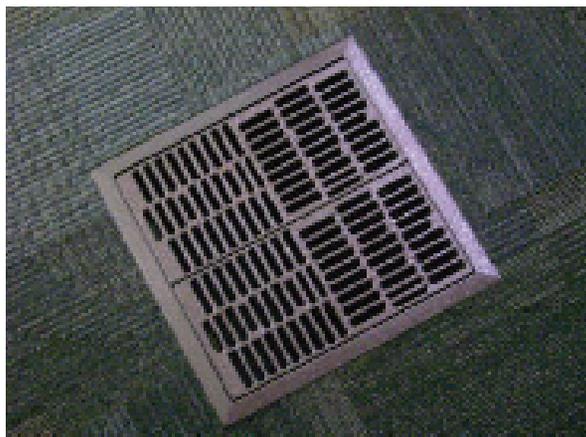
- Photovoltaic
- Wind



**Destratification fan**



**Heat recovery piping**



**Underfloor air distribution vent**



**Radiant floor system**

**SECTION 5 - REQUIREMENTS FOR BUS YARD COMPONENT SPACE MODULES**

**5.8 Electrical Systems**

Electrical systems that facilitate sustainability include, but are not limited to:

- Photovoltaic panels to be installed on roof of building
- Maximize lighting controls with daylight harvesting and occupancy and vacancy sensors
- LED lighting systems
- Task lighting in Repair Bays
- Efficient process equipment

**5.9 Plumbing Systems**

Plumbing systems that facilitate sustainability include, but are not limited to:

- “We fix” program for new plumbing fixtures
- Rainwater harvesting for irrigation
- Vehicle wash water reclaim
- Low flow plumbing fixtures
- Sensor operated faucets
- Grey water (purple pipe) for water closets
- Tankless water heaters
- Reclaimed water will be used for landscaping at new City facilities, per the San Francisco Green Building Code Amendments and GS6 Form for municipal projects



LED lighting



Photovoltaic panels on roof



Dual flush toilet



Low-flow plumbing fixtures



Wash water reclamation system



Rainwater harvesting

**SECTION 5 - REQUIREMENTS FOR BUS YARD COMPONENT SPACE MODULES****5.10 Architectural/Structural Systems Coordination**

- Coordinate routing, support systems, and clearances for mechanical ductwork, plumbing piping and electrical conduit
- Routing shall run above forklift and walk aisles
- Group wherever possible
- Route main ventilation ductwork above walk/ forklift aisles
- Use mezzanines for mechanical units

**5.10.1 Mechanical Systems Coordination**

- Route main ventilation ductwork above walk/ forklift aisles
- Use mezzanines for mechanical units

**5.10.2 Plumbing Systems Coordination**

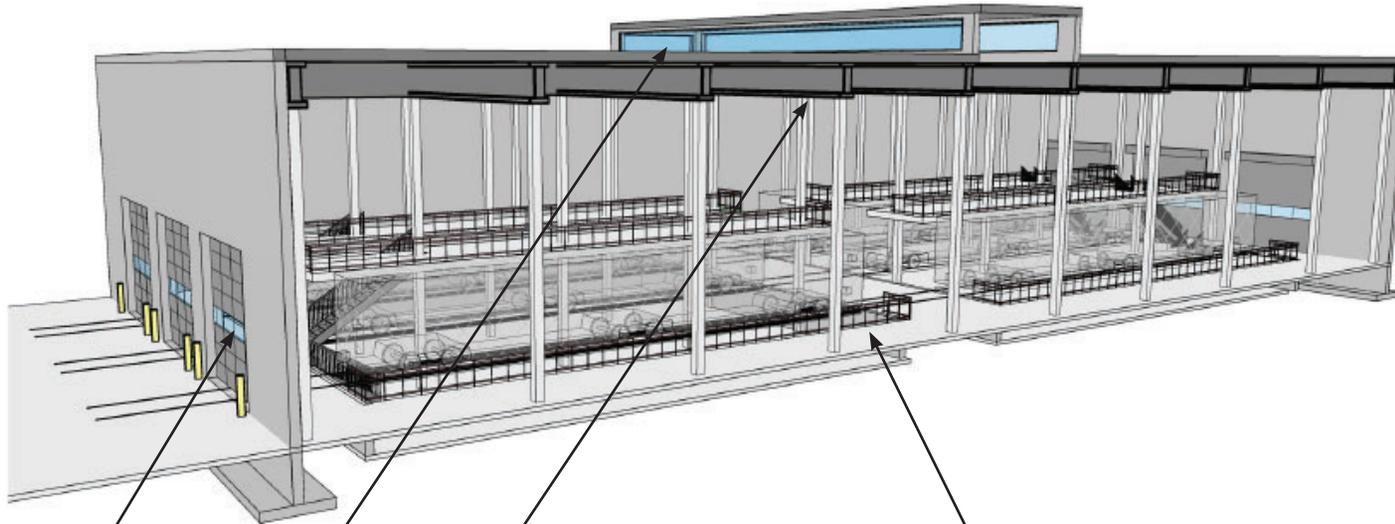
- Route water, sanitary, vent, storm, and service equipment piping above ground and above walk/forklift aisles

**5.10.3 Electrical Systems Coordination**

- Route main conduit runs above ground and above walk/forklift aisles.
- Communication systems and cable trays shall be coordinated with other building systems to allow for installation, removal of cables in the future. All communications conduits and cable trays shall be routed above ground.
- Route branch circuits, equipment feeds above ground to facilitate future renovations

SECTION 5 - REQUIREMENTS FOR BUS YARD COMPONENT SPACE MODULES

Sustainable Strategies



- Daylighting through skylights/clerestories/roof/monitors/windows in bay doors
- Low VOC finishes
- Operable windows/natural ventilation
- Use of recycled content of materials
- Destratification fans in high bay areas

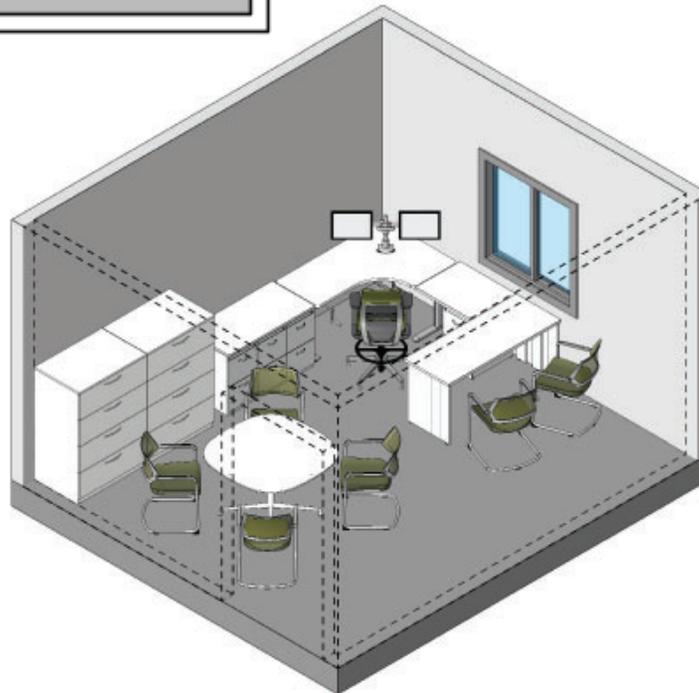
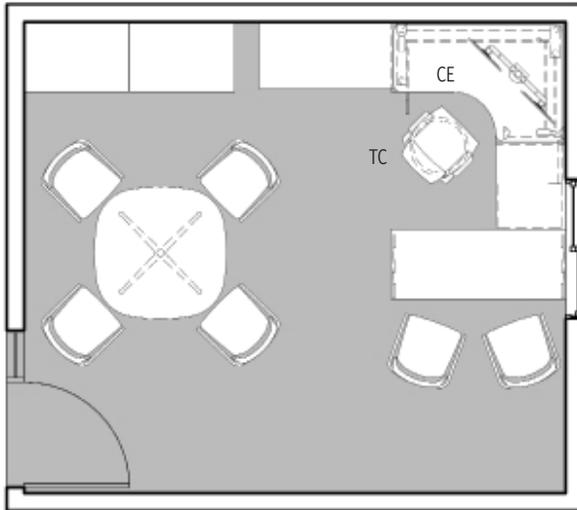
- Radiant floor slab heating
- Air quality sensors for exhaust fan controls
- Use of durable, long-lasting building materials
- Occupancy sensors
- Use of local building products
- Renewable energy sources such as solar and geothermal



## SECTION 5.1: OFFICE MODULES



**PRIVATE OFFICE - 224 SF**



**FUNCTION**

Private office for completing work tasks and holding small meetings.

**RELATIONSHIP TO OTHER AREAS**

- Case specific (office areas specific to each group); reference general modules

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

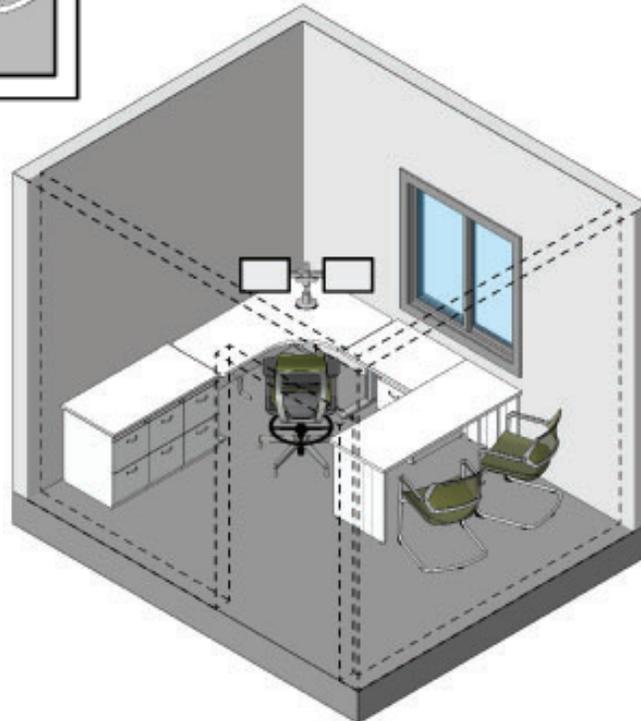
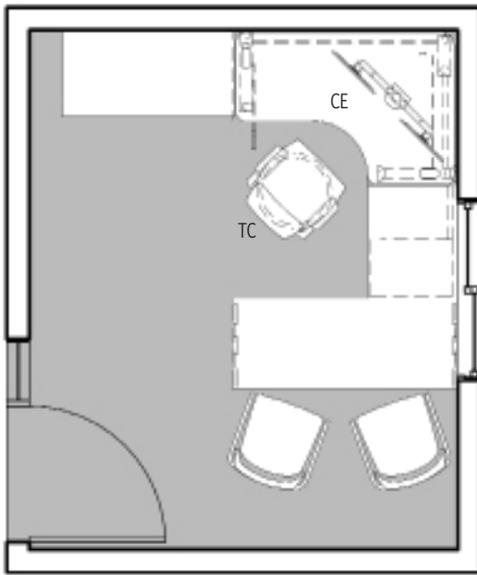
**EQUIPMENT/FURNISHINGS**

- Task chair
- TMC 60" by 30" typical sit/stand workstation
- Two pedestal cabinets per station. One two-drawers for files, and one three-drawers for personal items and files
- Table and Chairs

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring:
    - Carpet tile floor with rubber base for operation and administration areas. Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
    - Resilient floor covering with base for maintenance areas
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile
  - ✓ Doors:
    - Single leaf 3'-0" door with sidelight and lockable lever set hardware
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ Provide general purpose duplex receptacles (four minimum) and a quad receptacle at each workstation
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in room
- Lighting:
  - ✓ LED Lighting in accordance with IES recommendation (35 fc average)
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (as required)

**PRIVATE OFFICE - 120 SF**



**FUNCTION**

Private office for completing work tasks and holding one on one meetings.

**RELATIONSHIP TO OTHER AREAS**

- Case specific (office areas specific to each group); reference general modules

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

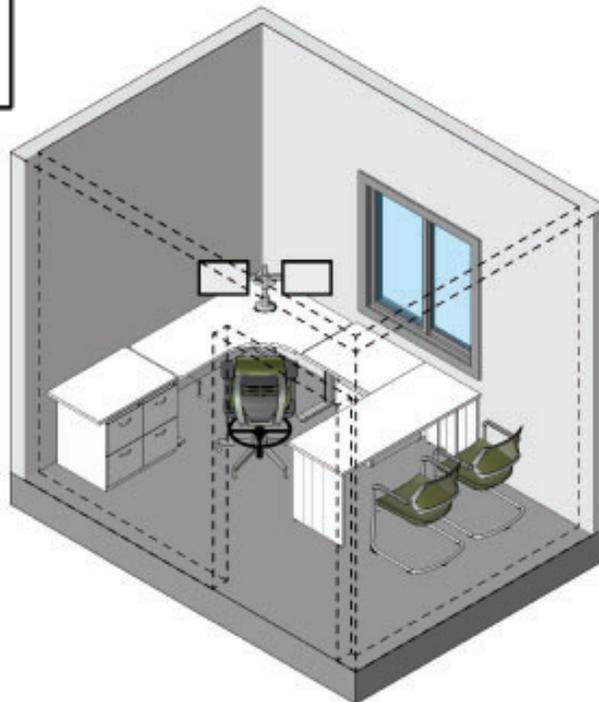
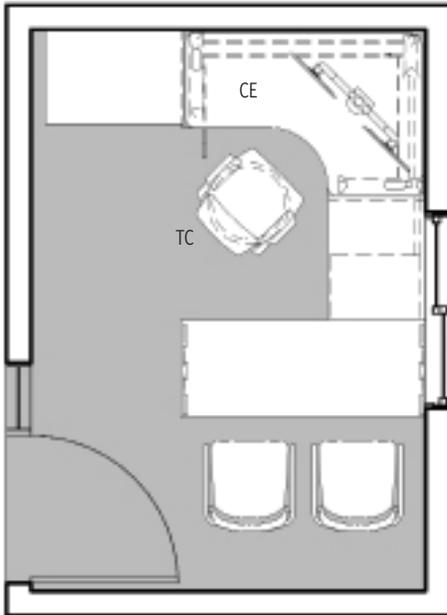
**EQUIPMENT/FURNISHINGS**

- Task chair
- TMC 60" by 30" typical sit/stand workstation
- Two pedestal cabinets per station. One two-drawers for files, and one three-drawers for personal items and files
- Guest chairs

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring:
    - Carpet tile floor with rubber base for operation and administration areas. Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
    - Resilient floor covering with base for maintenance areas
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile
  - ✓ Doors:
    - Single leaf 3'-0" door with sidelight and lockable lever set hardware
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ Provide general purpose duplex receptacles (four minimum) and a quad receptacle at each workstation
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in room
- Lighting:
  - ✓ LED Lighting in accordance with IES recommendation (35 fc average)
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (as required).

**PRIVATE OFFICE - 100 SF**



**FUNCTION**

Private office for completing work tasks and holding one on one meetings.

**RELATIONSHIP TO OTHER AREAS**

- Case specific (office areas specific to each group); reference general modules

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

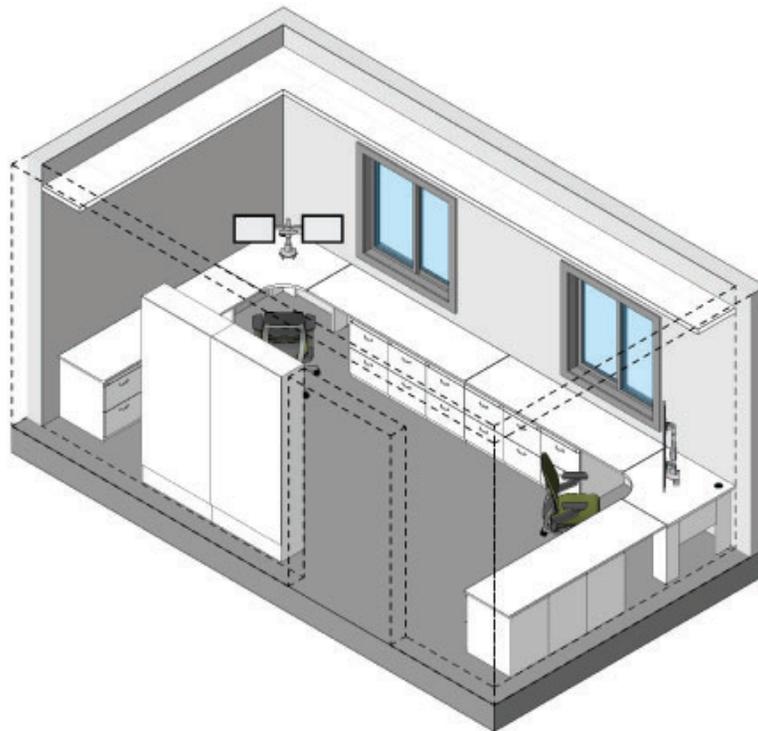
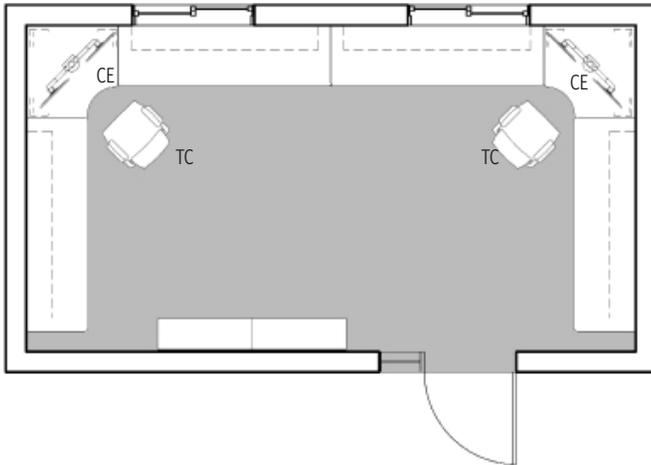
**EQUIPMENT/FURNISHINGS**

- Task chair
- TMC 60" by 30" typical sit/stand workstation
- Two pedestal cabinets per station. One two-drawers for files, and one three-drawers for personal items and files
- Guest chairs

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring:
    - Carpet tile floor with rubber base for operation and administration areas. Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
    - Resilient floor covering with base for maintenance areas
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile
  - ✓ Doors:
    - Single leaf 3'-0" door with sidelight and lockable lever set hardware
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ Provide general purpose duplex receptacles (four minimum) and a quad receptacle at each workstation
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in room
- Lighting:
  - ✓ LED Lighting in accordance with IES recommendation (35 fc average)
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (as required).

SHARED OFFICE



FUNCTION

Shared office for completing work tasks and holding one on one meetings.

RELATIONSHIP TO OTHER AREAS

- Case specific (office areas specific to each group); reference general modules

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

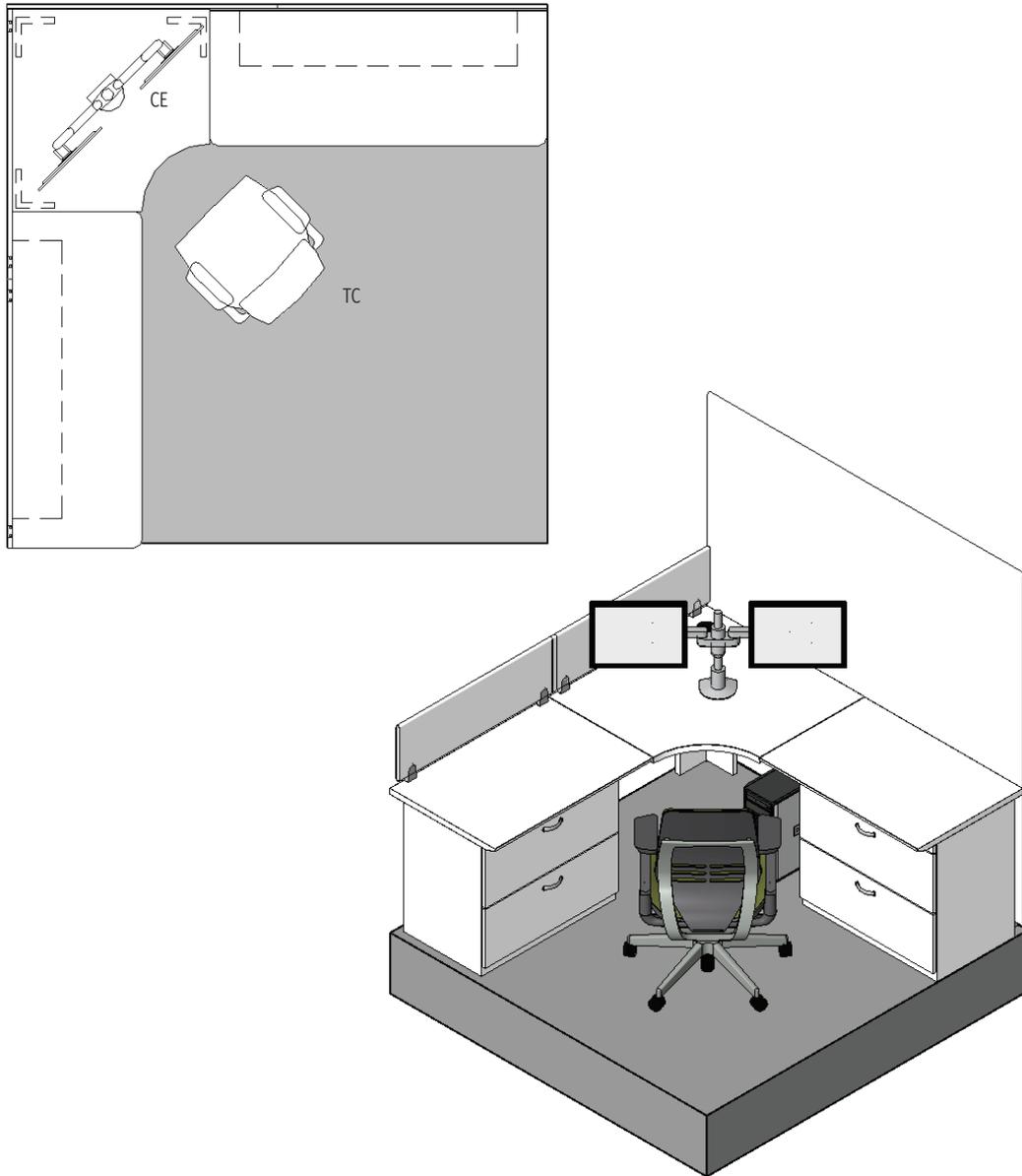
EQUIPMENT/FURNISHINGS

- Task chair
- TMC 60" by 30" typical sit/stand workstation
- Two pedestal cabinets per station. One two-drawers for files, and one three-drawers for personal items and files
- Guest chairs

DESIGN FEATURES

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring:
    - Carpet tile floor with rubber base for operation and administration areas. Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
    - Resilient floor covering with base for maintenance areas
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile
  - ✓ Doors:
    - Single leaf 3'-0" door with sidelight and lockable lever set hardware
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ Provide general purpose duplex receptacles (four minimum) and a quad receptacle at each workstation
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in room
- Lighting:
  - ✓ LED Lighting in accordance with IES recommendation (35 fc average)
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (as required).

**WORKSTATION - 64 SF**



**FUNCTION**

Open office workstation to complete work tasks.

**RELATIONSHIP TO OTHER AREAS**

- Case specific (office areas specific to each group); reference general modules

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

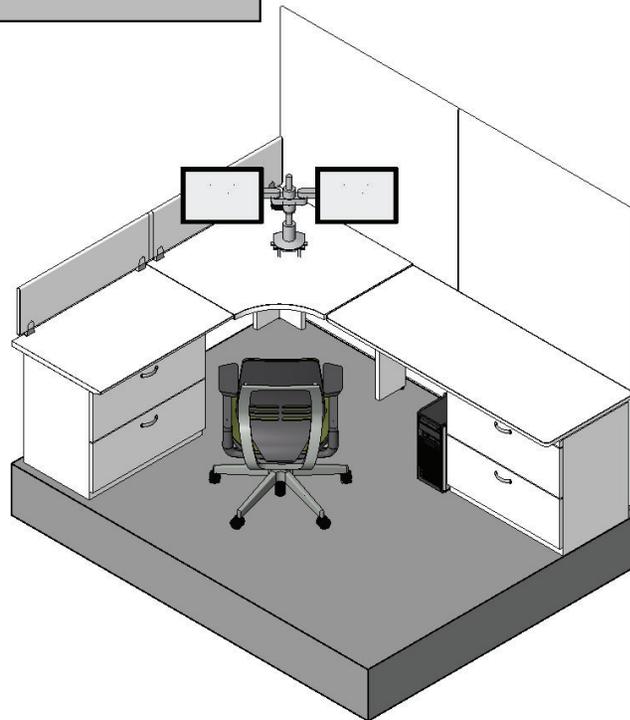
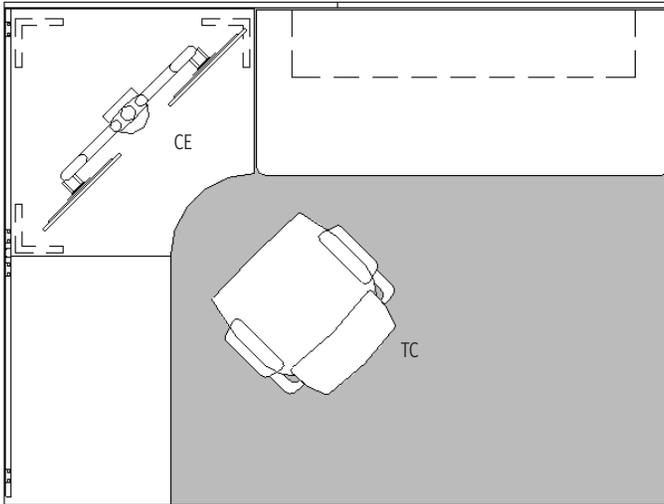
**EQUIPMENT/FURNISHINGS**

- Task chair
- TMC 60" by 30" typical sit/stand workstation
- Two pedestal cabinets per station. One two-drawers for files, and one three-drawers for personal items and files

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring:
    - Carpet tile floor with rubber base for operation and administration areas. Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
    - Resilient floor covering with base for maintenance areas
  - ✓ Ceiling: Acoustical ceiling tile
- Daylighting: Access to natural light
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ Provide general purpose duplex receptacles (three minimum) and a quad receptacle at workstation
  - ✓ Provide one data outlet with four data ports at workstation
- Lighting:
  - ✓ LED lighting in accordance with IES recommendation (35 fc average)
  - ✓ Verify feasibility of providing individual control of selected luminaires
  - ✓ Task lighting (as required).

**WORKSTATION - 48 SF**



**FUNCTION**

Open office workstation to complete work tasks.

**RELATIONSHIP TO OTHER AREAS**

- Case specific (office areas specific to each group); reference general modules

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

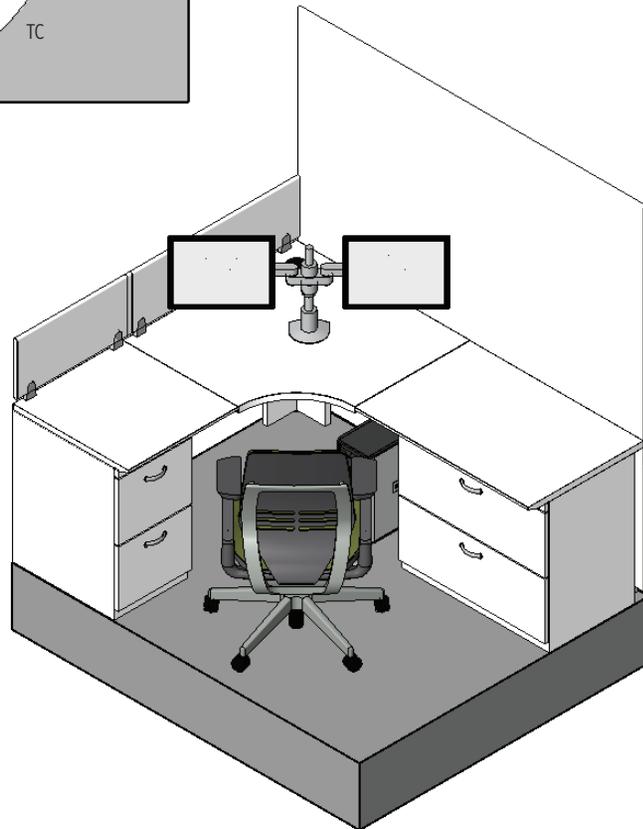
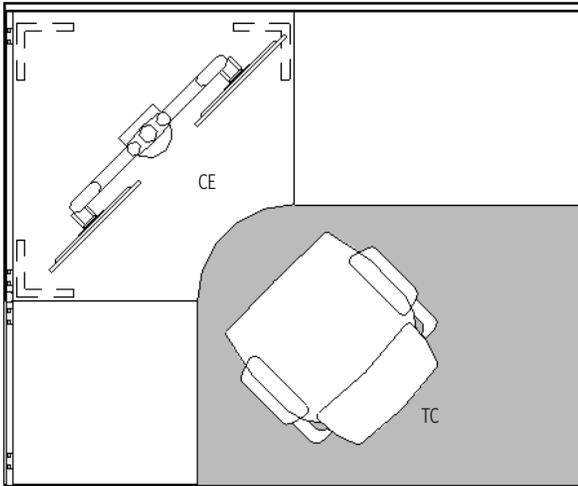
**EQUIPMENT/FURNISHINGS**

- Task chair
- TMC 60" by 30" typical sit/stand workstation
- Two pedestal cabinets per station. One two-drawers for files, and one three-drawers for personal items and files

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring:
    - Carpet tile floor with rubber base for operation and administration areas. Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
    - Resilient floor covering with base for maintenance areas
  - ✓ Ceiling: Acoustical ceiling tile
- Daylighting: Access to natural light
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ Provide general purpose duplex receptacles (three minimum) and a quad receptacle at workstation
  - ✓ Provide one data outlet with four data ports at workstation
- Lighting:
  - ✓ LED lighting in accordance with IES recommendation (35 fc average)
  - ✓ Verify feasibility of providing individual control of selected luminaires
  - ✓ Task lighting (as required).

**WORKSTATION - 30 SF AND 36 SF**



**FUNCTION**

Open office workstation to complete work tasks.

**RELATIONSHIP TO OTHER AREAS**

- Case specific (office areas specific to each group); reference general modules

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

**EQUIPMENT/FURNISHINGS**

- Task chair
- TMC 60" by 30" typical sit/stand workstation
- Two pedestal cabinets per station. One two-drawers for files, and one three-drawers for personal items and files

**DESIGN FEATURES**

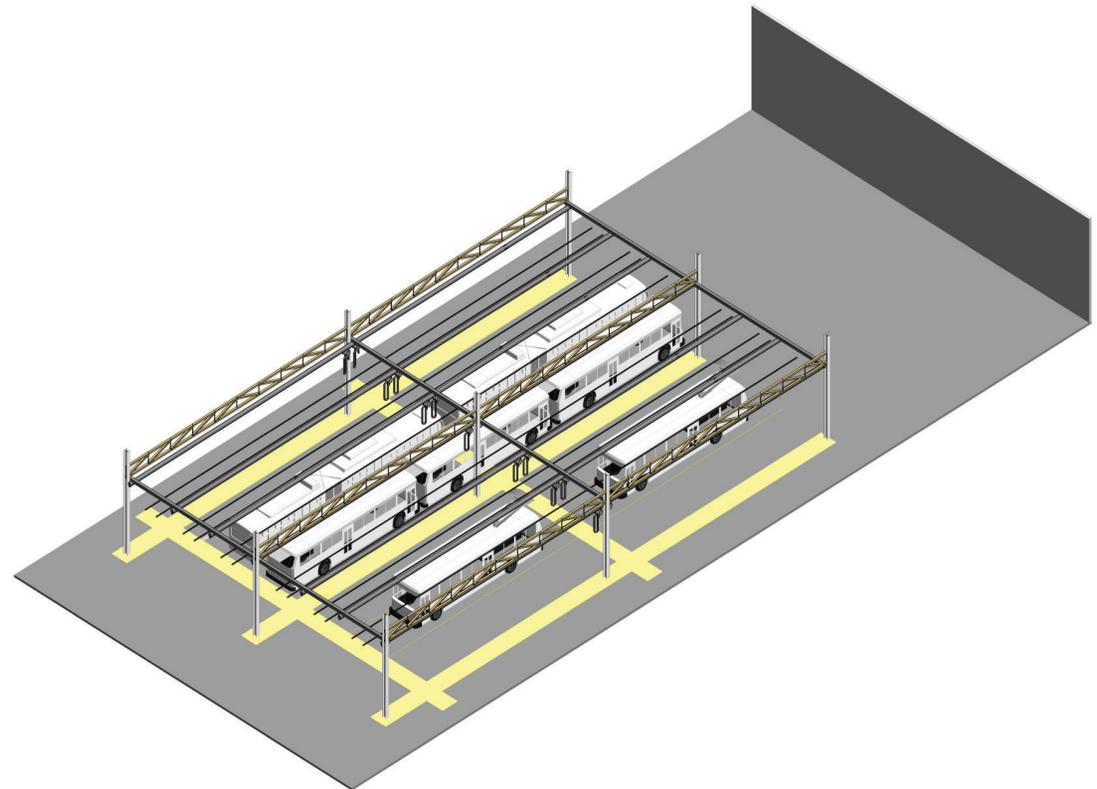
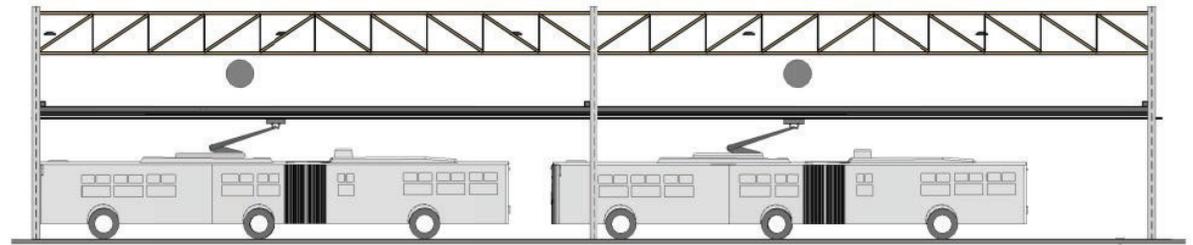
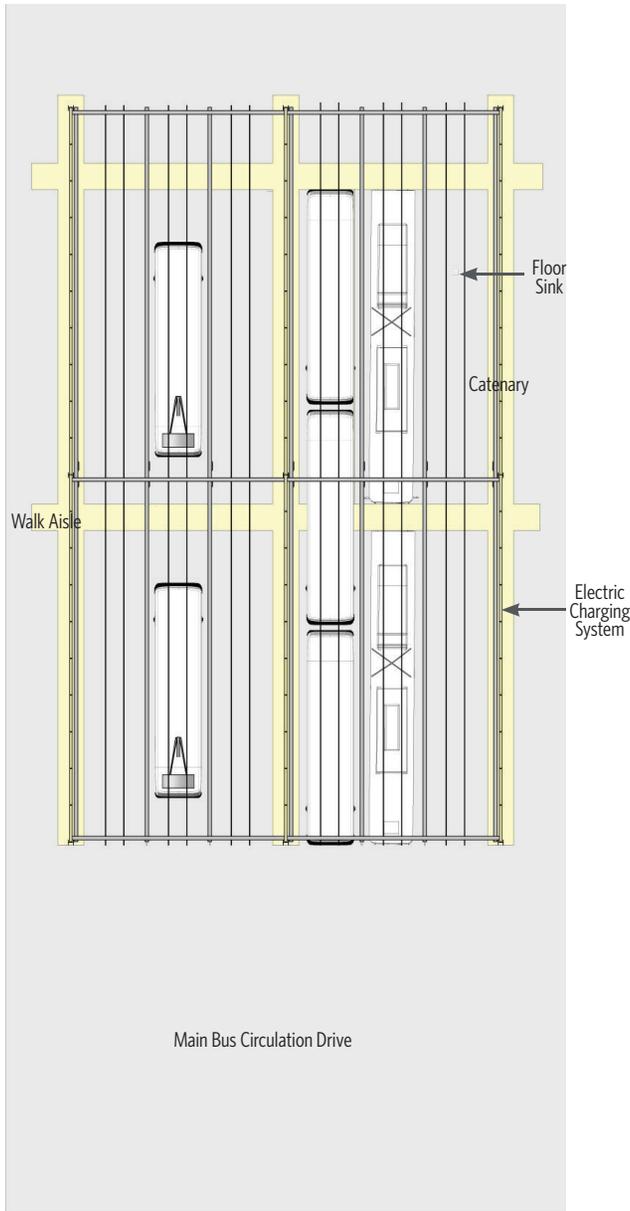
- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring:
    - Carpet tile floor with rubber base for operation and administration areas. Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
    - Resilient floor covering with base for maintenance areas
  - ✓ Ceiling: Acoustical ceiling tile
- Daylighting: Access to natural light
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ Provide general purpose duplex receptacles (three minimum) and a quad receptacle at workstation
  - ✓ Provide one data outlet with four data ports at workstation
- Lighting:
  - ✓ LED lighting in accordance with IES recommendation (35 fc average)
  - ✓ Verify feasibility of providing individual control of selected luminaires.
  - ✓ Task lighting (as required).



## SECTION 5.2: PARKING



40' AND 60' BUS PARKING



40' AND 60' BUS PARKING		
<p style="text-align: center;"><b>FUNCTION</b></p> <p>Dedicated area to park 40' and 60' trolleys.</p>	<ul style="list-style-type: none"> <li>✓ Have the buses go on wire at different locations on the street depending on their route. One block after pullout, another 5 blocks after pullout, and so on.</li> </ul>	<p style="text-align: center;"><b>PLUMBING CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Trench drain at overhead door with flush, removable grate covers, with sediment basket upstream of trap, to central sediment and oil interceptor.</li> <li>• 3/4" water hose bibb with standard faucet at rear of bay 2'-0" AFF (one per three bays)</li> <li>• Compressed air:                         <ul style="list-style-type: none"> <li>✓ 2'-0" compressed air piping loop (minimum)</li> <li>✓ Compressed air drops with shut-off valve, union separator, regulator with gauge and quick disconnects on 4'-0" AFF (one per four parking stalls)</li> <li>✓ Provide 3/8" and 1/2" disconnects at locations to be determined during detailed design</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Additional plumbing connections (water, drainage, etc.) as required by equipment</li> </ul>
<p style="text-align: center;"><b>RELATIONSHIP TO OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>• Access to Service Positions</li> <li>• Access to Bus Washer</li> </ul>	<p style="text-align: center;"><b>ARCHITECTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Finishes:                         <ul style="list-style-type: none"> <li>✓ Floor: Soil, grease, water, slip resistant concrete with chemical bonded concrete sealer</li> <li>✓ Walls: Soil and grease resistant, with light colored finish, concrete or masonry</li> <li>✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish</li> </ul> </li> <li>• Doors:                         <ul style="list-style-type: none"> <li>✓ Personnel door with view panel to meet applicable code exit requirements</li> <li>✓ Exterior of building overhead doors: High-lifting sectional, steel, insulated, size per Fleet 16'-0" wide by 16'-0" with view panels, automatic operator, detection loops</li> <li>✓ Bollards on exterior at jambs of overhead door (two each)</li> </ul> </li> </ul>	<p style="text-align: center;"><b>ELECTRICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Power:                         <ul style="list-style-type: none"> <li>✓ All receptacles and outlets at 3'-6" AFF</li> <li>✓ Provide general purpose duplex receptacles on every column</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Lighting:                         <ul style="list-style-type: none"> <li>✓ LED lighting in accordance with IES recommendation (5 fc average)</li> <li>✓ Fixtures located to illuminate work spaces and around the vehicles</li> <li>✓ Luminaires shall be placed between every row of buses to allow illumination between buses</li> </ul> </li> <li>• Communications: Paging/intercom system speakers with 100 percent coverage of all parking stalls</li> </ul>
<p style="text-align: center;"><b>CRITICAL DIMENSIONS</b></p> <ul style="list-style-type: none"> <li>• 19'-0" preferred vertical clearance to structure and fixtures. This vertical clearance height may be reduced to a minimum of 17' only if all fixtures, building systems, OCS, ETB pole systems, structure, and all other Technical Requirements are fully accommodated.</li> <li>• 12'-0" wide x 65'-0" long per space (60' bus)</li> <li>• 12'-0" wide x 45'-0" long per space (40' bus)</li> <li>• Ramps:                         <ul style="list-style-type: none"> <li>✓ 15'-0" wide ramp (minimum)</li> <li>✓ 14'-0" vertical clearance to structure and fixtures</li> <li>✓ Maximum 10 percent slope with 40' long 5 percent transition ramps at top and bottom</li> </ul> </li> </ul>	<p style="text-align: center;"><b>STRUCTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Control joints in floor slab at adequate spacing</li> <li>• Structure as needed to support equipment</li> </ul>	
<p style="text-align: center;"><b>EQUIPMENT/FURNISHINGS</b></p> <ul style="list-style-type: none"> <li>• OCS: Wire in parking positions for trolley buses</li> <li>• Electric charging: Reference E-Bus Performance Requirements. This E-Bus Performance Requirements Document supersedes anything in this document.</li> </ul>	<p style="text-align: center;"><b>MECHANICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Ventilation:                         <ul style="list-style-type: none"> <li>✓ 1.5 CFM exhaust per square foot of floor area</li> <li>✓ Return air openings in areas used for repair or servicing vehicles shall not be less than 18" above floor level accordance with NFPA 30A and ASHRAE 62.1</li> </ul> </li> <li>• Heating set point: 65 degrees Fahrenheit</li> </ul>	
<p style="text-align: center;"><b>DESIGN FEATURES</b></p> <ul style="list-style-type: none"> <li>• Buses parking in each aisle of every bus parking level must be organized by buses of the same length. Further, each bus parking aisle shall be designated for its respective bus length so that the charging infrastructure can be efficiently accommodated.</li> <li>• Pulling out from the facility needs to be further evaluated in final design because of the affects of going on wire could have on backups or delays at pullout. A couple of options are:                         <ul style="list-style-type: none"> <li>✓ Having wires connected to the street wires from inside the building so that going on wire would happen in a parking que lane at the exit of the facility.</li> </ul> </li> </ul>		

### GENERAL NOTES

- Provide one Preventive Maintenance Bay for every 50 buses
- All Maintenance Bays are designed for 40' and 60' buses
- The above are all industry standards. Reference Appendix C: Equipment Manual for industrial shop equipment specified per space.

## SECTION 5.3: BAYS AND SHOPS

GENERAL OFFICE MODULES: OFFICE AREAS

**RUNNING REPAIR - SUPERVISOR**

- Reference **Office Module Workstation - 64 sf**
- View of Repair Bays and Shops
- Adjacent to Preventive Maintenance Supervisor

**CONTROL ROOM CLERK**

- Reference **Office Module Workstation - 64 sf**
- Adjacent to Supervisors

**FLOOR SUPERVISOR**

- Reference **Office Module Workstation - 64 sf**
- View of Repair Bays and Shops

**PREVENTIVE MAINTENANCE SUPERVISOR**

- Reference **Office Module Workstation - 64 sf**
- View of Repair Bays and Shops
- Adjacent to Running Repair Supervisor

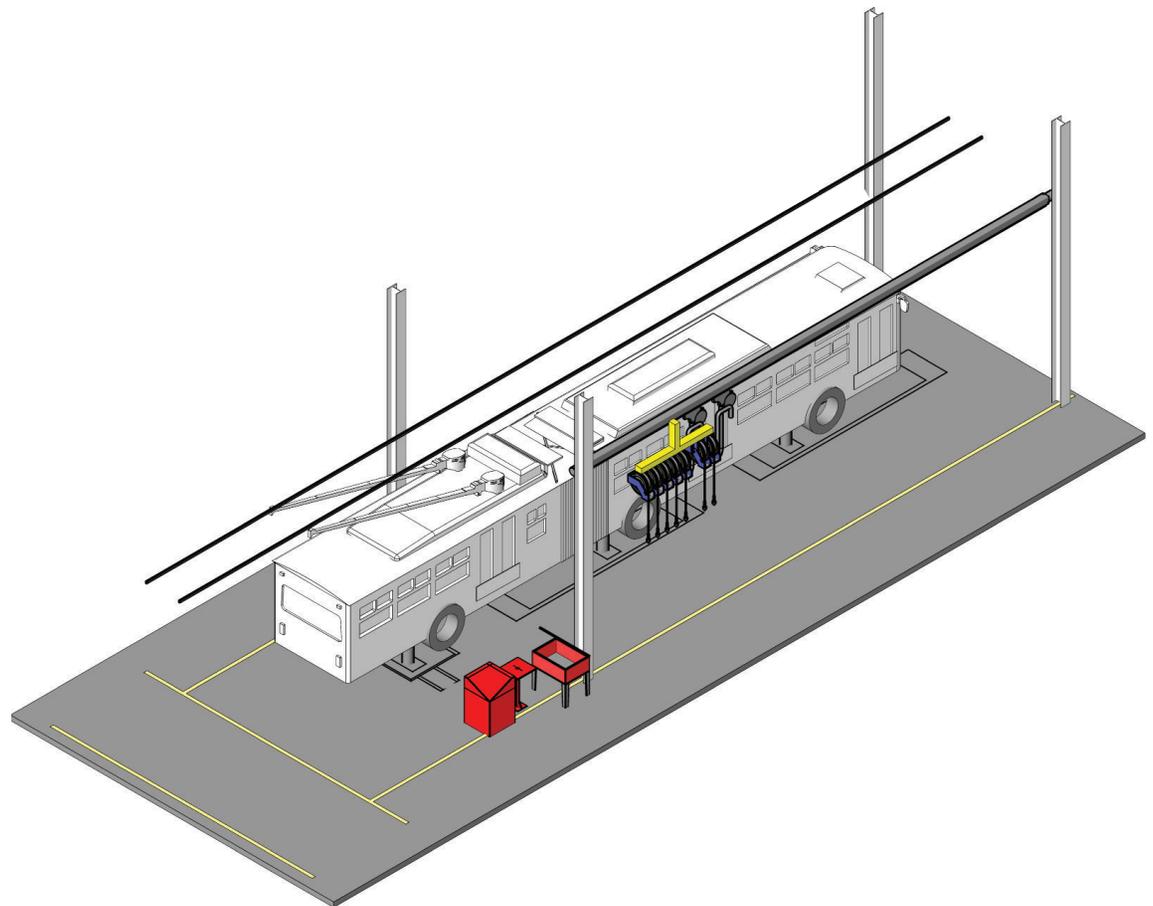
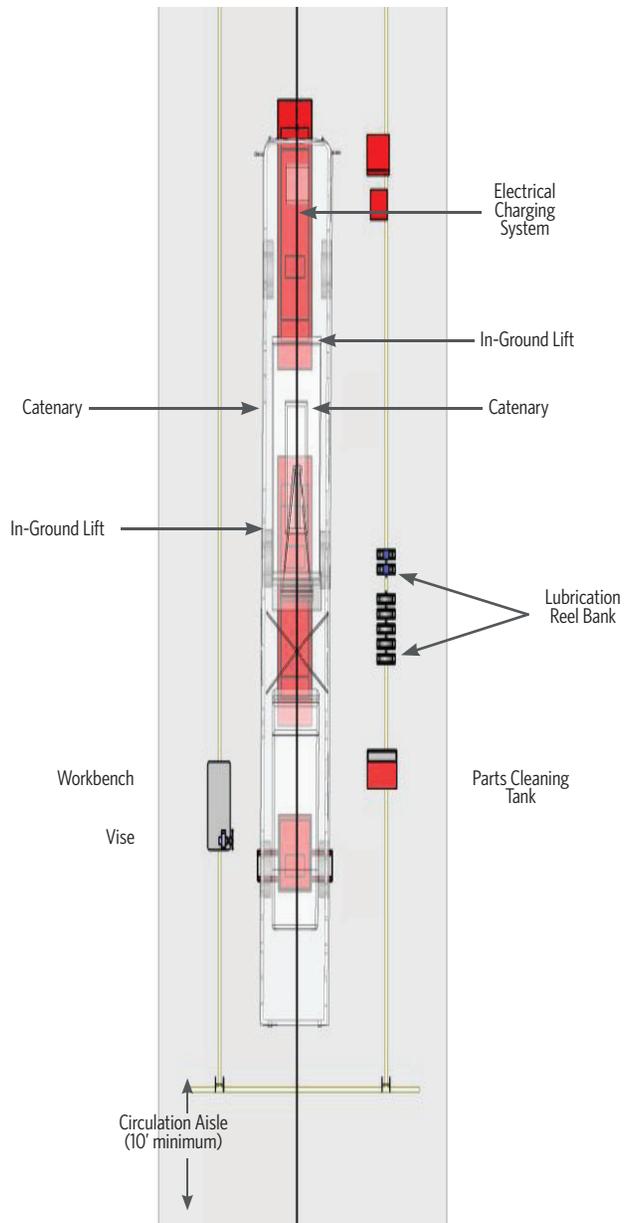
**ELECTRONIC SUPERVISOR**

- Reference **Office Module Workstation - 64 sf**
- View of Repair Bays and Shops
- Adjacent to Supervisors
- Access to Electronic Bench Shop

**ELECTRONIC SHOP WORKSTATIONS**

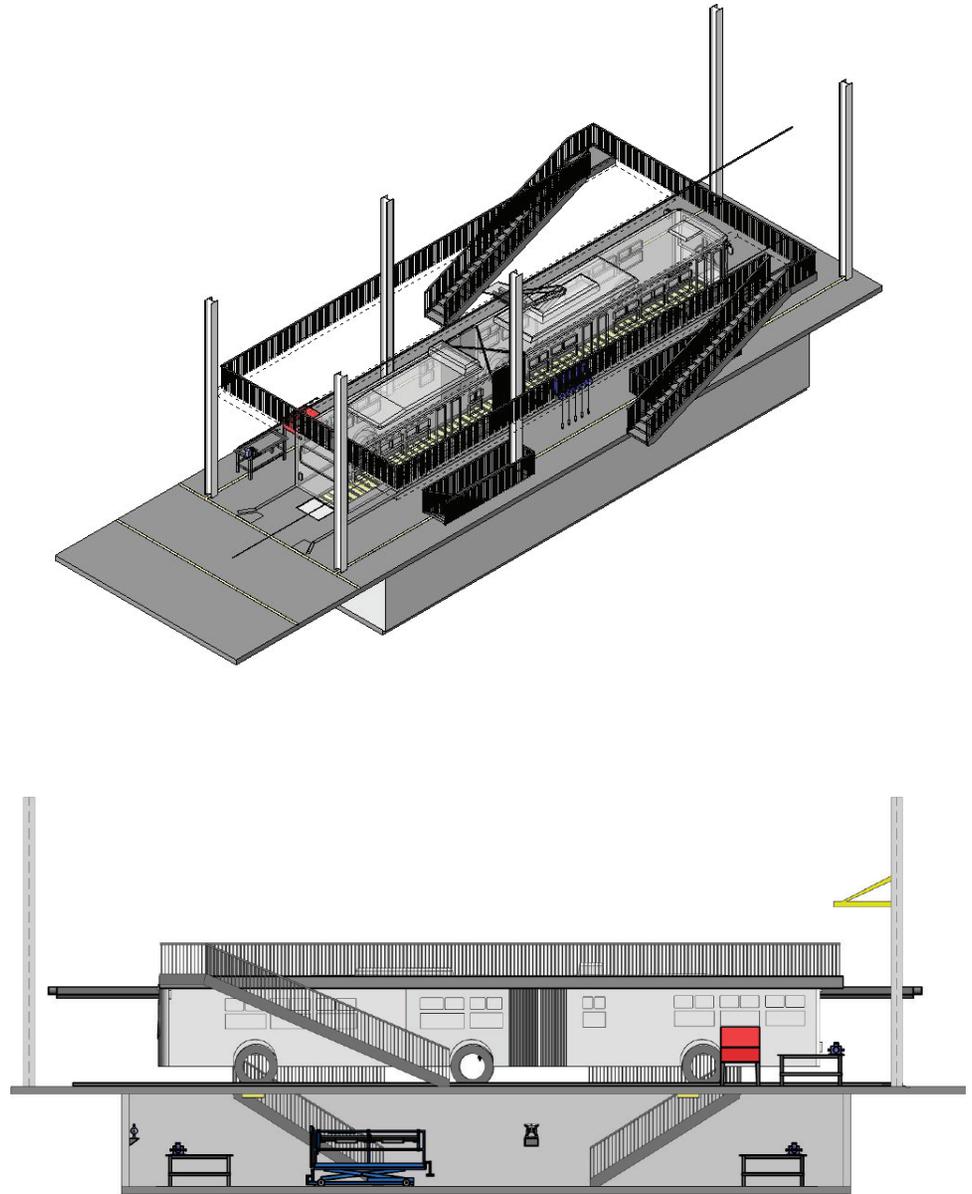
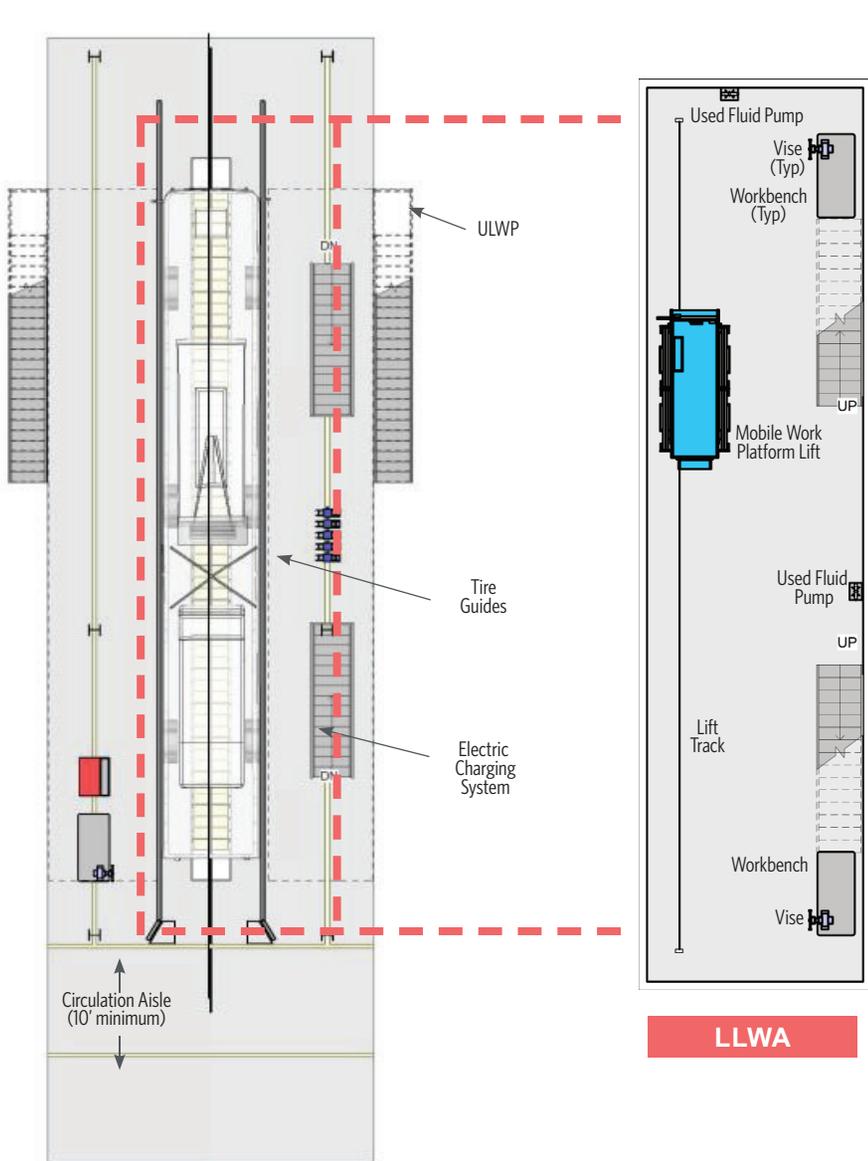
- Reference **Office Module Workstation - 30 sf**
- Adjacent to Electronic Bench Shop

60' BUS REPAIR BAY



60' BUS REPAIR BAY		
<p><b>FUNCTION</b></p> <p>Bay space to perform general repair and maintenance on trolleys and future BEBs.</p>	<p><b>ARCHITECTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Finishes:                             <ul style="list-style-type: none"> <li>✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer</li> <li>✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry</li> <li>✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish</li> </ul> </li> </ul>	<p><b>PLUMBING CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Lubrication reel bank (shared one per two bays)</li> <li>• 3/4" water hose bibb with standard faucet at rear of bay 2'-0" AFF (one per three bays)</li> <li>• Compressed air:                             <ul style="list-style-type: none"> <li>✓ 2'-0" compressed air piping loop (minimum)</li> <li>✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF</li> <li>✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Additional plumbing connections (water, drainage, etc.) as required by equipment</li> </ul>
<p><b>RELATIONSHIP TO OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>• Access to Common Work Area, Parts Storage, Portable Equipment Storage Areas, and Maintenance Office areas</li> </ul>	<p><b>STRUCTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Control joints in floor slab at adequate spacing</li> <li>• Structure as needed to support equipment</li> <li>• Floor slab designed to accommodate in-floor radiant heat (if desired)</li> <li>• Floor slab designed to accommodate forklift access</li> </ul>	<p><b>ELECTRICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Power:                             <ul style="list-style-type: none"> <li>✓ All receptacles and outlets at 3'-6" AFF</li> <li>✓ Provide general purpose duplex receptacles (four minimum) on walls, columns, and between overhead doors</li> <li>✓ Dedicated computer receptacle, adjacent to data conduit on column adjacent to workbench</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Lighting:                             <ul style="list-style-type: none"> <li>✓ LED lighting in accordance with IES recommendation minimum (75 fc average)</li> <li>✓ Fixtures located to illuminate work spaces and around the vehicles</li> </ul> </li> <li>• Communications:                             <ul style="list-style-type: none"> <li>✓ Paging/intercom system speakers</li> <li>✓ Data conduit on columns at each bay</li> </ul> </li> </ul>
<p><b>CRITICAL DIMENSIONS</b></p> <ul style="list-style-type: none"> <li>• 19'-0" vertical clearance to structure and fixtures</li> <li>• 20'-0" wide by 75'-0" long</li> </ul>	<p><b>MECHANICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• As required by equipment</li> <li>• Ventilation:                             <ul style="list-style-type: none"> <li>✓ 1.5 CFM exhaust per square foot of floor area</li> <li>✓ Return air openings in areas used for repair or servicing vehicles shall not be less than 18" above floor level accordance with NFPA 30A and ASHRAE 62.1</li> </ul> </li> <li>• Heating set point: 65 degrees Fahrenheit</li> <li>• In-floor radiant heat (if desired)</li> </ul>	
<p><b>EQUIPMENT/FURNISHINGS</b></p> <ul style="list-style-type: none"> <li>• Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment</li> <li>• OCS: Wire in positions for trolley buses</li> <li>• Electric charging: Reference E-Bus Performance Requirements. This E-Bus Performance Requirements Document supersedes anything in this document.</li> </ul>		
<p><b>DESIGN FEATURES</b></p> <ul style="list-style-type: none"> <li>• Forklift access</li> <li>• Natural daylighting desired</li> <li>• Roof Level Work Platform (RLWP) with fall protection</li> </ul>		

60' BUS PREVENTIVE MAINTENANCE



**60' BUS PREVENTIVE MAINTENANCE**

**FUNCTION**

Bay space to perform preventive maintenance such as inspections, and underfloor component replacement or repair on trolleys, and future battery electric buses with a Lower Level Work Area (LLWA). As well as, roof top component repair or replacement with an Upper Level Work Platform (ULWP) are performed in this area as well.

**RELATIONSHIP TO OTHER AREAS**

- Access to Common Work Area, Parts Storage, Portable Equipment Storage Areas, and Maintenance Office areas

**CRITICAL DIMENSIONS**

- 19'-0" vertical clearance to structure and fixtures
- 20'-0" wide by 75'-0" long
- LLWA: 60'-0" long by 10'-0" wide by 8'-6" depth (min.)
- 25'-0" (min) vertical clearance within the bay where bus is in position.

**EQUIPMENT/FURNISHINGS**

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment
- Electric charging: Reference E-Bus Performance Requirements. This E-Bus Performance Requirements Document supersedes anything in this document.
- Lockout/tag out system required when bus is in position
- No OCS: Wire in position for trolley buses.

**DESIGN FEATURES**

- Forklift access
- Natural daylighting desired
- LLWA
- ULWP
- Tire guides are required to assist with the maneuvering into the bay
- Lockout/tag out system for access to ULWP
- Trolley pole system inspection and maintenance to be conducted in all PM Bays. Reference diagram in section 3.6 OCS-Trolley for height diagram.

- Multiple PM bays should be located adjacent to one another and the LLWA for each should be contiguous from one to another, to allow for uninhibited passage from one LLWA to the next LLWA across the entire length of the LLWA.

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)
- Floor slab designed to accommodate forklift access
- LLWA opening to support bridge jacks

**MECHANICAL CONSIDERATIONS**

- As required by equipment
- Ventilation:
  - ✓ 1.5 CFM exhaust per square foot exhaust
  - ✓ Return openings in areas used for repair or servicing vehicles shall not be less than 18" above floor level accordance with NFPA 30A and ASHRAE 62.1
- Heating set point: 65 degrees Fahrenheit
- In-floor radiant heat (if desired)
- LLWA:
  - ✓ Minimum 1 CFM per square foot of LLWA floor area at all times the building is occupied or when vehicles are parked over these areas.
  - ✓ Exhaust shall be taken from a point within 1'-0" of the floor

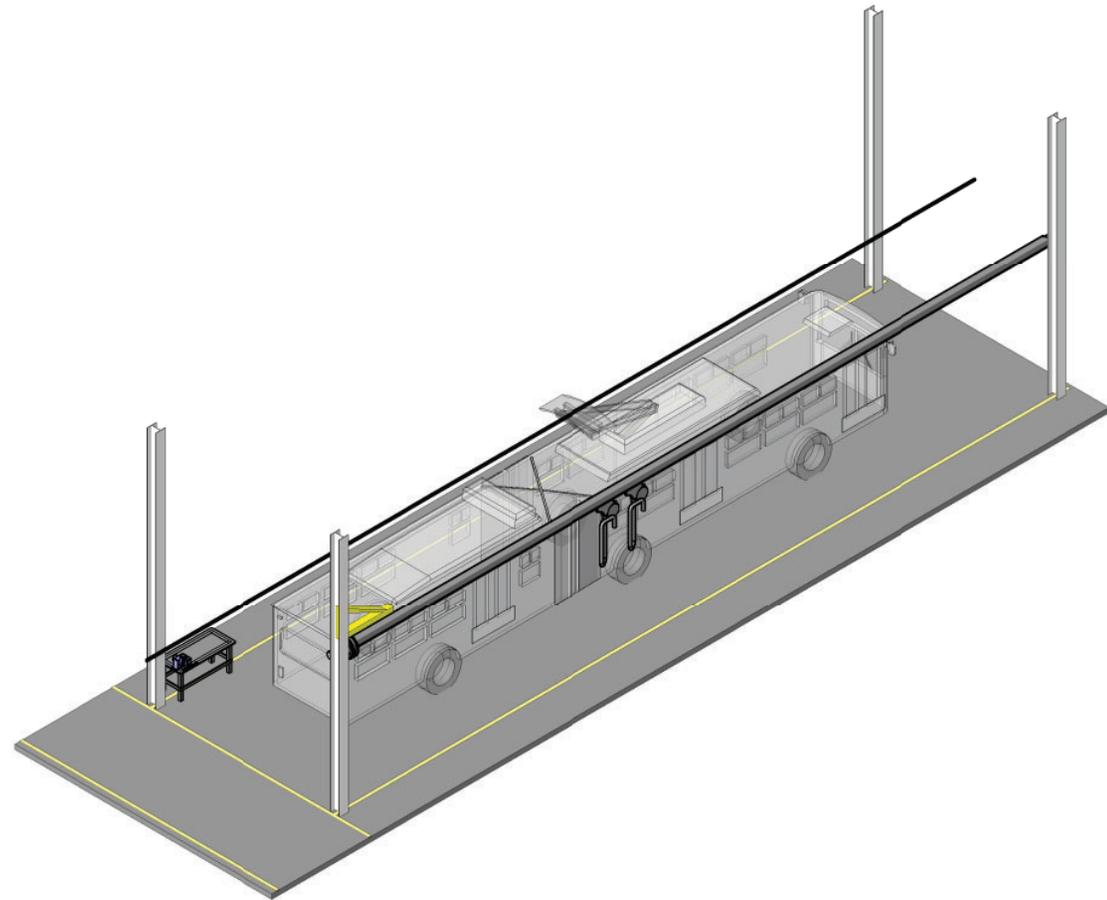
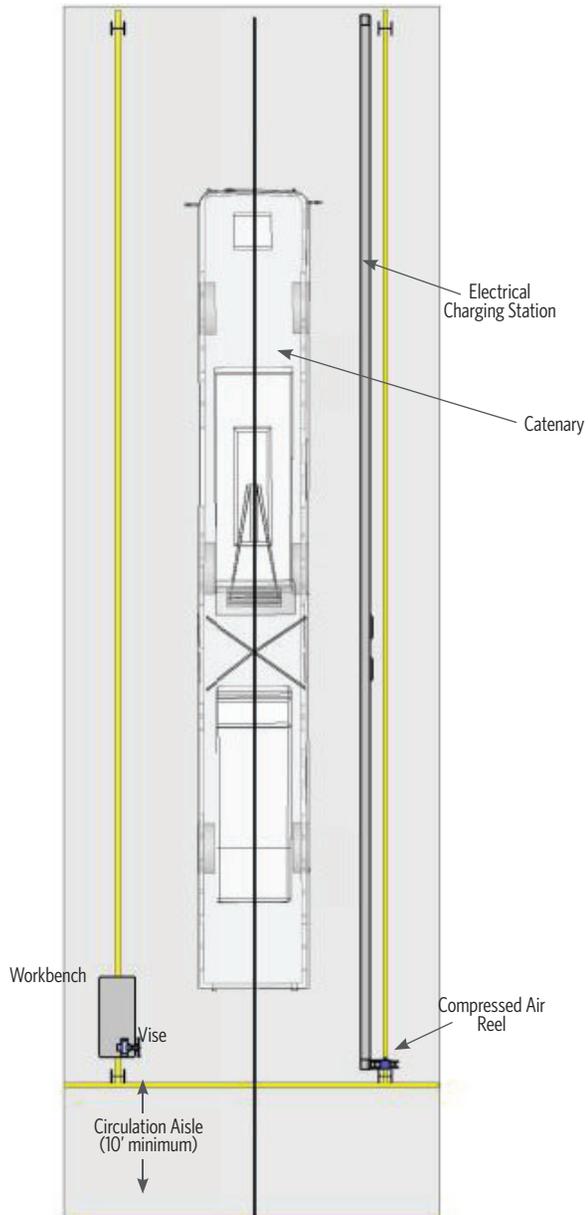
**PLUMBING CONSIDERATIONS**

- 3/4" water hose bibb with standard faucet at rear of bay on main and LLWA level, 2'-0" AFF (one per bay)
- Compressed air:
  - ✓ 2'-0" compressed air piping loop (minimum)
  - ✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - ✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design
  - ✓ Provide on Main Level, ULWP, and LLWA
  - ✓ As required by equipment
- Additional plumbing connections (water, drainage, etc.) as required by equipment

**ELECTRICAL CONSIDERATIONS**

- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (four minimum) on walls, columns, and between overhead doors
  - ✓ Dedicated computer receptacle, adjacent to data conduit on column adjacent to workbench
  - ✓ As required by equipment
- Lighting:
  - ✓ LED lighting in accordance with IES recommendation minimum (75 fc average)
  - ✓ Explosion proof LED lighting in pit
  - ✓ Fixtures located to illuminate work spaces and around the vehicles
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns at each bay

60' BUS TIRE BAY



**60' BUS TIRE BAY**

**FUNCTION**

Bay space to perform tire replacement and repair on trolleys and future BEBs.

**RELATIONSHIP TO OTHER AREAS**

- Access to Common Work Area, Parts Storage, Portable Equipment Storage Areas, and Maintenance Office areas
- Adjacent to Tire Shop

**CRITICAL DIMENSIONS**

- 19'-0" vertical clearance to structure and fixtures
- 20'-0" wide by 75'-0" long

**EQUIPMENT/FURNISHINGS**

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment
- Electric charging: Reference E-Bus Performance Requirements. This E-Bus Performance Requirements Document supersedes anything in this document.
- OCS: Wire in positions for trolley buses

**DESIGN FEATURES**

- Forklift access
- Natural daylighting desired

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)
- Floor slab designed to accommodate forklift access

**MECHANICAL CONSIDERATIONS**

- As required by equipment
- Ventilation:
  - ✓ 1.5 CFM exhaust per square foot of floor area
  - ✓ Return air openings in areas used for repair or servicing vehicles shall not be less than 18" above floor level accordance with NFPA 30A and ASHRAE 62.1
- Heating set point: 65 degrees Fahrenheit
- In-floor radiant heat (if desired)

**PLUMBING CONSIDERATIONS**

- Lubrication reel bank (shared one per two bays)
- 3/4" water hose bibb with standard faucet at rear of bay 2'-0" AFF (one per three bays)
- Compressed air:
  - ✓ 2'-0" compressed air piping loop (minimum)
  - ✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - ✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design
  - ✓ As required by equipment
- Additional plumbing connections (water, drainage, etc.) as required by equipment

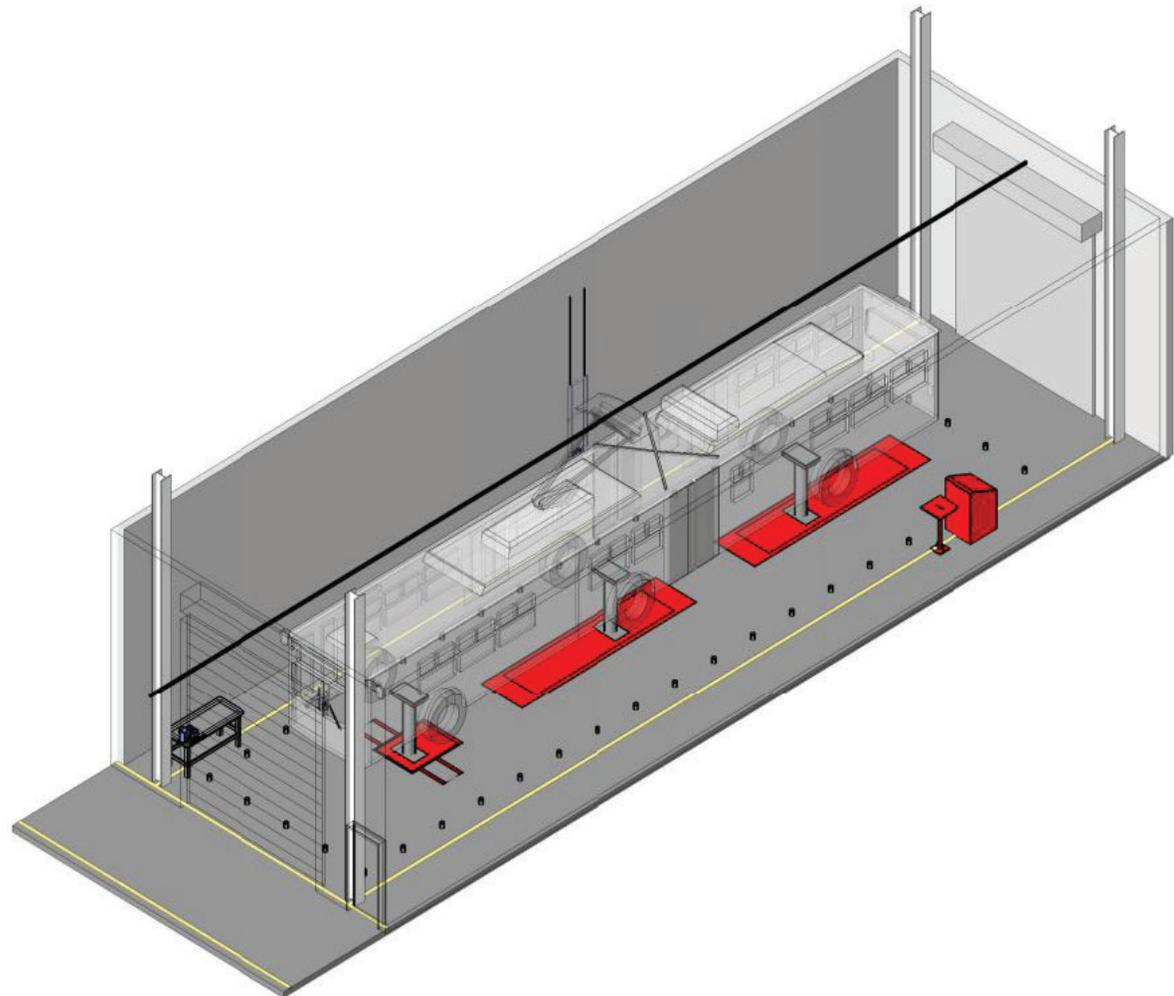
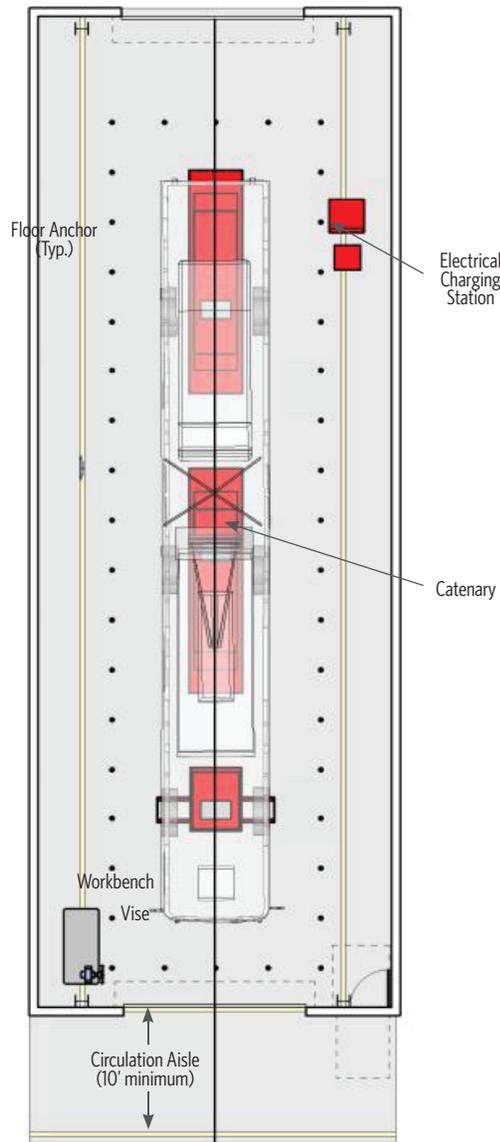
**ELECTRICAL CONSIDERATIONS**

- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (four minimum) on walls, columns, and between overhead doors
  - ✓ Dedicated computer receptacle, adjacent to data conduit on column adjacent to workbench
  - ✓ As required by equipment
- Lighting:
  - ✓ LED lighting in accordance with IES recommendation minimum (25 fc average)
  - ✓ Fixtures located to illuminate work spaces and around the vehicles
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns at each bay

**FIRE SUPPRESSION CONSIDERATIONS**

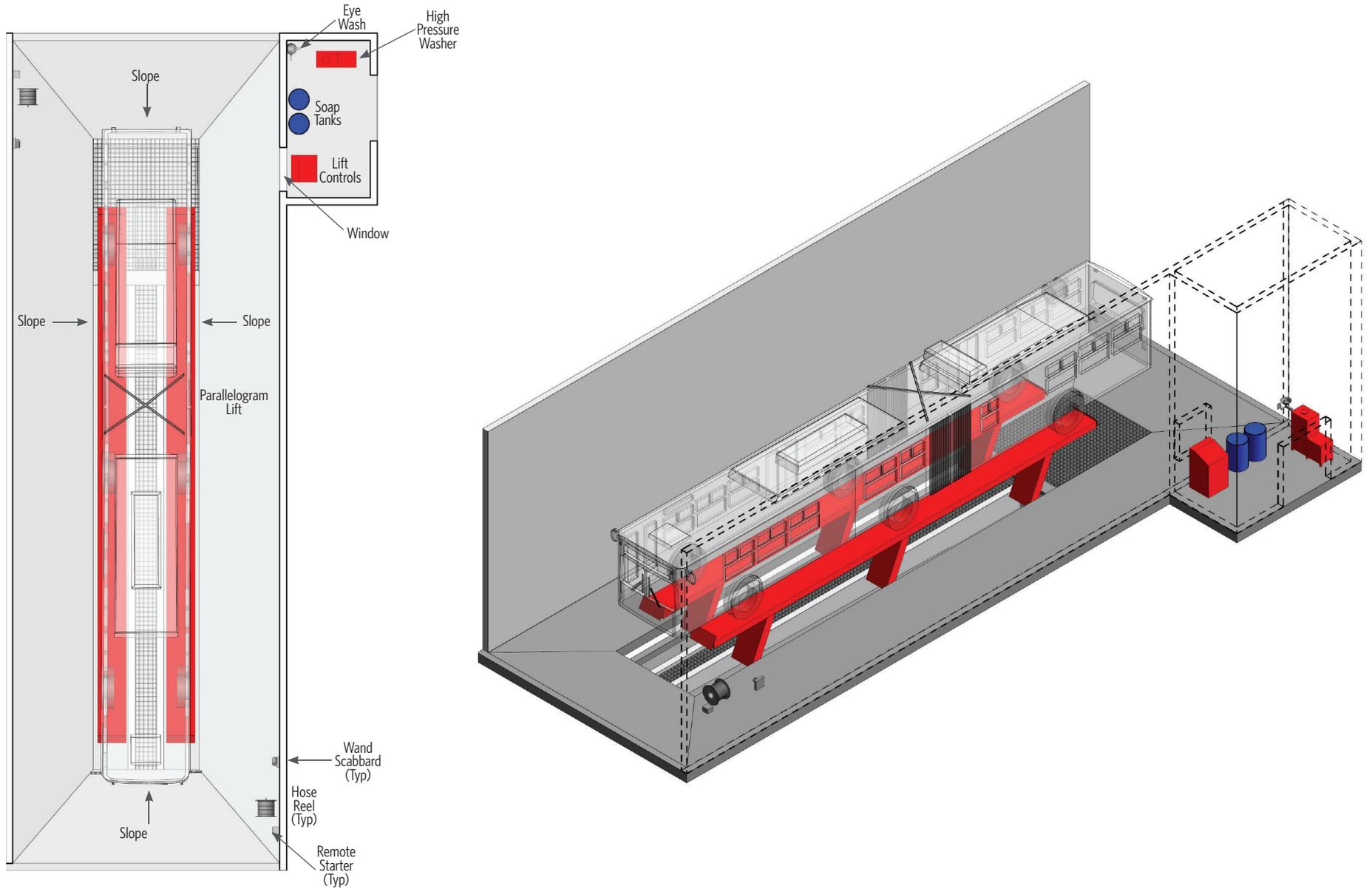
The fire protection and pyrotechnics experts on the detailed design team will be responsible for devising a robust fire protection system for the tire bay and tire shop/storage areas that minimizes risk to the Yard and any joint development above. Review and recommendations provided by the experts will include, but not be limited to, the location, ventilation, and fire suppression systems for Potrero Yard's tire facilities.

60' BUS MINOR BODY REPAIR



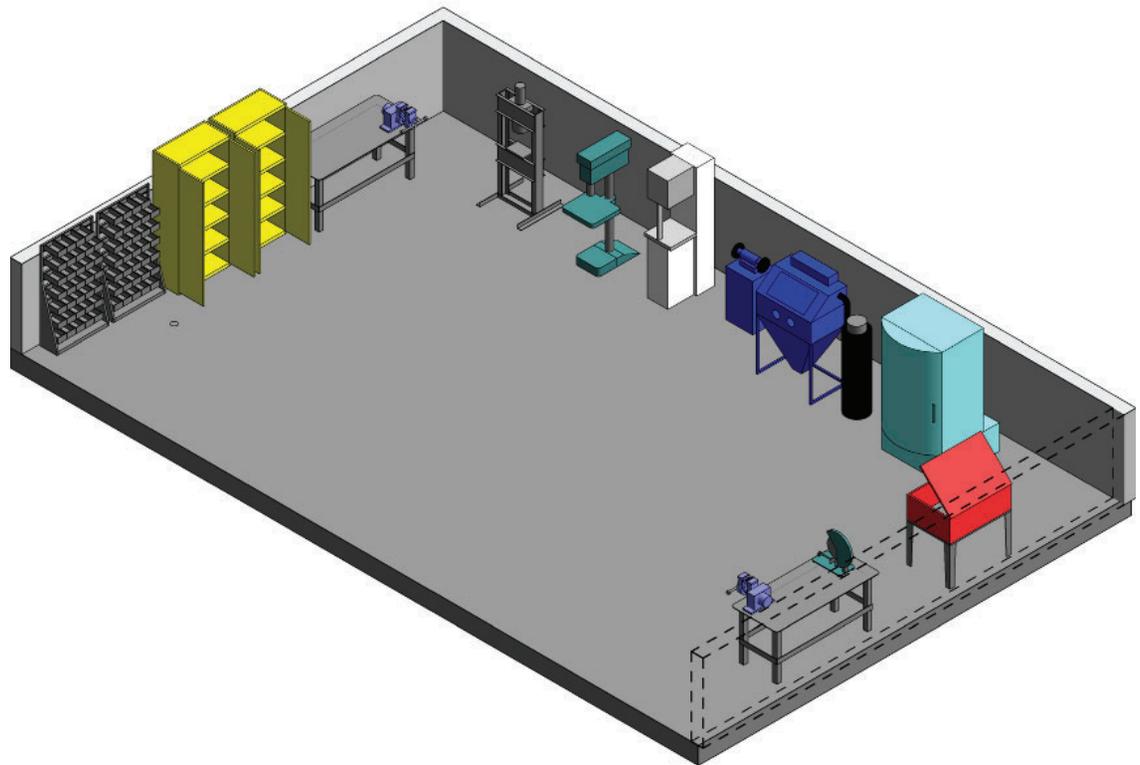
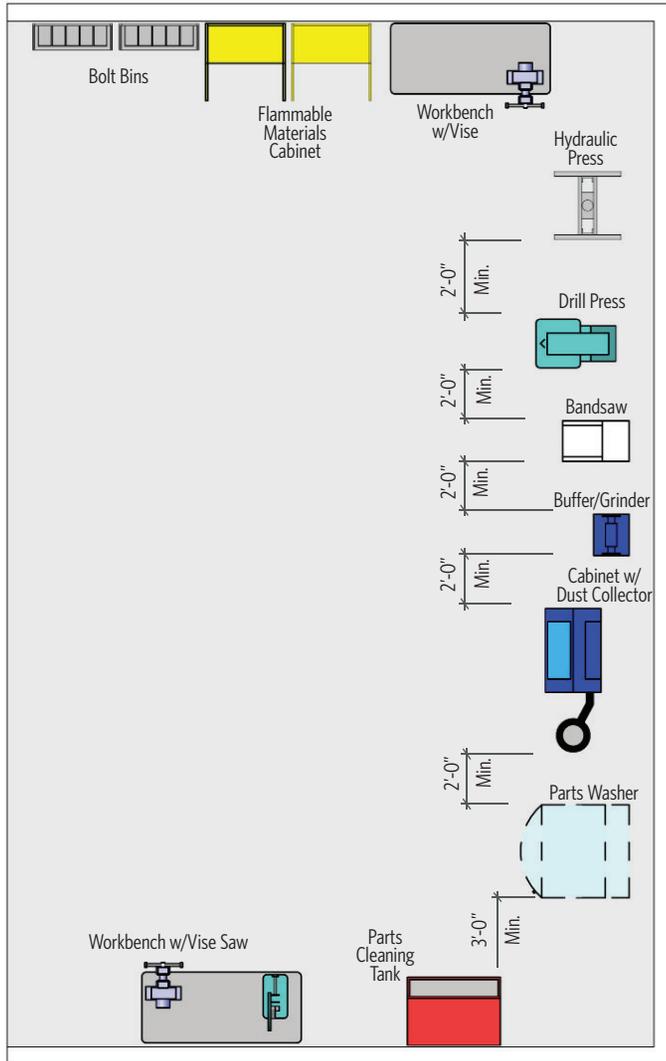
60' BUS MINOR BODY REPAIR		
<p><b>FUNCTION</b></p> <p>Perform minor replacement and repair of glass panel and other body parts of the trolley and future BEBs.</p>	<p><b>ARCHITECTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Finishes:                             <ul style="list-style-type: none"> <li>✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer</li> <li>✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry</li> <li>✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish</li> </ul> </li> <li>• Doors:                             <ul style="list-style-type: none"> <li>✓ Personnel door with view panel to meet applicable code exit requirements</li> <li>✓ Overhead door: High-lifting sectional, steel, insulated, 14'-0" by 14'-0" with view panels, automatic operator, interior and exterior push button controls</li> </ul> </li> </ul>	<p><b>PLUMBING CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Lubrication reel bank (shared one per two bays)</li> <li>• 3/4" water hose bibb with standard faucet at rear of bay 2'-0" AFF (one per three bays)</li> <li>• Compressed air:                             <ul style="list-style-type: none"> <li>✓ 2'-0" compressed air piping loop (minimum)</li> <li>✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF</li> <li>✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Additional plumbing connections (water, drainage, etc.) as required by equipment.</li> </ul>
<p><b>RELATIONSHIP TO OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>• Adjacent to Minor Body Shop</li> </ul>		
<p><b>CRITICAL DIMENSIONS</b></p> <ul style="list-style-type: none"> <li>• 19'-0" vertical clearance to structure and fixtures</li> <li>• 20'-0" wide by 75'-0" long</li> </ul>		
<p><b>EQUIPMENT/FURNISHINGS</b></p> <ul style="list-style-type: none"> <li>• Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment</li> <li>• Electric charging: Reference E-Bus Performance Requirements. This E-Bus Performance Requirements Document supersedes anything in this document.</li> <li>• OCS: Wire in positions for trolley buses</li> </ul>	<p><b>STRUCTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Control joints in floor slab at adequate spacing</li> <li>• Structure as needed to support equipment</li> <li>• Floor slab designed to accommodate in-floor radiant heat (if desired)</li> <li>• Floor slab designed to accommodate forklift access</li> </ul>	<p><b>ELECTRICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Power:                             <ul style="list-style-type: none"> <li>✓ All receptacles and outlets at 3'-6" AFF</li> <li>✓ Provide general purpose duplex receptacles (four minimum) on walls, columns, and between overhead doors</li> <li>✓ Dedicated computer receptacle, adjacent to data conduit on column adjacent to workbench</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Lighting:                             <ul style="list-style-type: none"> <li>✓ LED lighting in accordance with IES recommendation minimum (75 fc average)</li> <li>✓ Fixtures located to illuminate work spaces and around the vehicles</li> </ul> </li> <li>• Communications:                             <ul style="list-style-type: none"> <li>✓ Paging/intercom system speakers</li> <li>✓ Data conduit on columns at each bay</li> </ul> </li> </ul>
<p><b>DESIGN FEATURES</b></p> <ul style="list-style-type: none"> <li>• Forklift access</li> <li>• Natural daylighting desired</li> </ul>	<p><b>MECHANICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• As required by equipment</li> <li>• Ventilation:                             <ul style="list-style-type: none"> <li>✓ 1.5 CFM exhaust per square foot of floor area</li> <li>✓ Return air openings in areas used for repair or servicing vehicles shall not be less than 18" above floor level accordance with NFPA 30A and ASHRAE 62.1</li> </ul> </li> <li>• Heating set point: 65 degrees Fahrenheit</li> <li>• In-floor radiant heat (if desired)</li> </ul>	

60' BUS CHASSIS WASH



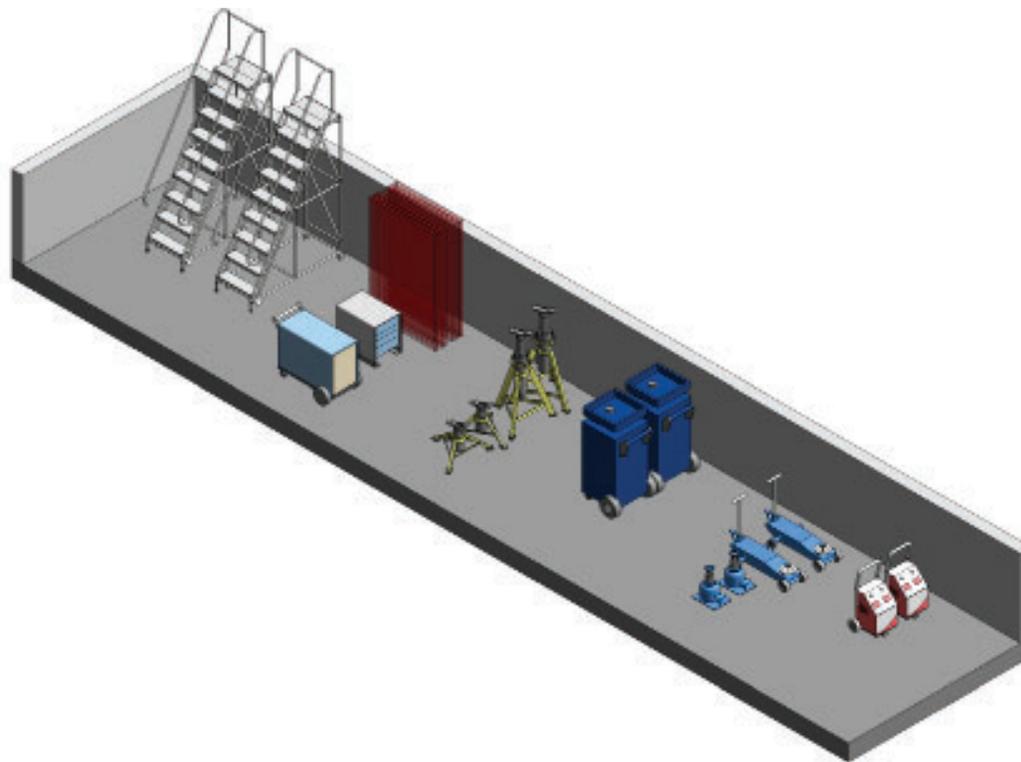
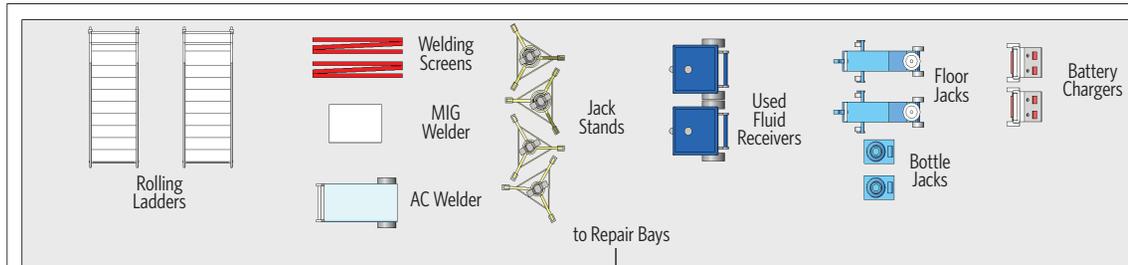
60' BUS CHASSIS WASH		
<p><b>FUNCTION</b></p> <p>Chassis Wash Bay: Enclosed bay for washing of underside of trolleys and future battery electric buses before bringing into repair bays. Wash Equipment Room: A room adjacent to the Wash Bay for high pressure washer and soap drums.</p>	<p><b>ARCHITECTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Finishes:                             <ul style="list-style-type: none"> <li>✓ Floor: Soil, grease, water, slip resistant concrete with chemical bonded concrete sealer</li> <li>✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry, with polyurea coatings treatment for wet and moisture protection</li> <li>✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish</li> </ul> </li> <li>• Doors: Personnel doors with view panels to meet applicable code exit requirements</li> </ul>	<p><b>PLUMBING CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Compressed air:                             <ul style="list-style-type: none"> <li>✓ 2'-0" compressed air piping loop (minimum)</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Wash connections from high pressure washer to wand scabbard on both sides of bay</li> <li>• Water connection to emergency eye wash/shower station</li> <li>• Trench drain area (with removable cover), with sediment basket upstream of trap, to central sediment and oil inceptor</li> <li>• Large grated sump with side drain overflow to central sediment and oil inceptor</li> <li>• Additional plumbing connections (water, drainage, etc.) as required by equipment</li> </ul>
<p><b>RELATIONSHIP TO OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>• Access to all other shop areas</li> </ul>	<p><b>STRUCTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Control joints in floor slab at adequate spacing</li> <li>• Structural grating over sump pit to accommodate H-20 loading</li> <li>• Large grated sump with side drain for overflow</li> <li>• Slope floor to trench drain and sump pit</li> <li>• Structure as needed to support equipment</li> </ul>	<p><b>ELECTRICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Power:                             <ul style="list-style-type: none"> <li>✓ All receptacles and outlets at 3'-6" AFF</li> <li>✓ Provide waterproof duplex receptacles (four minimum) on walls</li> </ul> </li> <li>• Lighting:                             <ul style="list-style-type: none"> <li>✓ Sealed LED water tight lighting fixtures with no external reset device on walls (20 fc average)</li> <li>✓ Fixtures located to illuminate work space and around vehicles</li> </ul> </li> <li>• Communications: Paging/intercom system speakers</li> </ul>
<p><b>CRITICAL DIMENSIONS</b></p> <ul style="list-style-type: none"> <li>• 19'-0" vertical clearance</li> <li>• 20'-0" wide by 75'-0" long</li> </ul>	<p><b>MECHANICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Special ventilation to remove moisture</li> <li>• Water resistant heating system</li> <li>• In-floor radiant heating (if desired)</li> <li>• As required by equipment</li> <li>• Exhaust:                             <ul style="list-style-type: none"> <li>✓ Minimum 10 air changes per hour when wash equipment is activated.</li> <li>✓ Minimum one air change per hour when wash equipment is inactive</li> </ul> </li> <li>• Heating set point: 55 degrees Fahrenheit</li> </ul>	
<p><b>EQUIPMENT/FURNISHINGS</b></p> <ul style="list-style-type: none"> <li>• Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment</li> <li>• No OCS: Wire in position for trolley buses.</li> </ul>		
<p><b>DESIGN FEATURES</b></p> <ul style="list-style-type: none"> <li>• Forklift access</li> <li>• Natural daylighting desired</li> </ul>		

COMMON WORK AREA



COMMON WORK AREA		
<p><b>FUNCTION</b></p> <p>Designated area for common fixed shop equipment which supports all repair bays and associated shop areas.</p>	<p><b>ARCHITECTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Finishes:                             <ul style="list-style-type: none"> <li>✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer</li> <li>✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry</li> <li>✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities, light colored finish</li> </ul> </li> <li>• Doors: None</li> </ul>	<p><b>PLUMBING CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Compressed air drop:                             <ul style="list-style-type: none"> <li>✓ 2'-0" compressed air piping loop (minimum)</li> <li>✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF</li> <li>✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Water: 3/4" water hose bibb with standard hose bibb at 2'-0" AFF</li> <li>• Additional plumbing connections (water, drainage, etc.) as required by equipment</li> </ul>
<p><b>RELATIONSHIP TO OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>• Access from Maintenance Office areas</li> <li>• Adjacent to Repair Bays, Parts Room, and Portable Equipment Storage</li> <li>• Located on first floor</li> </ul>	<p><b>STRUCTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Control joints in floor slab at adequate spacing</li> <li>• Structure as needed to support equipment</li> <li>• Floor slab designed to accommodate in-floor radiant heat (if desired)</li> <li>• Floor slab designed to accommodate forklift access</li> </ul>	<p><b>ELECTRICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Power:                             <ul style="list-style-type: none"> <li>✓ All receptacles and outlets at 3'-6" AFF</li> <li>✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns</li> <li>✓ Dedicated computer receptacle, adjacent to data conduit on wall or column</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Lighting:                             <ul style="list-style-type: none"> <li>✓ LED lighting in accordance with IES recommendation minimum (50 fc average)</li> <li>✓ Fixtures located to illuminate work spaces</li> </ul> </li> <li>• Communications:                             <ul style="list-style-type: none"> <li>✓ Paging/intercom system speakers</li> <li>✓ Data conduit on columns and/or walls</li> </ul> </li> </ul>
<p><b>CRITICAL DIMENSIONS</b></p> <ul style="list-style-type: none"> <li>• 12'-0" to vertical clearance to structure and fixtures</li> </ul>	<p><b>MECHANICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Heating set point: 65 degrees Fahrenheit</li> <li>• General ventilation (per code)</li> <li>• In-floor radiant heat (if desired)</li> <li>• As required by equipment</li> </ul>	
<p><b>EQUIPMENT/FURNISHINGS</b></p> <ul style="list-style-type: none"> <li>• Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment</li> </ul>		
<p><b>DESIGN FEATURES</b></p> <ul style="list-style-type: none"> <li>• Half-height 56" walls on three sides for utilities and to prevent blocking vision of shop from office areas and repair bays</li> <li>• Forklift access</li> <li>• Natural daylighting desired</li> </ul>		

**PORTABLE EQUIPMENT STORAGE**



**FUNCTION**

A dedicated area for storage of portable shop equipment.

**RELATIONSHIP TO OTHER AREAS**

- Access to all Repair Bays and all shop areas

**CRITICAL DIMENSIONS**

- 12'-0" vertical clearance to structure and fixtures

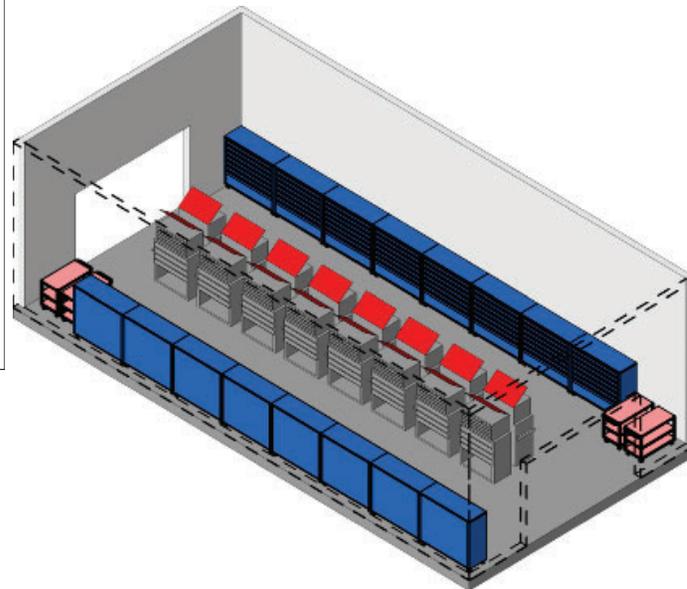
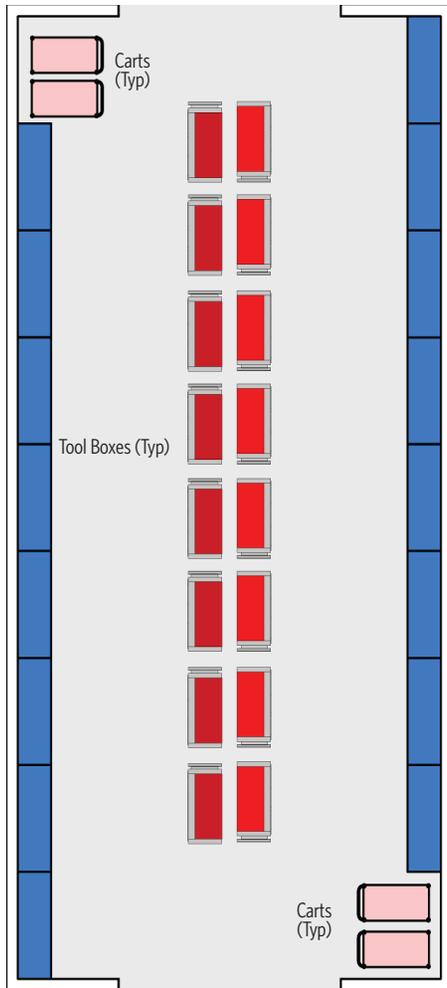
**EQUIPMENT/FURNISHINGS**

- Portable equipment including but not limited to: Service jacks, bottle jacks, jack stands, ladders, diagnostic equipment, used fluid drain pans, battery chargers, work platforms, welders, welding screens, etc.
- Typical equipment is shown, reference Appendix C: Equipment Manual for specific project equipment

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, with light colored finish concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities, light colored finish
- Structural:
  - ✓ Control joints in floor slab at adequate spacing
  - ✓ Floor slab to accommodate in-floor radiant heat (if desired)
  - ✓ Structure as needed to support equipment
  - ✓ Floor slab designed to accommodate forklift access
- Mechanical:
  - ✓ In-floor radiant heat (if desired)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ General ventilation (per code)
  - ✓ As required by equipment
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting:
  - ✓ LED lighting in accordance with IES recommendation minimum (20 fc average)
  - ✓ Fixtures located to illuminate work spaces

**TOOL BOX STORAGE**



**FUNCTION**

Dedicated area for the storage of toolboxes and carts.

**RELATIONSHIP TO OTHER AREAS**

- Access to all repair bays and all shop areas

**CRITICAL DIMENSIONS**

- 12'-0" vertical clearance to structure and fixtures

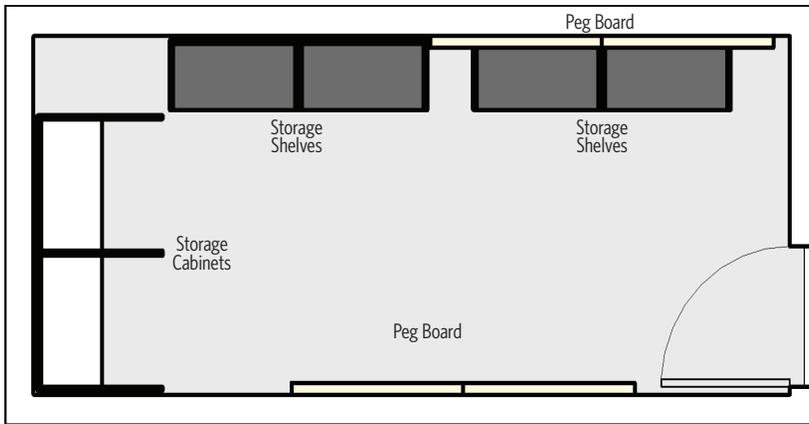
**EQUIPMENT/FURNISHINGS**

- Toolboxes
- Carts
- Anchors to be installed for security toolboxes
- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

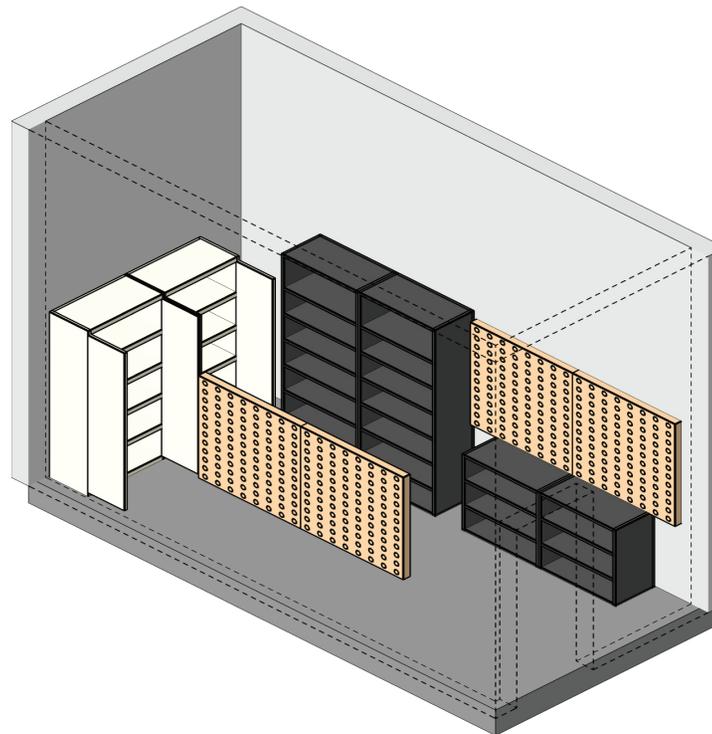
**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities, light colored finish
- Structural:
  - ✓ Control joints in floor slab at adequate spacing
  - ✓ Floor slab to accommodate in-floor radiant heat (if desired)
  - ✓ Structure as needed to support equipment
  - ✓ Floor slab designed to accommodate forklift access
- Mechanical:
  - ✓ In-floor radiant heat (if desired)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ General ventilation (per code)
  - ✓ As required by equipment
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting:
  - ✓ LED lighting in accordance with IES recommendation minimum (20 fc average)
  - ✓ Fixtures located to illuminate work spaces

**TOOL STORAGE**



**GENERIC WALL**



**FUNCTION**

Secure area for storing specialized tools and equipment.

**RELATIONSHIP TO OTHER AREAS**

- Access to Repair Bays and Shops
- Adjacent to Parts Room and Maintenance Offices

**CRITICAL DIMENSIONS**

- 12'-0" vertical clearance to structure and fixtures

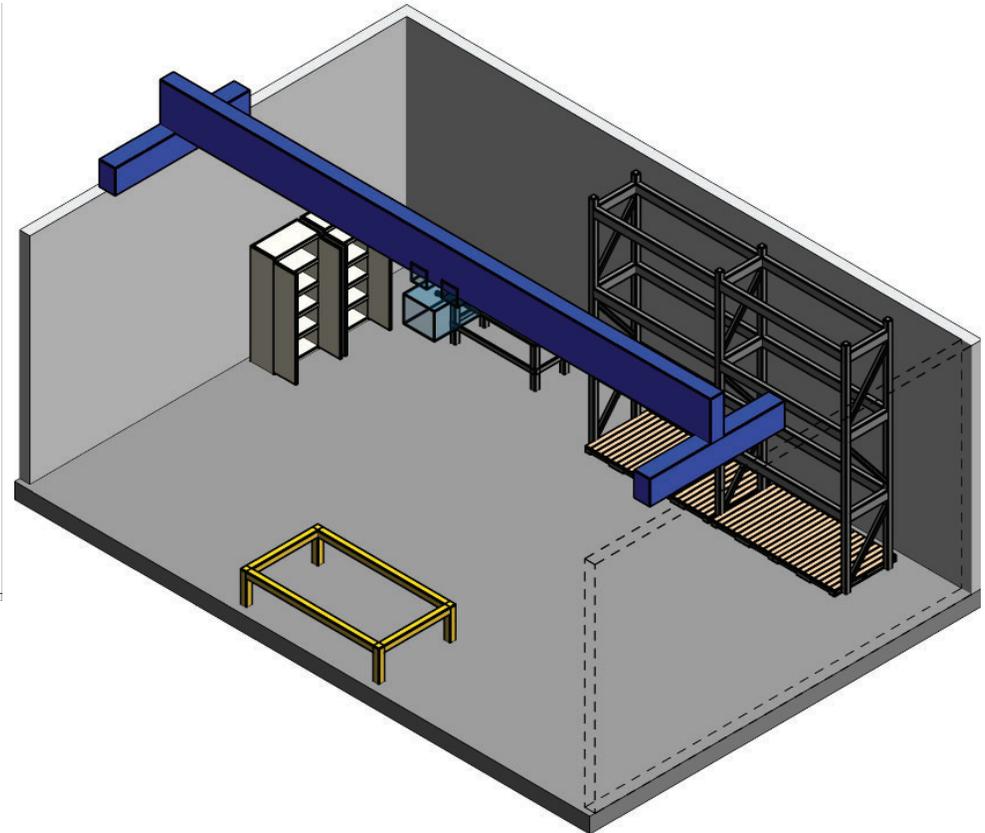
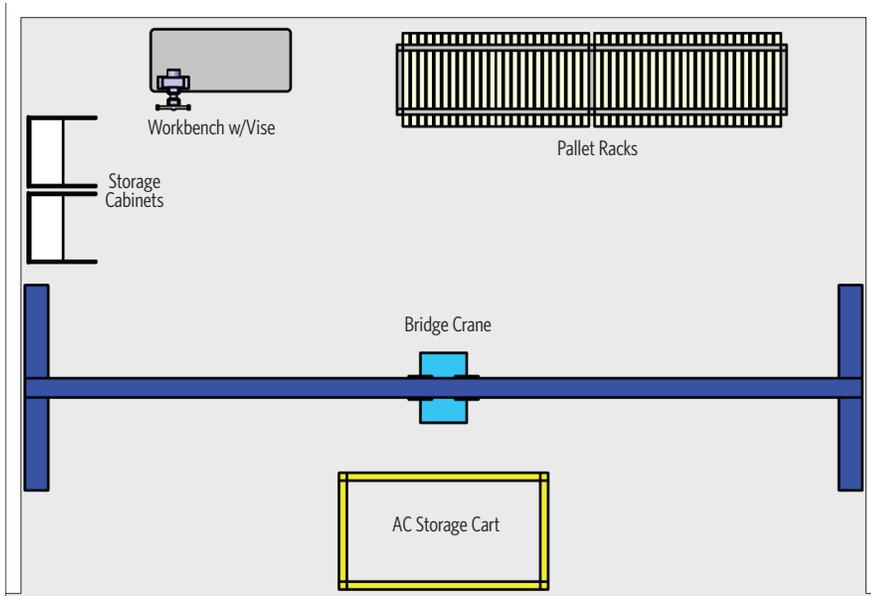
**EQUIPMENT/FURNISHINGS**

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Soil, grease, water, slip resistant concrete, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities, light colored finish
  - ✓ Doors: Personnel door with view panels to meet applicable code exit requirements (not required with wire mesh walls)
- Structural:
  - ✓ Control joints in floor slab at adequate spacing
  - ✓ Floor slab to accommodate in-floor radiant heat (if desired)
  - ✓ Structure as needed to support equipment
  - ✓ Floor slab designed to accommodate forklift access
- Mechanical:
  - ✓ In-floor radiant heat (if desired)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ General ventilation (per code)
  - ✓ As required by equipment
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting: LED lighting in accordance with IES recommendation minimum (20 fc average)

AC SHOP/STORAGE



**AC SHOP/STORAGE**

**FUNCTION**

Designated shop for repair and storage of air conditioning units for trolley and future BEBs.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to 60' Bus Preventive Maintenance

**CRITICAL DIMENSIONS**

- 19'-0" vertical clearance to structure and fixtures

**EQUIPMENT/FURNISHINGS**

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

**DESIGN FEATURES**

- Forklift access
- Physically separated from other areas to prevent migration of noise, dirt and fumes, if possible
- Natural daylighting desired

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)
- Floor slab designed to accommodate forklift access

**MECHANICAL CONSIDERATIONS**

- In-floor radiant heat (if desired)
- Heating set point: 65 degrees Fahrenheit
- General ventilation (per code)
- As required by equipment

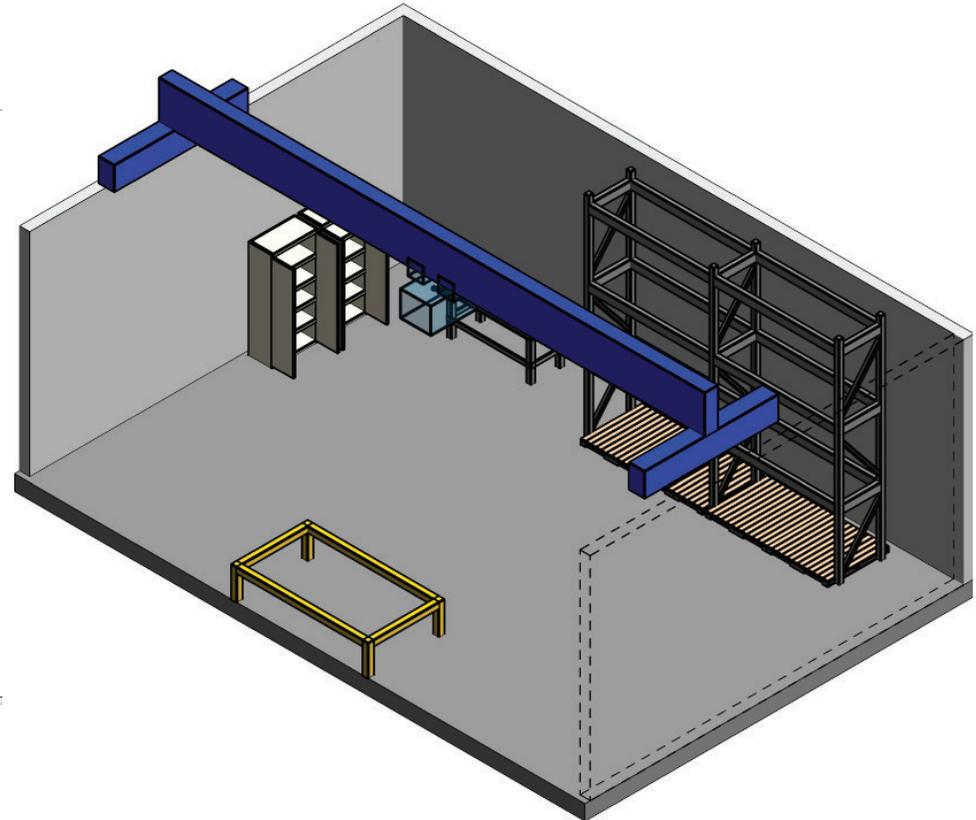
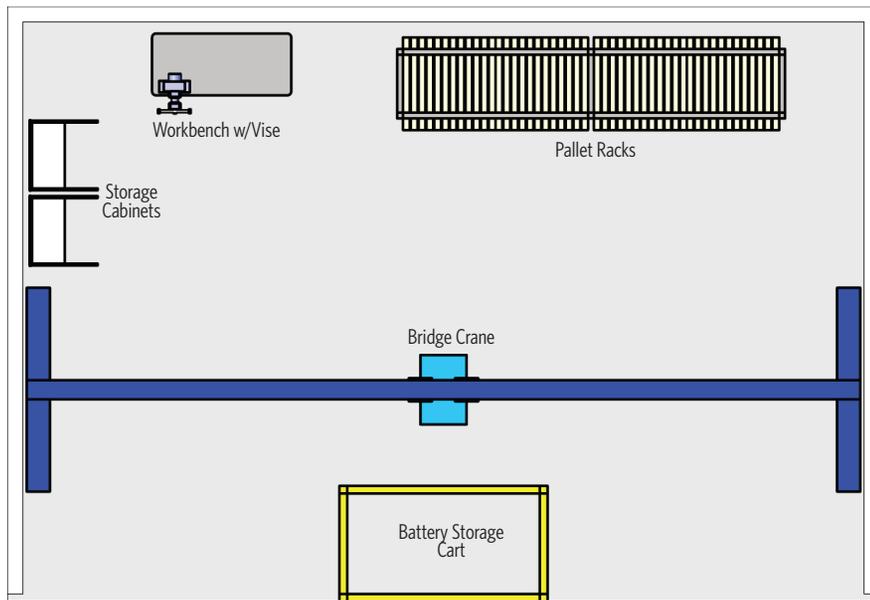
**PLUMBING CONSIDERATIONS**

- Compressed air drop:
  - ✓ 2'-0" compressed air piping loop (minimum)
  - ✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - ✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design
  - ✓ As required by equipment
- Water: 3/4" water hose bibb with standard hose bibb at 2'-0" AFF
- As required by equipment

**ELECTRICAL CONSIDERATIONS**

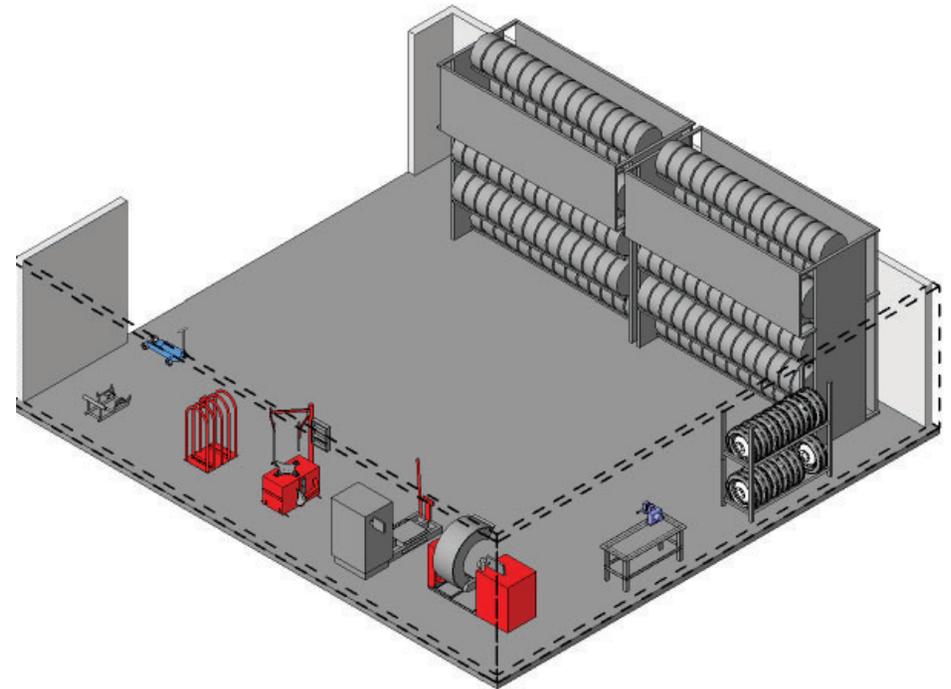
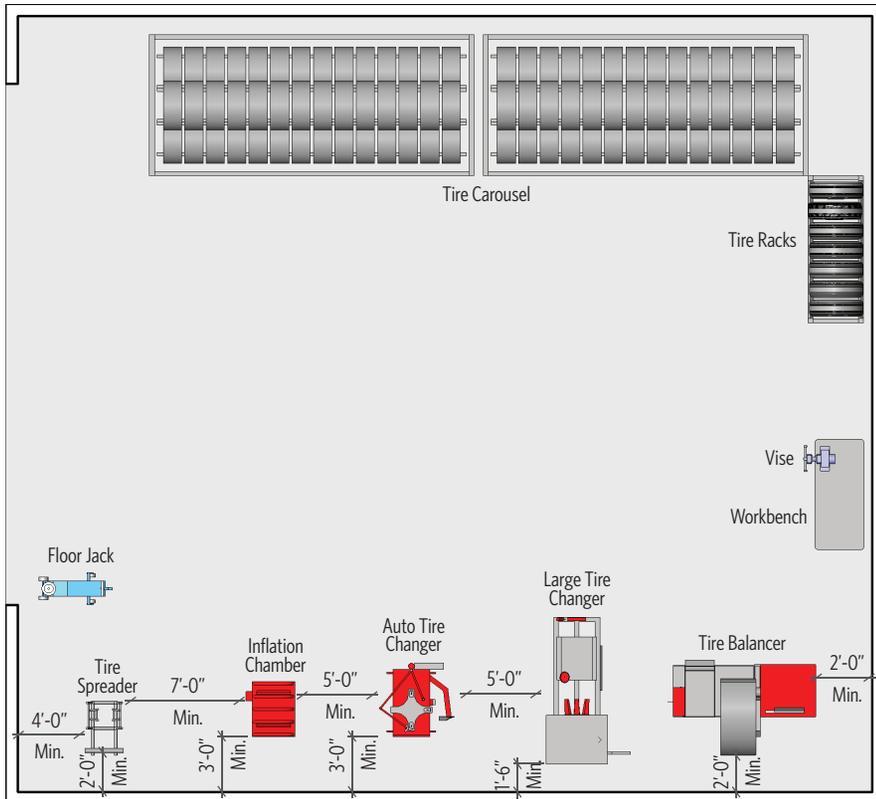
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (four minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting:
  - ✓ LED lighting in accordance with IES recommendation minimum (50 fc average)
  - ✓ Fixtures located to illuminate work spaces and around the vehicles
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns and/or walls

BATTERY REBUILD SHOP



BATTERY REBUILD SHOP		
<p><b>FUNCTION</b></p> <p>Designated shop for the repair and storage of batteries for trolley and future BEBs.</p>	<p><b>ARCHITECTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Finishes:                             <ul style="list-style-type: none"> <li>✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer</li> <li>✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry</li> <li>✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish</li> </ul> </li> </ul>	<p><b>PLUMBING CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Compressed air drop:                             <ul style="list-style-type: none"> <li>✓ 2'-0" compressed air piping loop (minimum)</li> <li>✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF</li> <li>✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Water: 3/4" water hose bibb with standard hose bibb at 2'-0" AFF</li> <li>• As required by equipment</li> </ul>
<p><b>RELATIONSHIP TO OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>• Adjacent to 60' Bus Preventive Maintenance</li> </ul>	<p><b>STRUCTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Control joints in floor slab at adequate spacing</li> <li>• Structure as needed to support equipment</li> <li>• Floor slab designed to accommodate in-floor radiant heat (if desired)</li> <li>• Floor slab designed to accommodate forklift access</li> </ul>	<p><b>ELECTRICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Power:                             <ul style="list-style-type: none"> <li>✓ All receptacles and outlets at 3'-6" AFF</li> <li>✓ Provide general purpose duplex receptacles (four minimum) on walls and columns</li> <li>✓ Dedicated computer receptacle, adjacent to data conduit on wall or column</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Lighting:                             <ul style="list-style-type: none"> <li>✓ LED lighting in accordance with IES recommendation minimum (50 fc average)</li> <li>✓ Fixtures located to illuminate work spaces and around the vehicles</li> </ul> </li> <li>• Communications:                             <ul style="list-style-type: none"> <li>✓ Paging/intercom system speakers</li> <li>✓ Data conduit on columns and/or walls</li> </ul> </li> </ul>
<p><b>CRITICAL DIMENSIONS</b></p> <ul style="list-style-type: none"> <li>• 19'-0" vertical clearance to structure and fixtures</li> </ul>	<p><b>MECHANICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• In-floor radiant heat (if desired)</li> <li>• Heating set point: 65 degrees Fahrenheit</li> <li>• General ventilation (per code)</li> <li>• As required by equipment</li> </ul>	
<p><b>EQUIPMENT/FURNISHINGS</b></p> <ul style="list-style-type: none"> <li>• Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment</li> </ul>		
<p><b>DESIGN FEATURES</b></p> <ul style="list-style-type: none"> <li>• Forklift access</li> <li>• Physically separated from other areas to prevent migration of noise, dirt and fumes, if possible</li> <li>• Natural daylighting desired</li> </ul>		

TIRE SHOP/STORAGE



**TIRE SHOP/STORAGE**

**FUNCTION**

Repair, changing, balancing, and storage of tires.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to 60 Foot Bus Tire Bay
- Access to Common Work Area and Parts Storage

**CRITICAL DIMENSIONS**

- 19'-0" vertical clearance to structure and fixtures

**EQUIPMENT/FURNISHINGS**

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

**DESIGN FEATURES**

- Forklift access
- Access to exterior for delivery of tires
- Physically separated with full height walls from other areas to prevent migration of noise, dirt, and fumes
- Natural daylighting desired

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities, light colored finish

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed for equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)
- Floor slab designed to accommodate forklift access

**MECHANICAL CONSIDERATIONS**

- In-floor radiant heat (if desired)
- Heating set point: 65 degrees Fahrenheit
- General ventilation (per code)
- As required by equipment

**PLUMBING CONSIDERATIONS**

- Compressed air:
  - ✓ 2'-0" compressed air piping loop (minimum)
  - ✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, and quick disconnects on 4'-0" AFF
  - ✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design
  - ✓ As required by equipment
- As required by equipment

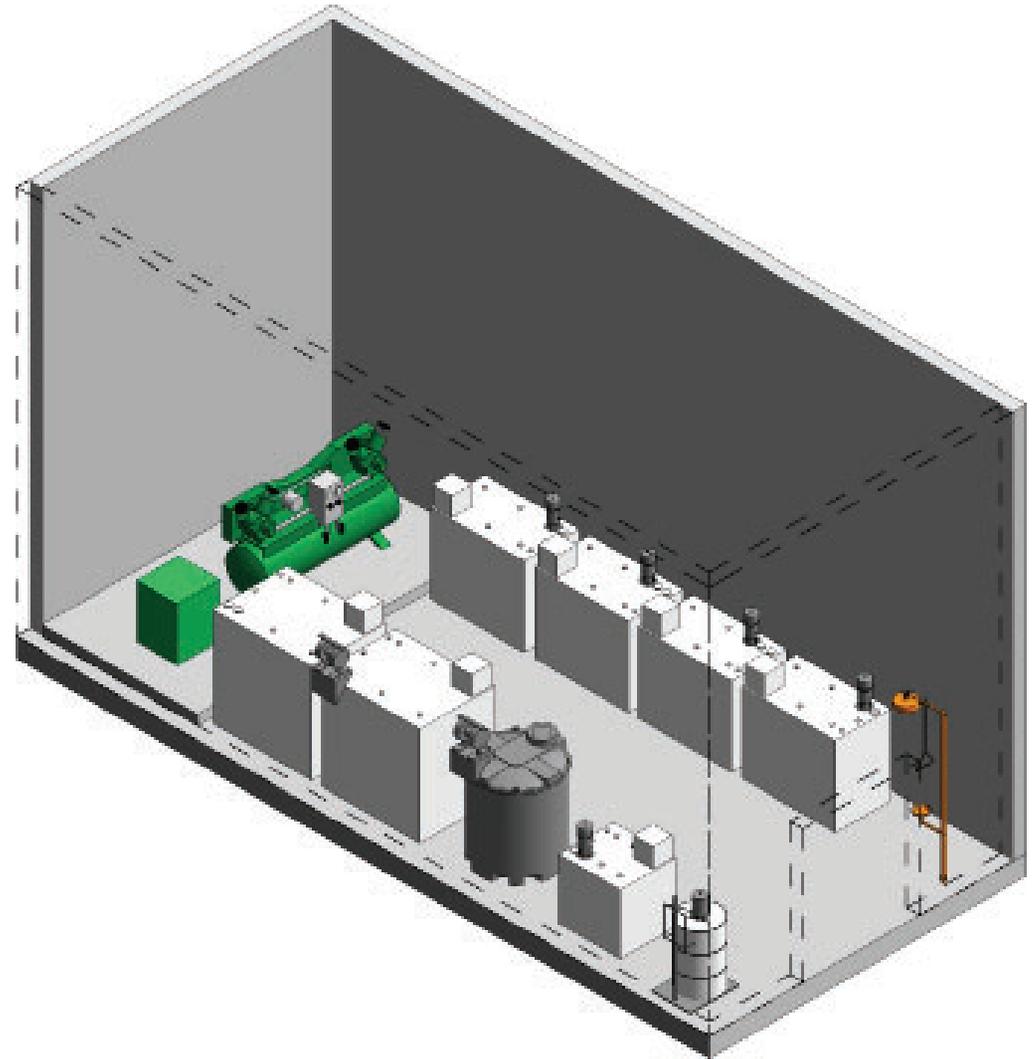
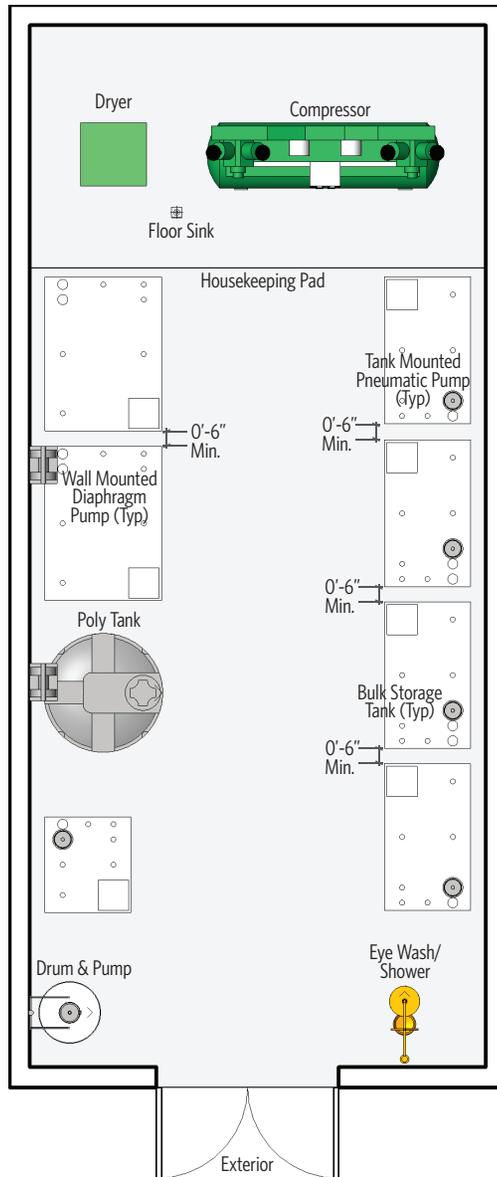
**ELECTRICAL CONSIDERATIONS**

- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (five minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting:
  - ✓ LED lighting in accordance with IES recommendation minimum in Storage Area (15 fc average) and Shop Area (25 fc average)
  - ✓ Fixtures located to illuminate work spaces and around the vehicles
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns and/or walls

**FIRE SUPPRESSION CONSIDERATIONS**

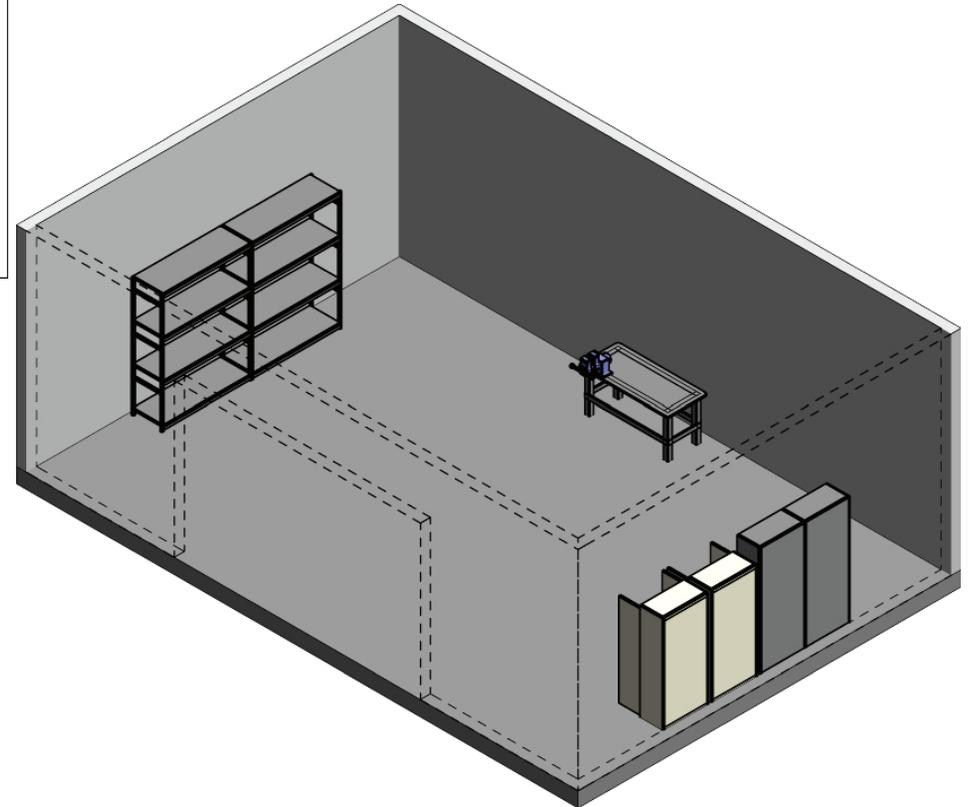
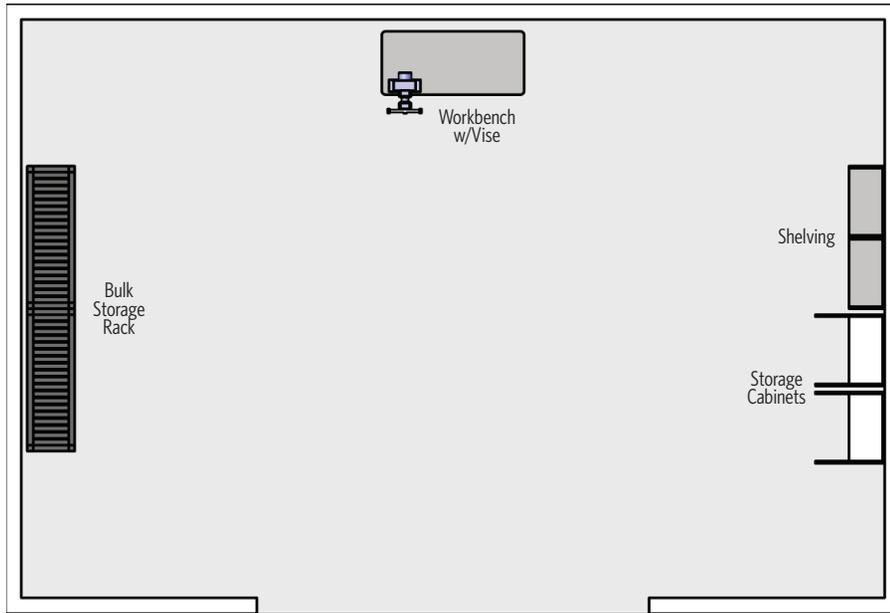
The fire protection and pyrotechnics experts on the detailed design team will be responsible for devising a robust fire protection system for the tire bay and tire shop/storage areas that minimizes risk to the Yard and any joint development above. Review and recommendations by these experts will include, but not be limited to, the location, ventilation, and fire suppression systems for Potrero Yard's tire facilities.

LUBE/COMPRESSOR ROOM



LUBE/COMPRESSOR ROOM		
<p><b>FUNCTION</b></p> <p>Enclosed room for storage and central distribution of lubricants. Space shall include a compressor(s) and refrigerated air dryer(s).</p>	<p><b>ARCHITECTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Finishes:                             <ul style="list-style-type: none"> <li>✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer</li> <li>✓ Walls: Soil and grease resistant, with light colored finish sound absorption material</li> <li>✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities, with light colored finish, and sound absorption material</li> </ul> </li> <li>• Doors:                             <ul style="list-style-type: none"> <li>✓ Personnel door with view panel to meet applicable code exit requirements</li> <li>✓ Double 6'-0" wide door with interior exit device</li> <li>✓ No thresholds</li> </ul> </li> <li>• Acoustics: Determine based on equipment and location of adjacent spaces</li> </ul>	<p><b>PLUMBING CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Compressed air:                             <ul style="list-style-type: none"> <li>✓ Duplex air compressor, air dryer, and air receiver</li> <li>✓ Floor sink between air compressor and dryer. Plumb to central sediment and oil interceptor</li> <li>✓ 2'-0" compressed air piping loop (minimum) started in the Lube/Compressor Room</li> <li>✓ Compressed air line with 3/8" and 1/2" shut-off valve, separator, regulator with gauge, lubricator, and quick disconnect on wall at 4'-0" AFF</li> <li>✓ Connect to lubricant pumps</li> </ul> </li> <li>• Tank mount all piston lubricant pump(s)</li> <li>• Wall mount all diaphragm pump(s)</li> <li>• CG pump mounted to an air operated hoist (if required)</li> <li>• Plumb tanks to corresponding lube reel banks located in the Repair Bays</li> <li>• Plumb UC tanks to corresponding pumps located in the Repair Bays (if required)</li> <li>• 3/4" water hose bibb with standard faucet 2'-0" AFF</li> <li>• Emergency eyewash</li> </ul>
<p><b>RELATIONSHIP TO OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>• Access to exterior for deliveries</li> </ul>	<p><b>STRUCTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Control joints in floor slab at adequate spacing</li> <li>• 0'-6" housekeeping pad for both the air compressor and refrigerated air dryer</li> <li>• Structure as needed to support equipment</li> <li>• Containment pit for 110 percent of largest tank (per local code)</li> </ul>	<p><b>ELECTRICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Power:                             <ul style="list-style-type: none"> <li>✓ All receptacles and outlets at 3'-6" AFF</li> <li>✓ Provide general purpose duplex receptacles (four minimum) on walls</li> <li>✓ Lube/compressor: 25 fc average</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Lighting:                             <ul style="list-style-type: none"> <li>✓ LED lighting in accordance with IES recommendation minimum (25 fc average)</li> <li>✓ Fixtures located to illuminate work spaces</li> </ul> </li> </ul>
<p><b>CRITICAL DIMENSIONS</b></p> <ul style="list-style-type: none"> <li>• 12'-0" vertical clearance to structure and fixtures</li> </ul>	<p><b>MECHANICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Heating set point: 55 degrees Fahrenheit</li> <li>• Exhaust: Minimum 1.0 CFM per square foot</li> <li>• Negative pressurization</li> <li>• As required by equipment</li> </ul>	
<p><b>EQUIPMENT/FURNISHINGS</b></p> <ul style="list-style-type: none"> <li>• Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment</li> </ul>		
<p><b>DESIGN FEATURES</b></p> <ul style="list-style-type: none"> <li>• Exterior access for deliveries</li> <li>• Acoustically and physically separated from other areas to prevent migration of noise, dirt, and fumes</li> </ul>		

MINOR BODY SHOP



**MINOR BODY SHOP**

**FUNCTION**

Designated shop for minor body repair or replacement and storage.

**RELATIONSHIP TO OTHER AREAS**

- Open to Minor Body Bay

**CRITICAL DIMENSIONS**

- 12'-0" vertical clearance to structure and fixtures

**EQUIPMENT/FURNISHINGS**

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

**DESIGN FEATURES**

- Forklift access
- Physically separated from other areas to prevent migration of noise, dirt and fumes, if possible
- Natural daylighting desired

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)
- Floor slab designed to accommodate forklift access

**MECHANICAL CONSIDERATIONS**

- In-floor radiant heat (if desired)
- Heating set point: 65 degrees Fahrenheit
- General ventilation (per code)
- Exhaust and makeup air for dust collection system
- As required by equipment

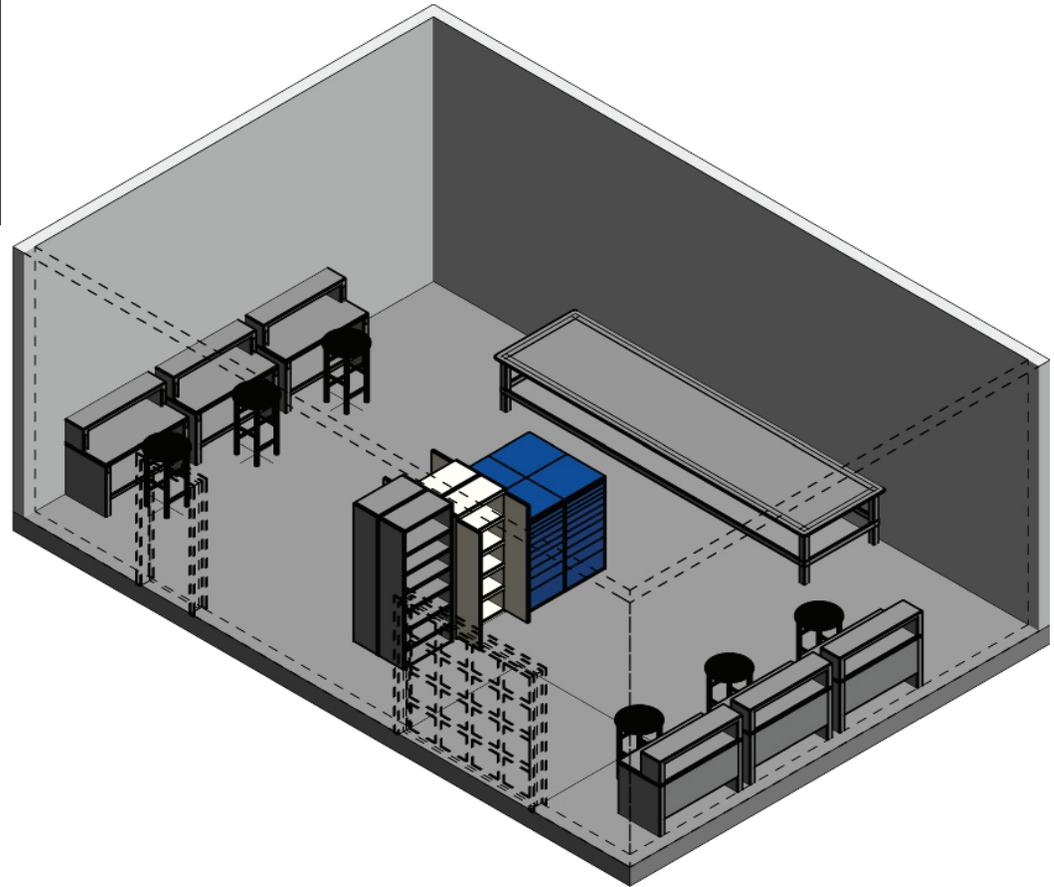
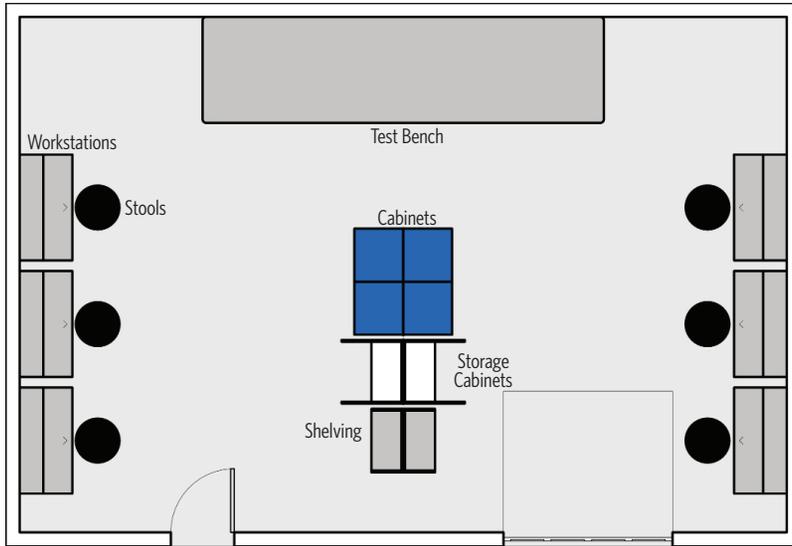
**PLUMBING CONSIDERATIONS**

- Compressed air drop:
  - ✓ 2'-0" compressed air piping loop (minimum)
  - ✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - ✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design
  - ✓ As required by equipment
- Water: 3/4" water hose bibb with standard hose bibb at 2'-0" AFF
- As required by equipment

**ELECTRICAL CONSIDERATIONS**

- Lighting:
  - ✓ LED lighting in accordance with IES recommendation minimum (50 fc average)
  - ✓ Fixtures located to illuminate work spaces and around the vehicles
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (four minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns and/or walls

ELECTRONIC BENCH SHOP



ELECTRONIC BENCH SHOP		
<p><b>FUNCTION</b></p> <p>Enclosed area for repairing and modifying trolleys and future BEBs electronic and computer control systems. Radio equipment, electrical signage, and other electrical equipment is installed and maintained in this space.</p>	<p><b>ARCHITECTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Finishes:                             <ul style="list-style-type: none"> <li>✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer</li> <li>✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry</li> <li>✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities, light colored finish</li> </ul> </li> <li>• Doors:                             <ul style="list-style-type: none"> <li>✓ Personnel doors with view panels to meet applicable code exit requirements</li> <li>✓ Overhead door (if desired): High-lifting sectional, steel, insulated, 10'-0" by 10'-0" with view panels, automatic operator, interior and exterior push button controls</li> </ul> </li> </ul>	<p><b>PLUMBING CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Compressed air drop:                             <ul style="list-style-type: none"> <li>✓ 2'-0" compressed air piping loop (minimum)</li> <li>✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, and quick disconnects on 4'-0" AFF</li> <li>✓ Provide disconnects for 3/8" impact tools at locations to be determined during detailed design</li> <li>✓ As required by equipment</li> </ul> </li> <li>• As required by equipment</li> </ul>
<p><b>RELATIONSHIP TO OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>• Adjacent to Electronic Shop Workstations</li> </ul>		
<p><b>CRITICAL DIMENSIONS</b></p> <ul style="list-style-type: none"> <li>• 12'-0" vertical clearance to structure and fixtures</li> </ul>		
<p><b>EQUIPMENT/FURNISHINGS</b></p> <ul style="list-style-type: none"> <li>• Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment</li> </ul>	<p><b>STRUCTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Control joints in floor slab at adequate spacing</li> <li>• Structure as needed to support equipment</li> <li>• Floor slab designed to accommodate in-floor radiant heat (if desired)</li> </ul>	<p><b>ELECTRICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Power:                             <ul style="list-style-type: none"> <li>✓ All receptacles and outlets at 3'-6" AFF</li> <li>✓ Provide general purpose duplex receptacles (four minimum) on walls and columns</li> <li>✓ Dedicated computer receptacle, adjacent to data conduit on wall or column</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Lighting:                             <ul style="list-style-type: none"> <li>✓ LED lighting in accordance with IES recommendation minimum (50 fc average)</li> <li>✓ Fixtures located to illuminate work spaces</li> </ul> </li> <li>• Communications:                             <ul style="list-style-type: none"> <li>✓ Paging/intercom system speakers</li> <li>✓ Data conduit on columns and/or walls</li> </ul> </li> </ul>
<p><b>DESIGN FEATURES</b></p> <ul style="list-style-type: none"> <li>• Dust proof required for electrical components</li> </ul>	<p><b>MECHANICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• In-floor radiant heat (if desired)</li> <li>• Cooling set point: 74 degrees Fahrenheit</li> <li>• Heating set point: 65 degrees Fahrenheit</li> <li>• General ventilation (per code)</li> <li>• As required by equipment</li> <li>• Relative humidity: 50-35 percent</li> </ul>	



SECTION 5.4: FARE BOX AND  
CLIPPER CARD READER  
REPAIR SHOP



GENERAL OFFICE MODULES: OFFICE AREAS

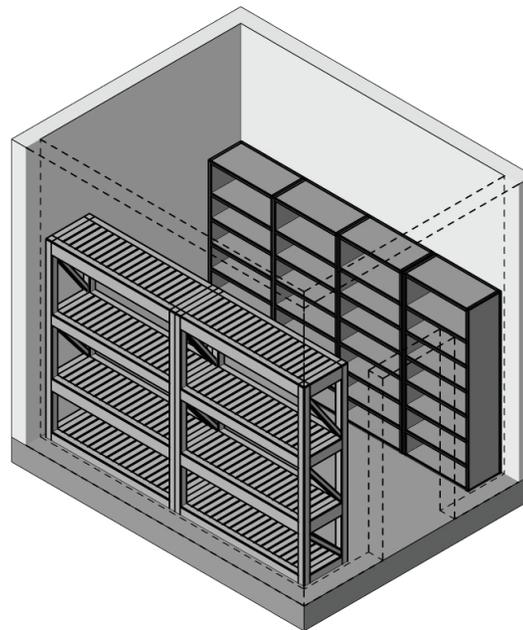
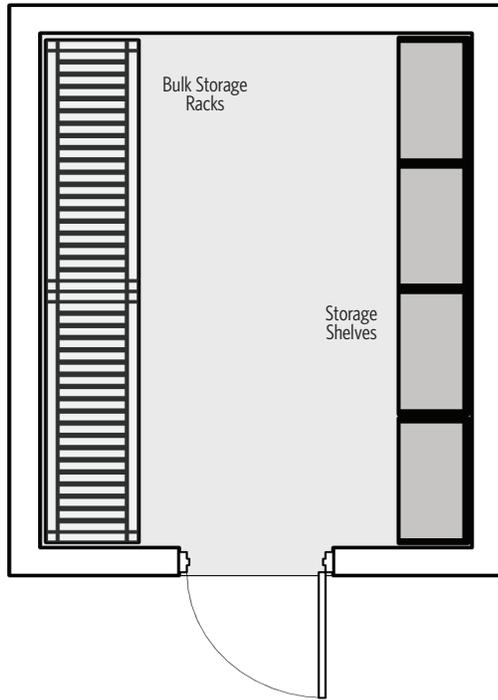
MANAGER

- Reference **Office Module Private Office- 120 sf**
- Adjacent to Fare Box Staff

FARE BOX STAFF

- Reference **Office Module Workstation- 64 sf**
- Adjacent to Manager
- Adjacent to Shop, Storage, and Parts Storage

**INCOMING AND OUTGOING DEVICE STORAGE**



**FUNCTION**

Storage of the fare box and clipper card readers when needing repair and repair is completed.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to Fare Box Staff

**CRITICAL DIMENSIONS**

- 12'-0" vertical clearance to structure and fixtures

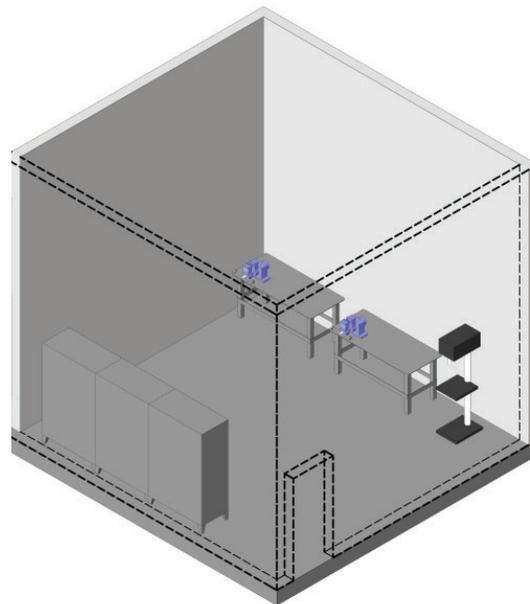
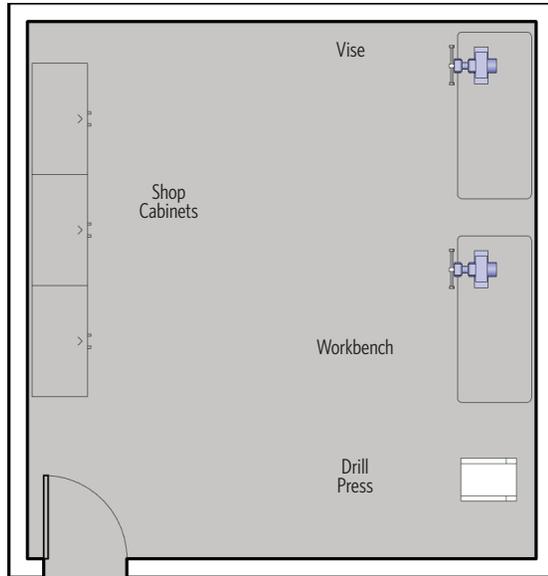
**EQUIPMENT/FURNISHINGS**

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Soil, grease, water, slip resistant concrete, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities, light colored finish
  - ✓ Doors: Personnel door with view panels to meet applicable code exit requirements (not required with wire mesh walls)
- Structural:
  - ✓ Control joints in floor slab at adequate spacing
  - ✓ Floor slab to accommodate in-floor radiant heat (if desired)
  - ✓ Structure as needed to support equipment
  - ✓ Floor slab designed to accommodate forklift access
- Mechanical:
  - ✓ In-floor radiant heat (if desired)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ General ventilation (per code)
  - ✓ As required by equipment
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting: LED lighting in accordance with IES recommendation minimum (20 fc average)

SHOP



FUNCTION

Designated shop for repair of fare boxes and clipper readers.

RELATIONSHIP TO OTHER AREAS

- Adjacent to Fare Box Staff, Storage, and Parts Storage

CRITICAL DIMENSIONS

- 12'-0" vertical clearance to structure and fixtures

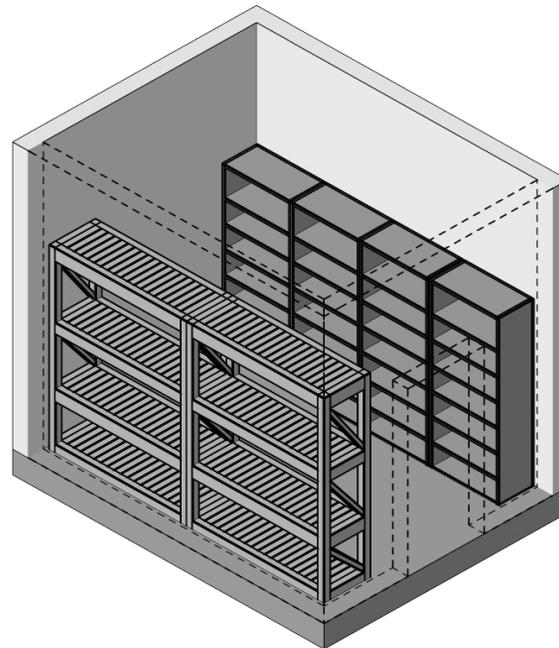
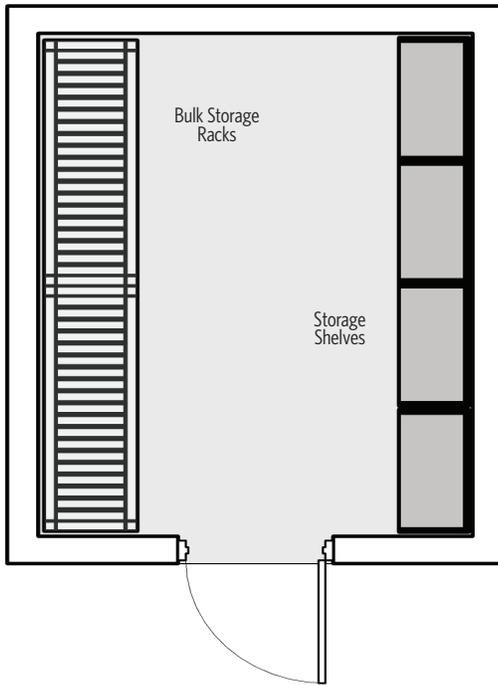
EQUIPMENT/FURNISHINGS

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Soil, grease, water, slip resistant concrete, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities, light colored finish
  - ✓ Doors: Personnel door with view panels to meet applicable code exit requirements (not required with wire mesh walls)
- Structural:
  - ✓ Control joints in floor slab at adequate spacing
  - ✓ Floor slab to accommodate in-floor radiant heat (if desired)
  - ✓ Structure as needed to support equipment
  - ✓ Floor slab designed to accommodate forklift access
- Mechanical:
  - ✓ In-floor radiant heat (if desired)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ General ventilation (per code)
  - ✓ As required by equipment
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting: LED lighting in accordance with IES recommendation minimum (20 fc average)

**STORAGE**



**FUNCTION**

Dedicated secure storage for fare box and clipper reader supplies.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to Shop and Parts Storage

**CRITICAL DIMENSIONS**

- 12'-0" vertical clearance to structure and fixtures

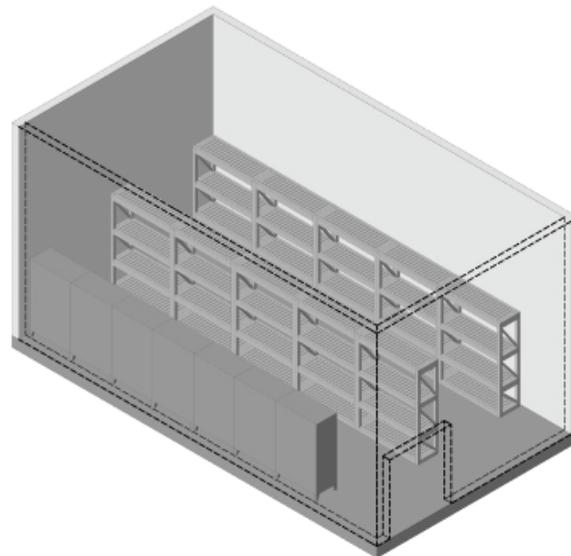
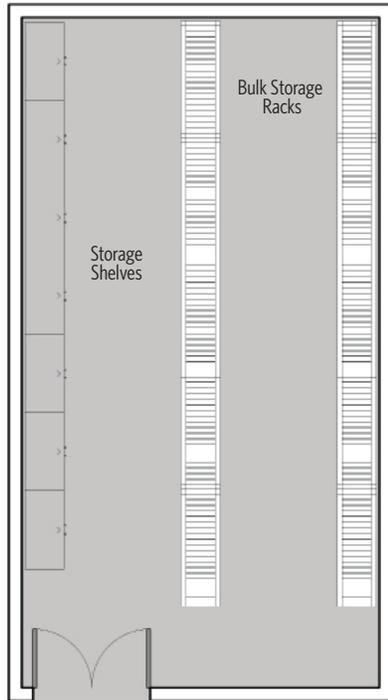
**EQUIPMENT/FURNISHINGS**

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Soil, grease, water, slip resistant concrete, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities, light colored finish
  - ✓ Doors: Personnel door with view panels to meet applicable code exit requirements (not required with wire mesh walls)
- Structural:
  - ✓ Control joints in floor slab at adequate spacing
  - ✓ Floor slab to accommodate in-floor radiant heat (if desired)
  - ✓ Structure as needed to support equipment
  - ✓ Floor slab designed to accommodate forklift access
- Mechanical:
  - ✓ In-floor radiant heat (if desired)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ General ventilation (per code)
  - ✓ As required by equipment
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting: LED lighting in accordance with IES recommendation minimum (20 fc average)

**PARTS STORAGE**



**FUNCTION**

Dedicated storage for fare box and clipper reader components.

**RELATIONSHIP TO OTHER AREAS**

- N/A

**CRITICAL DIMENSIONS**

- 12'-0" vertical clearance to structure and fixtures

**EQUIPMENT/FURNISHINGS**

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Soil, grease, water, slip resistant concrete, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities, light colored finish
  - ✓ Doors: Personnel door with view panels to meet applicable code exit requirements (not required with wire mesh walls)
- Structural:
  - ✓ Control joints in floor slab at adequate spacing
  - ✓ Floor slab to accommodate in-floor radiant heat (if desired)
  - ✓ Structure as needed to support equipment
  - ✓ Floor slab designed to accommodate forklift access
- Mechanical:
  - ✓ In-floor radiant heat (if desired)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ General ventilation (per code)
  - ✓ As required by equipment
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting: LED lighting in accordance with IES recommendation minimum (20 fc average)



# SECTION 5.5: SERVICE AND CLEAN

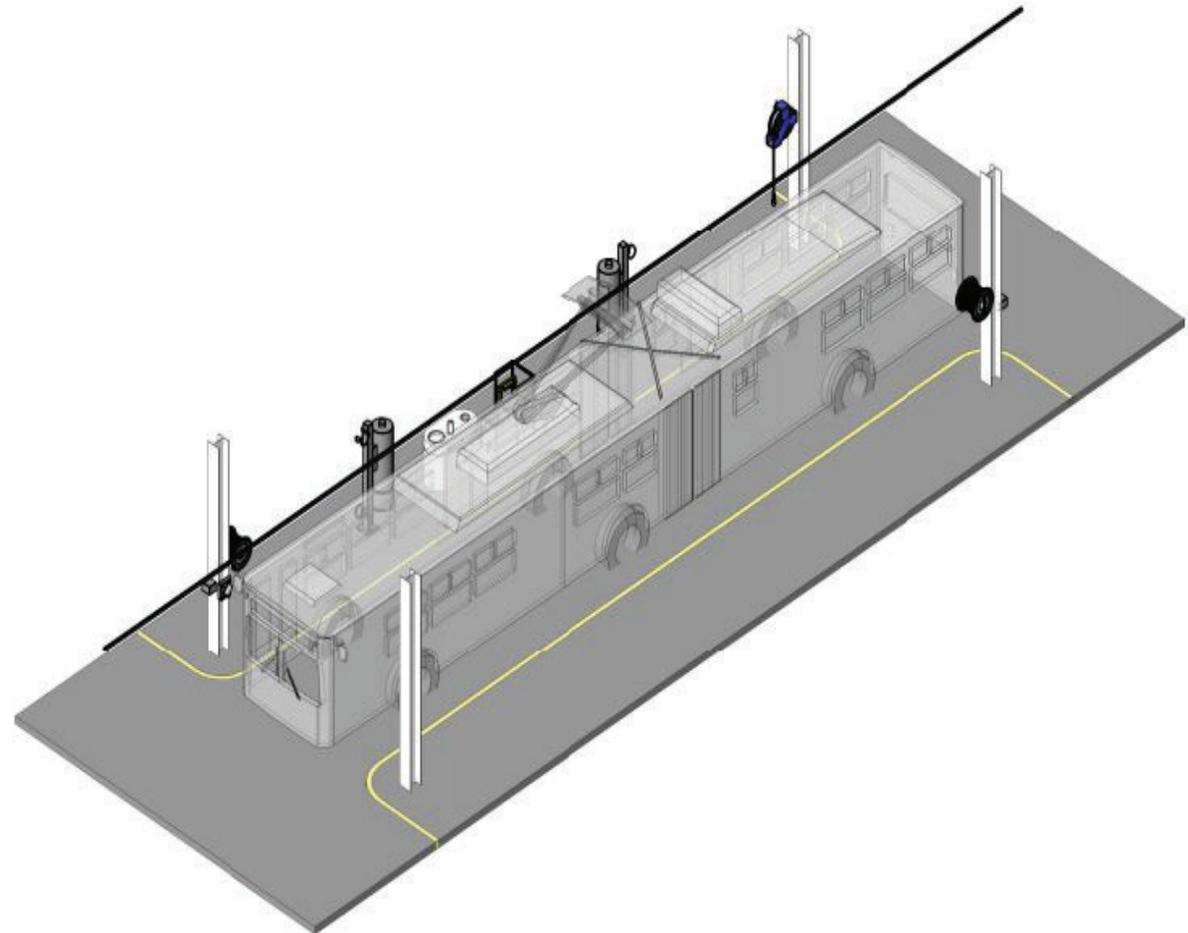
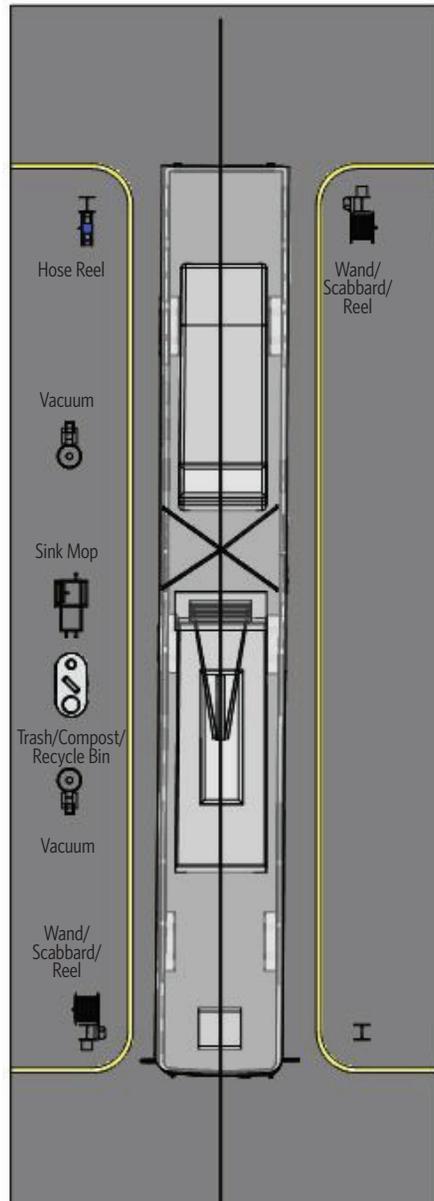


GENERAL OFFICE MODULE: OFFICE AREAS

SERVICE SUPERVISOR OFFICE

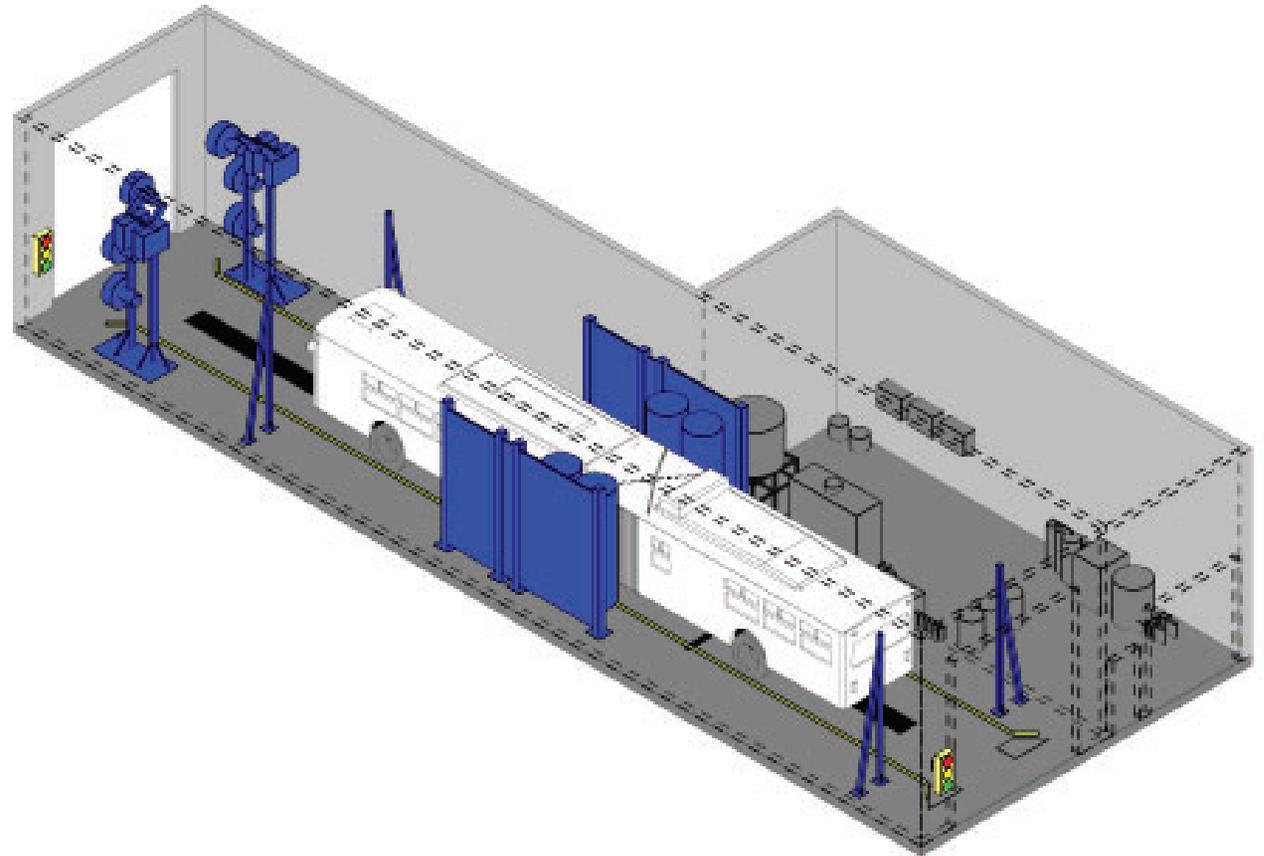
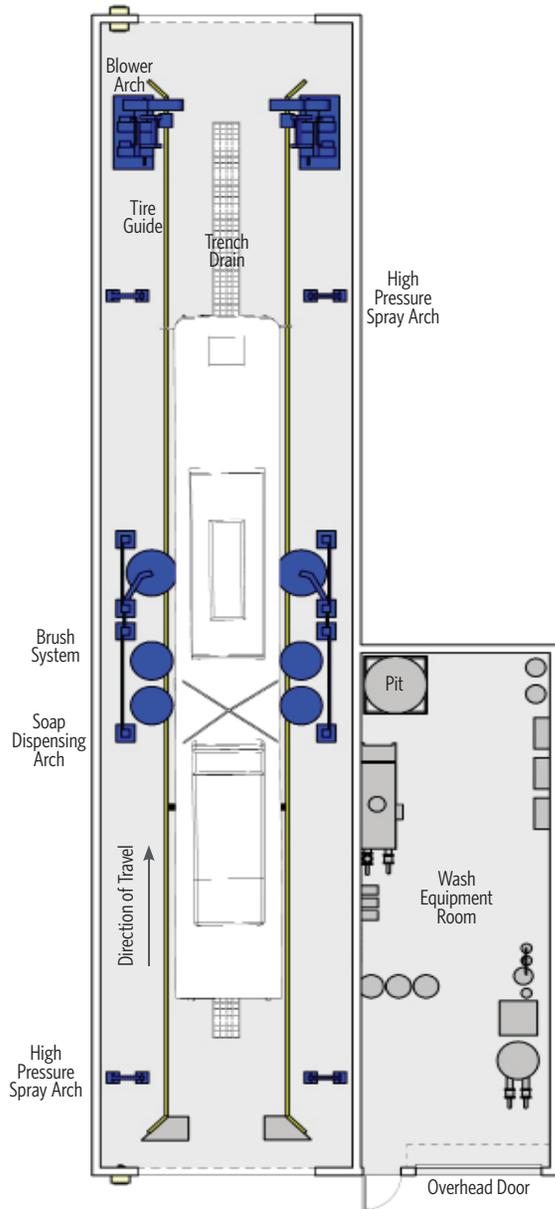
- Reference **Office Module Shared Office**
- Adjacent to Service Position and Bus Washer

SERVICE POSITION



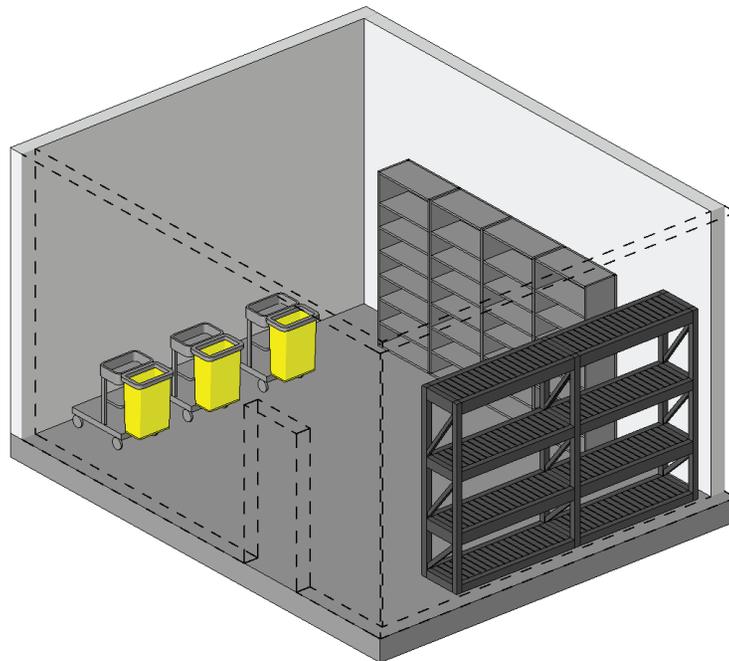
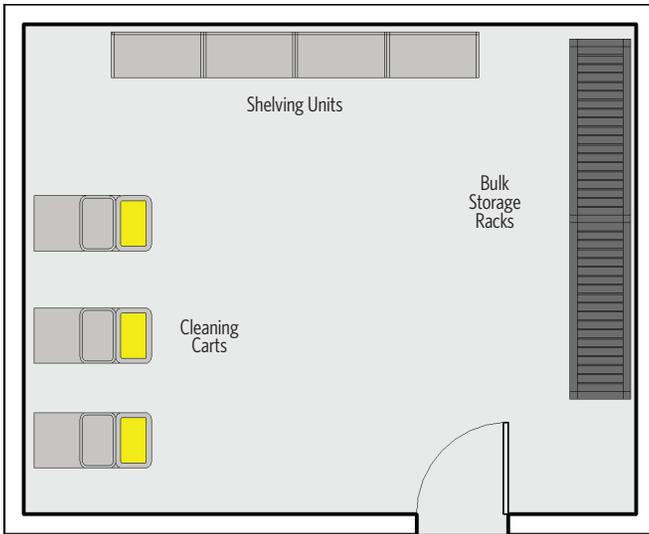
SERVICE POSITION		
<p><b>FUNCTION</b></p> <p>Dedicated bay used for nightly servicing, fluid level checks, and tire pressure checks. The space also serves as detail bay cleaning position (when needed).</p>	<p><b>ARCHITECTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Finishes                             <ul style="list-style-type: none"> <li>✓ Floor: Soil, grease, water, slip resistant concrete, and chemical bonded concrete sealer</li> <li>✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry</li> <li>✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities, light colored finish</li> </ul> </li> <li>• Doors: None</li> </ul>	<p><b>PLUMBING CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• 3/4" hot water hose bib with standard faucet, 2'-0" AFF (one per mop sink)</li> <li>• As required by equipment</li> </ul>
<p><b>RELATIONSHIP TO OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>• Adjacent to Cleaning Equipment Storage</li> </ul>	<p><b>STRUCTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Control joints in floor slab at adequate spacing</li> <li>• Structure as needed to support equipment</li> </ul>	<p><b>ELECTRICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Power:                             <ul style="list-style-type: none"> <li>✓ All receptacles and outlets mounted at 3'-6" AFF and water protected</li> <li>✓ Provide general purpose duplex receptacles (four minimum) on walls, columns, and between overhead doors</li> <li>✓ Dedicated computer receptacle, adjacent to data conduit on column adjacent to workbench</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Lighting:                             <ul style="list-style-type: none"> <li>✓ LED lighting in accordance with IES recommendation minimum (20 fc average)</li> <li>✓ Fixtures located to illuminate work spaces and around the vehicles</li> </ul> </li> <li>• Communications:                             <ul style="list-style-type: none"> <li>✓ Paging/intercom system speakers</li> <li>✓ Data conduit on columns at each lane/fuel position</li> </ul> </li> </ul>
<p><b>CRITICAL DIMENSIONS</b></p> <ul style="list-style-type: none"> <li>• 16'-0" vertical clearance</li> <li>• 20'-0" wide by 70'-0" long</li> <li>• 8'-0" island</li> <li>• 12'-0" lane</li> </ul>	<p><b>MECHANICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• As required by equipment</li> <li>• 1.0 CFM per square foot continuous exhaust in accordance with NFPA 30A</li> <li>• Heating set point: 65 degrees Fahrenheit</li> <li>• In-floor radiant heat (if desired)</li> </ul>	
<p><b>EQUIPMENT/FURNISHINGS</b></p> <ul style="list-style-type: none"> <li>• Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment</li> <li>• Wand</li> <li>• Scabbard</li> <li>• Trash/Compost/Recycle bin</li> <li>• OCS overhead</li> <li>• Electric charging: Reference E-Bus Performance Requirements. This E-Bus Performance Requirements Document supersedes anything in this document.</li> </ul>		
<p><b>DESIGN FEATURES</b></p> <ul style="list-style-type: none"> <li>• Natural daylighting desired</li> </ul>		

BUS WASHER/WATER RECLAMATION



BUS WASHER/WATER RECLAMATION		
<p><b>FUNCTION</b></p> <p>Dedicated area for automatic washing of sides, top, front, back, and under carriage of the trolleys, motors coaches, and future BEBs.</p>	<p><b>ARCHITECTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Finishes:                             <ul style="list-style-type: none"> <li>✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer</li> <li>✓ Walls: Soil and grease resistant, cast-in-place concrete or CMU block, light colored finish, with polyurea coating treatment for wet and moisture protection</li> <li>✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish</li> </ul> </li> <li>• Doors:                             <ul style="list-style-type: none"> <li>✓ Personnel doors with view panels to meet applicable code exit requirements (Equipment Room)</li> <li>✓ Equipment Room overhead door, 10'-0" by 12'-0"</li> </ul> </li> <li>• Bollards on exterior jambs of overhead door (two each)</li> </ul>	<p><b>PLUMBING CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Trench drains:                             <ul style="list-style-type: none"> <li>✓ Integrated trench drain sump pit with removable covers to central sediment and oil interceptor</li> <li>✓ Trench drain with removable cover at overhead door, with sediment basket upstream of trap.</li> <li>✓ Wash Equipment Room: sump with removable covers at an overflow to sediment and oil interceptor</li> </ul> </li> <li>• Water and compressed air connections to wash and reclamation equipment</li> <li>• Emergency eyewash in Wash Equipment Room</li> <li>• As required by equipment</li> </ul>
<p><b>RELATIONSHIP TO OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>• Access to Service Position</li> </ul>	<p><b>STRUCTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Control joints in floor slab at adequate spacing</li> <li>• Structural grating over sump pit to accommodate H-20 loading</li> <li>• Slope floor to trench drain and sump pit</li> <li>• Structure as needed to support equipment</li> <li>• Control joints to have metal water stops</li> <li>• Wash Bay:                             <ul style="list-style-type: none"> <li>✓ Integrated trench drain and sump pit with removable covers</li> <li>✓ Trench drain with removable cover at overhead door(s)</li> <li>✓ Wash Equipment Room: sump pits with removable covers</li> </ul> </li> </ul>	<p><b>ELECTRICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Power:                             <ul style="list-style-type: none"> <li>✓ All receptacles and outlets mounted at 3'-6" AFF and water protected</li> <li>✓ Provide waterproof duplex receptacles (four minimum) on walls</li> <li>✓ All outlets and electrical boxes sealed for a hose down environment</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Lighting:                             <ul style="list-style-type: none"> <li>✓ LED lighting in Bay (50 fc average) and in Water Reclamation Room (25 fc average)</li> <li>✓ Fixtures located to illuminate work spaces and around vehicles</li> </ul> </li> <li>• Communications: Paging/intercom system speakers</li> </ul>
<p><b>CRITICAL DIMENSIONS</b></p> <ul style="list-style-type: none"> <li>• 18'-0" vertical clearance to structure (minimum)</li> <li>• 20'-0" wide by 100'-0" long</li> </ul>	<p><b>MECHANICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Special ventilation to remove moisture, low air supply to eliminate steam</li> <li>• Water resistant heating system</li> <li>• As required by equipment</li> <li>• Exhaust:                             <ul style="list-style-type: none"> <li>✓ Minimum 10 air changes per hour when wash equipment is activated</li> <li>✓ Minimum one air change per hour when wash equipment is inactive</li> </ul> </li> <li>• Heating set point: 55 degrees Fahrenheit</li> </ul>	
<p><b>EQUIPMENT/FURNISHINGS</b></p> <ul style="list-style-type: none"> <li>• Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment</li> <li>• Drive through wash system</li> <li>• Water reclamation system</li> <li>• No OCS</li> </ul>		
<p><b>DESIGN FEATURES</b></p> <ul style="list-style-type: none"> <li>• Forklift accessible</li> <li>• Natural daylighting desired</li> </ul>		

CLEANING EQUIPMENT STORAGE



FUNCTION

Secure room for storage of vehicle cleaning equipment.

RELATIONSHIP TO OTHER AREAS

- Adjacent to service position

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

EQUIPMENT/FURNISHINGS

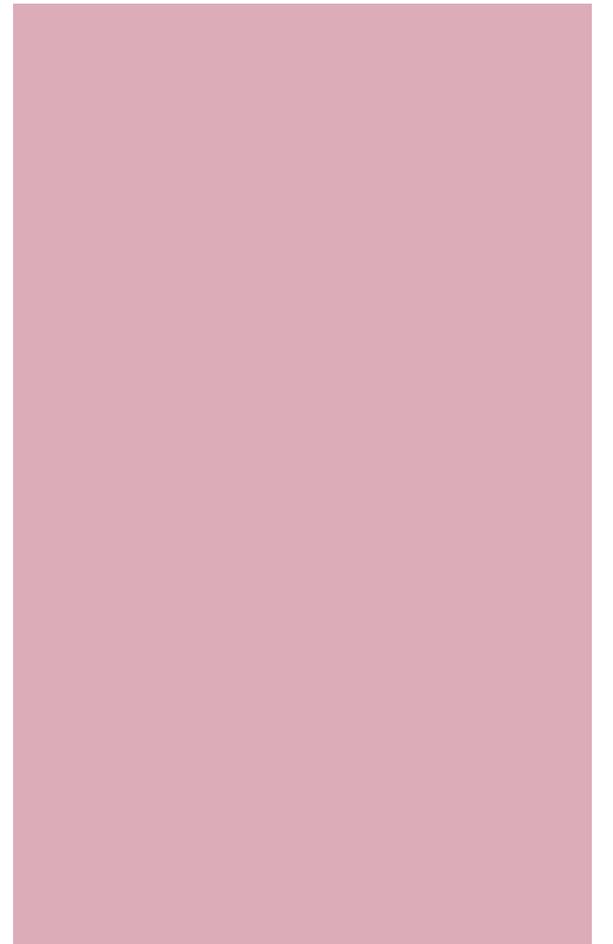
- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: finished concrete (recommended)
  - ✓ Walls: Soil and grease resilient, with light color finish
  - ✓ Ceiling: Painted exposed structure
  - ✓ Doors:
    - Personnel door with view panels to meet applicable code exit requirements.
    - Electronically secured entry (as required)
- Mechanical: Provide appropriate balanced cooling, heating, and ventilation (per code)
- Power:
  - ✓ LED lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
- Lighting: Dimmable, indirect lighting with occupancy sensors



## SECTION 5.6: PARTS

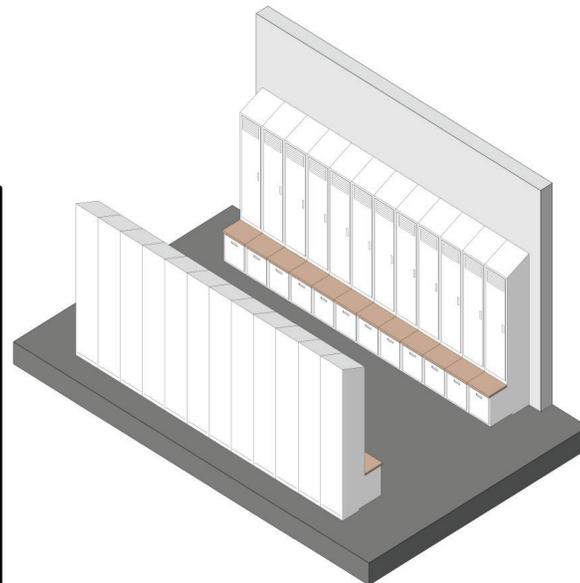
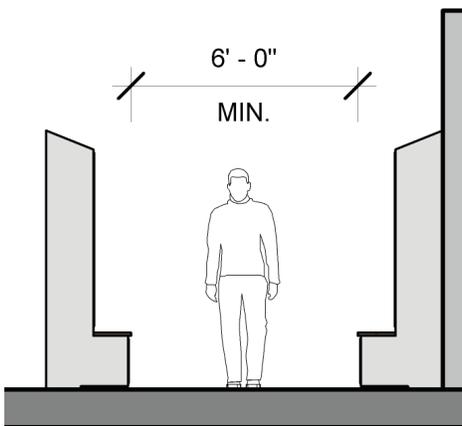
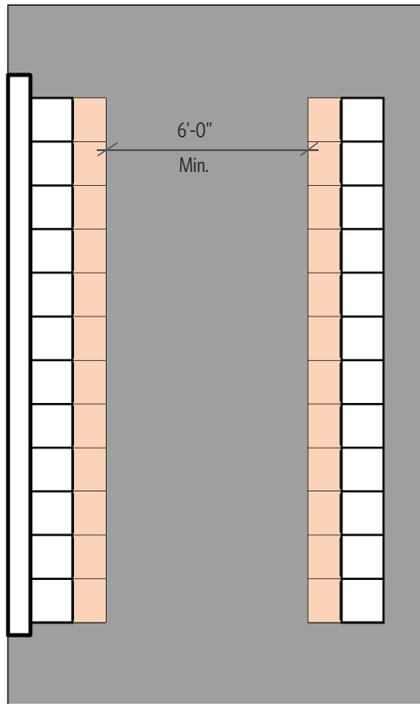


GENERAL MODULE: OFFICE AREAS

PARTS SUPERVISOR

- Reference **Office Module Private Office - 120 sf**
- Adjacent to Parts Storage
- Adjacent to Shopkeepers

**PARTS LOCKERS**



**PARTS**

Locker area for each Parts employees. Locker areas must be appropriately sized to meet the needs of Parts staff.

**RELATIONSHIP TO OTHER AREAS**

- Located within Parts Room

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

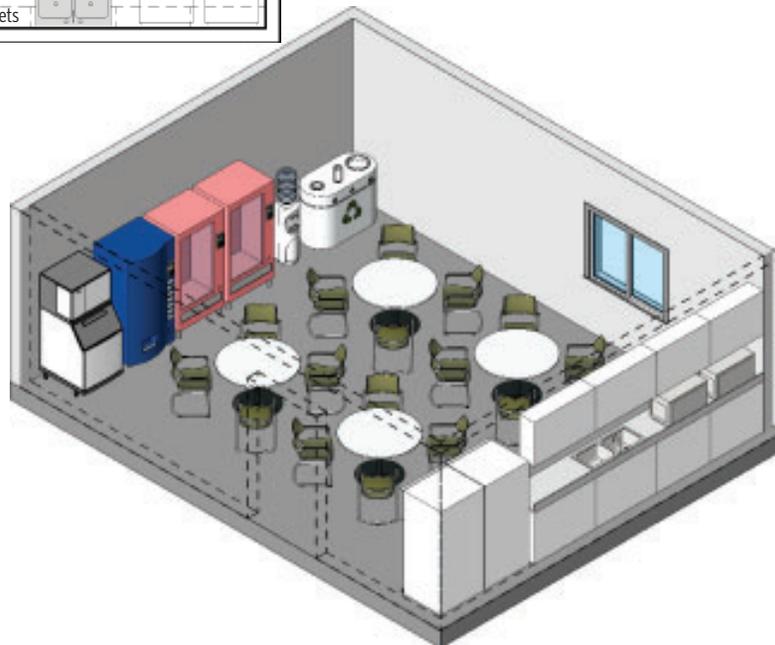
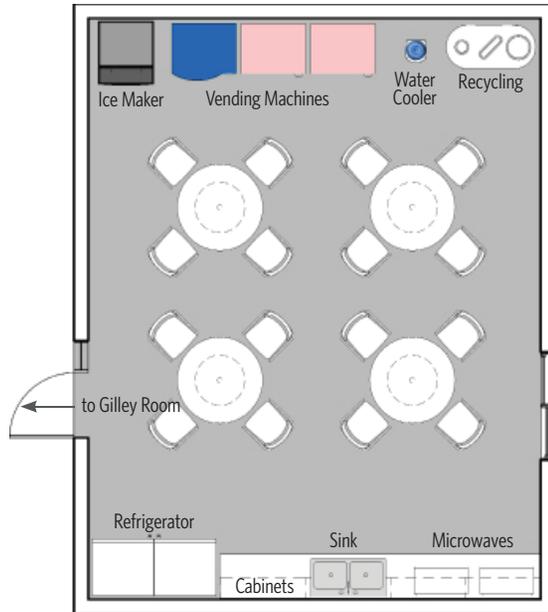
**EQUIPMENT/FURNISHINGS**

- 6'-0" high gear, well-ventilated lockers with built-in bench
- Lockers must be ADA compliant and have mirrors
- Locker Dimensions: 24" by 24"
- Lockers to have sloped tops

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering or finished concrete (recommended)
  - ✓ Walls:
    - Tile covering or finished masonry
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors: Single leaf 3'-0" door
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating, ventilation, and exhaust (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (15 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**BREAK ROOM**



**FUNCTION**

Area used for staff to eat, prepare, and store food.

**RELATIONSHIP TO OTHER AREAS**

- Located within Parts Room.

**CRITICAL DIMENSIONS**

- 9' -0" vertical clearance (minimum)

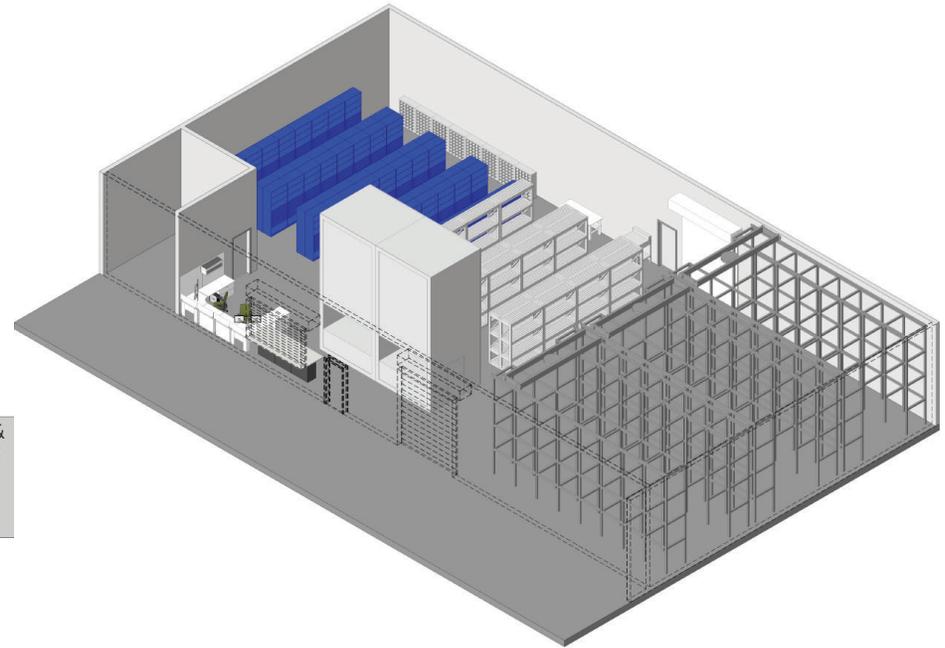
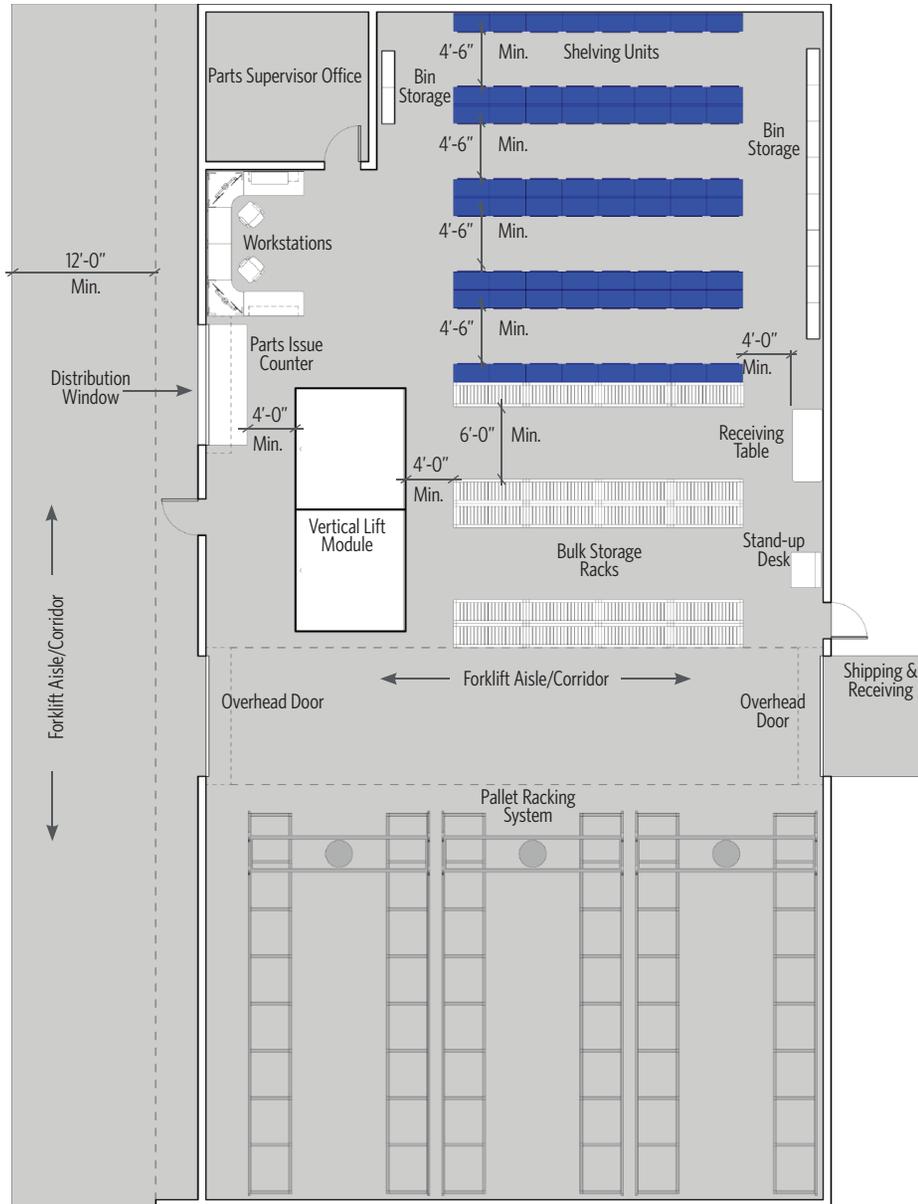
**EQUIPMENT/FURNISHINGS**

- Counter, upper and lower cabinets, sink with water filter, microwaves, refrigerators, coffee maker, ice maker, water coolers, vending machines, trash/recycling/compost bins, tables, chairs
- Millwork

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" doors (two minimum) with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Plumbing: Rough-in for equipment
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
  - ✓ Provide three GFCI outlets above the kitchenette counter
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

PARTS WINDOW/SHOPKEEPER/PARTS STORAGE/SHIPPING AND RECEIVING



**PARTS WINDOW/SHOPKEEPER/PARTS STORAGE/SHIPPING AND RECEIVING**

**FUNCTION**

Dedicated secure area for receiving, storage, and issuing of parts, material, and specialized tools.

**RELATIONSHIP TO OTHER AREAS**

- Access to exterior for deliveries
- Adjacent to Parts Office
- Access from Repair Bays and Shops

**CRITICAL DIMENSIONS**

- Vertical clearance below mezzanine: 12'-0" (minimal) (if mezzanine is desired)
- Vertical clearance above mezzanine: 15'-0" (minimum)(if mezzanine is desired)
- 20'-0" clear for high bay pallet storage (minimum)
- VLM or stack system can be any desired height

**EQUIPMENT/FURNISHINGS**

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

**DESIGN FEATURES**

- Exterior access for deliveries
- Provide Issue Counter with stainless steel top and fire rated rolling overhead door
- Provide staging area for shipping/receiving with an overhead door to exterior of building
- Forklift access
- Parts deliveries should be as functionally separated and as secure as possible in relation to any public accessible and joint development area in the basement.

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish
- Doors:
  - ✓ Personnel door with view panel to meet applicable code exit requirements
  - ✓ Exterior overhead door: High-lifting sectional, steel, insulated 10'-0" by 12'-0" with view panels, automatic operator, interior and exterior push button controls with lockout on exterior
  - ✓ Overhead door at Issue Window
  - ✓ Interior overhead door: Coiling steel, 10'-0" by 12'-0", automatic operator, push controls, lockable

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)
- Floor slab designed to accommodate forklift access

**MECHANICAL CONSIDERATIONS**

- Cooling set point: 74 degrees Fahrenheit
- Heating set point: 65 degrees Fahrenheit
- General ventilation (per code)
- In-floor radiant heat (if desired)
- As required by equipment

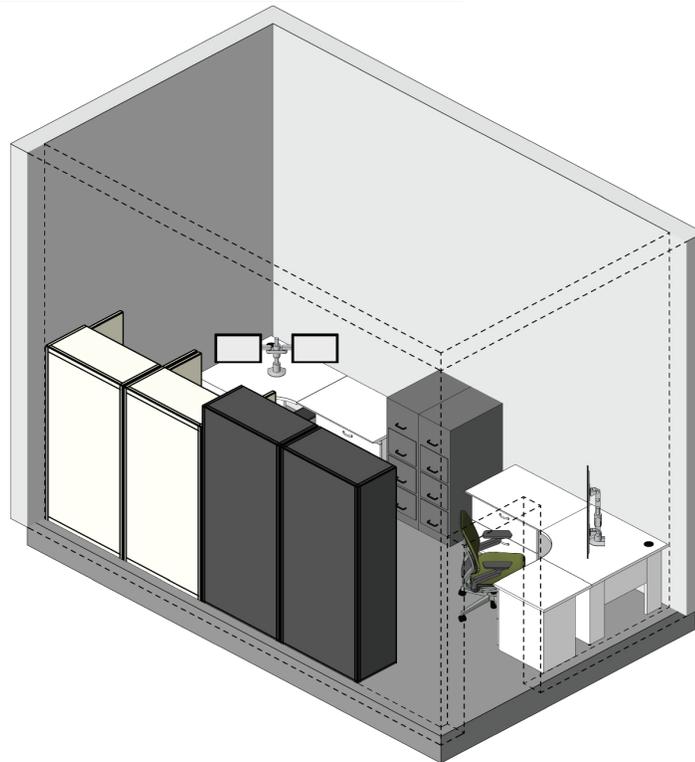
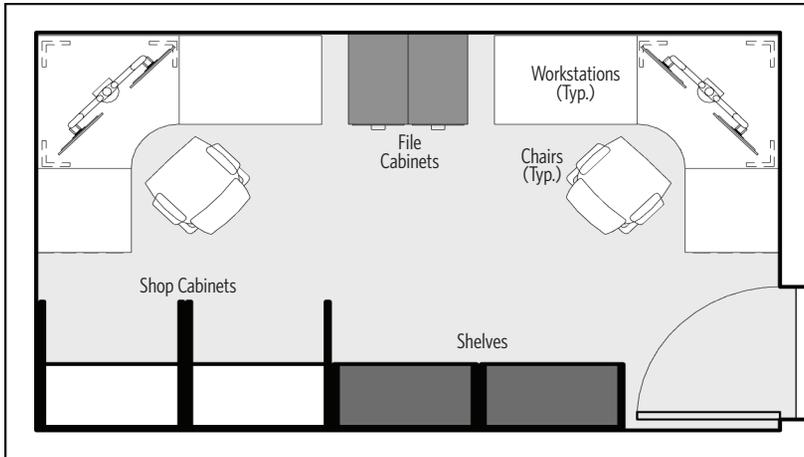
**PLUMBING CONSIDERATIONS**

- Water: 3/4" water hose bibb with standard hose bibb at 2'-0" AFF
- As required by equipment

**ELECTRICAL CONSIDERATIONS**

- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting:
  - ✓ LED lighting in accordance with IES recommended lighting levels for Parts Window, Shipping/Receiving, and Shopkeeper (35 fc average) and Storage Area (20 fc average)
  - ✓ Fixtures located to illuminate work spaces
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns and/or walls

RECEIVING OFFICE



FUNCTION

Workstations and storage for Receiving staff.

RELATIONSHIP TO OTHER AREAS

- Access to Parts Window/Shopkeeper/Parts Storage/ Shipping and Receiving/ Dock

CRITICAL DIMENSIONS

- 12'-0" vertical clearance to structure and fixtures

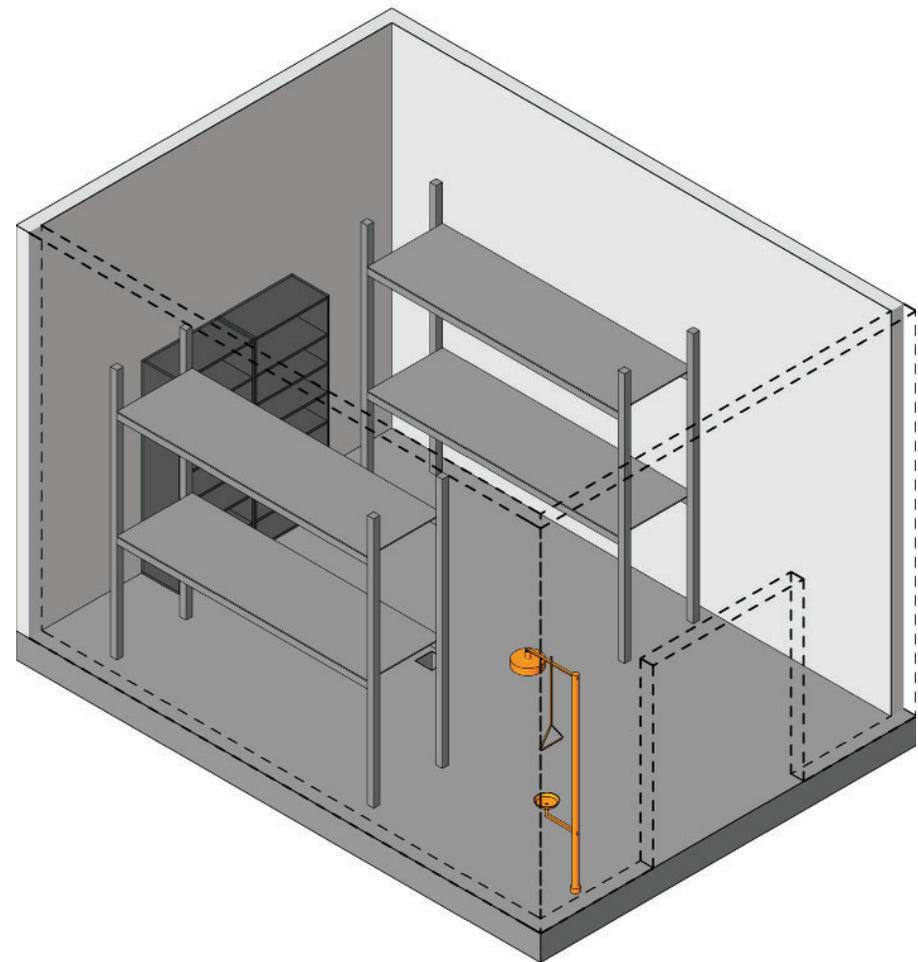
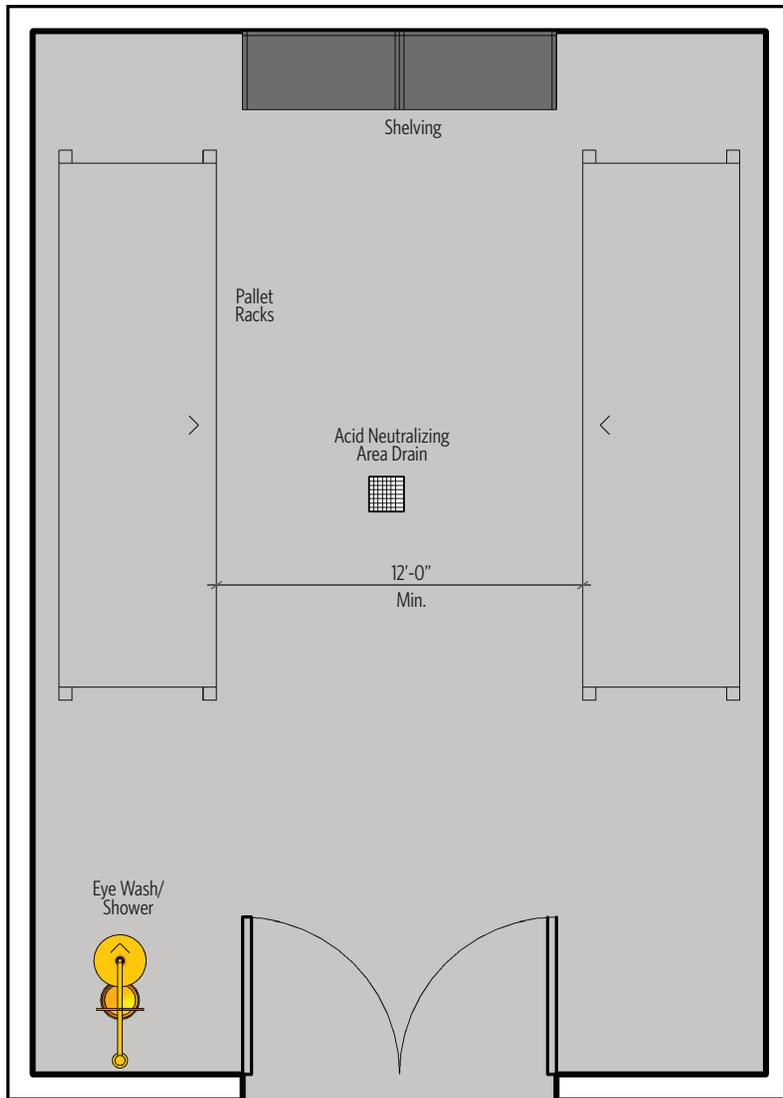
EQUIPMENT/FURNISHINGS

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Soil, grease, water, slip resistant concrete, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities, light colored finish
  - ✓ Doors: Personnel door with view panels to meet applicable code exit requirements (not required with wire mesh walls)
- Structural:
  - ✓ Control joints in floor slab at adequate spacing
  - ✓ Floor slab to accommodate in-floor radiant heat (if desired)
  - ✓ Structure as needed to support equipment
  - ✓ Floor slab designed to accommodate forklift access
- Mechanical:
  - ✓ In-floor radiant heat (if desired)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ General ventilation (per code)
  - ✓ As required by equipment
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting: LED lighting in accordance with IES recommendation minimum (20 fc average)

BATTERY STORAGE



**BATTERY STORAGE**

**FUNCTION**

Enclosed and secure room for storage of trolley and future BEBs batteries and components.

**RELATIONSHIP TO OTHER AREAS**

- Access from Repair Bays and Shops

**CRITICAL DIMENSIONS**

- 12'-0" vertical clearance to structure and fixtures (minimum)

**EQUIPMENT/FURNISHINGS**

- Emergency eyewash/shower
- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

**DESIGN FEATURES**

- Acoustically and physically separated from other areas to prevent migration of noise, dirt, and fumes

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete, and treated with chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, with light colored finished concrete or masonry, with polyurea coatings for acid and chemical resistance
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities with light colored finish
- Doors:
  - ✓ Personnel door with view panel to meet applicable code exit requirements
  - ✓ Double 3'-0" wide doors

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)
- Floor slab designed to accommodate forklift access

**MECHANICAL CONSIDERATIONS**

- Heating set point: 65 degrees Fahrenheit
- Exhaust (per code)
- General ventilation (per code)
- As required by equipment

**PLUMBING CONSIDERATIONS**

- Tempered water: Connection to emergency eye wash/shower
- Acid neutralizing floor drain and piping to acid dilution tank

**ELECTRICAL CONSIDERATIONS**

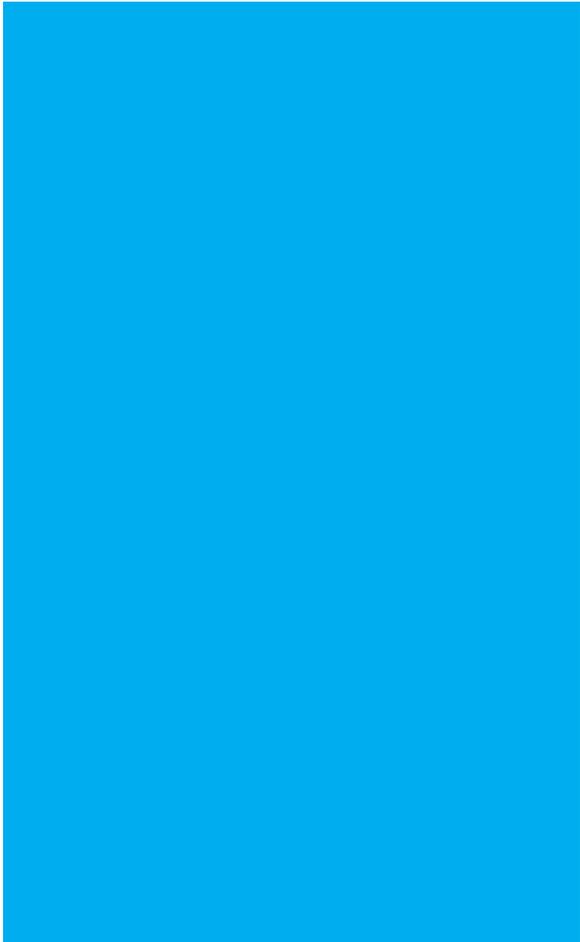
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles on walls
  - ✓ Dedicated computer receptacle, adjacent to data conduit on column adjacent to workbench
  - ✓ As required by equipment
- Lighting:
  - ✓ LED lighting in accordance with IES recommendation minimum, explosion proof (20 fc average)
  - ✓ Fixtures located to illuminate work spaces
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns at each bay

**FIRE SUPPRESSION CONSIDERATIONS**

The fire protection and pyrotechnics experts on the detailed design team will be responsible for devising a robust fire protection system for the tire bay and tire shop/storage areas that minimizes risk to the Yard and any joint development above. Review and recommendations by the experts will include, but not be limited to, the location, ventilation, and fire suppression systems for Potrero Yard's tire facilities.



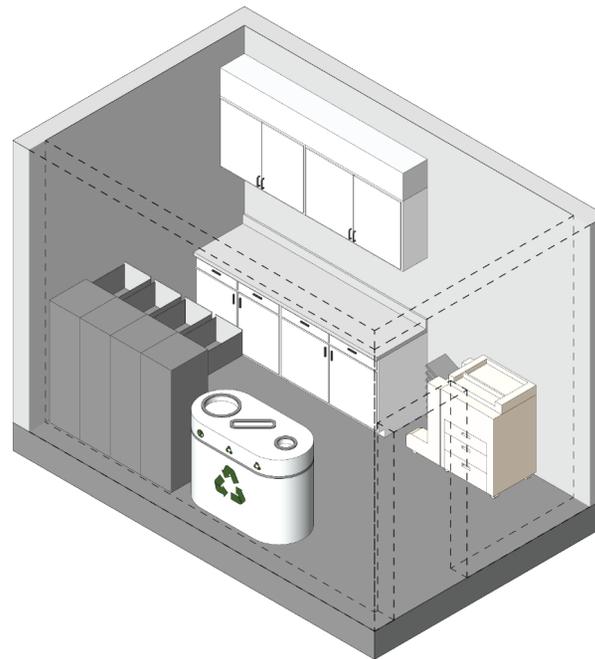
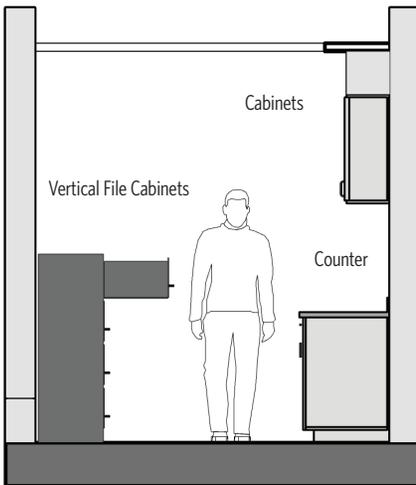
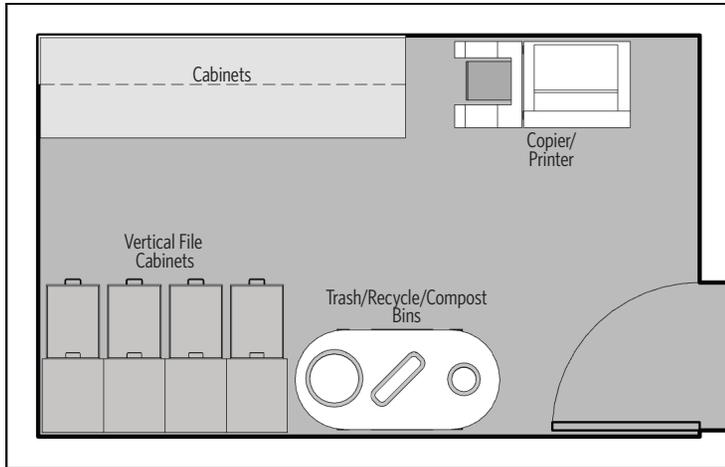
## SECTION 5.7: MAINTENANCE - ADMINISTRATION



**GENERAL MODULE: OFFICE AREAS**

SUPERINTENDENT	ASSISTANT SUPERINTENDENT	SENIOR CONTROLLER	ADMINISTRATIVE ASSISTANT		
<ul style="list-style-type: none"> <li>Reference <b>Office Module Private Office - 224 sf</b></li> <li>Adjacent to Assistant Superintendent</li> <li>Adjacent to Administrative Assistant</li> </ul>	<ul style="list-style-type: none"> <li>Reference <b>Office Module Private Office - 120 sf</b></li> <li>Adjacent to Superintendent</li> <li>Adjacent to Administrative Assistant</li> </ul>	<ul style="list-style-type: none"> <li>Reference <b>Office Module Private Office - 120 sf</b></li> <li>Adjacent to Assistant Superintendent</li> <li>Adjacent to Administrative Assistant</li> </ul>	<ul style="list-style-type: none"> <li>Reference <b>Office Module Workstation - 48 sf</b></li> <li>Adjacent to Superintendent and Assistant Superintendent</li> </ul>		
<th>HOTELING - WORKSTATION</th> <td colspan="2"> <th>SUPPORT SHOP</th> </td>		HOTELING - WORKSTATION	<th>SUPPORT SHOP</th>		SUPPORT SHOP
<ul style="list-style-type: none"> <li>Reference <b>Office Module Workstation - 64 sf</b></li> <li>Located within open office space</li> <li>Access to copy/supply</li> </ul>		<ul style="list-style-type: none"> <li>Reference <b>Office Module Workstation - 64 sf</b></li> <li>Located within open office space</li> <li>Access to copy/supply</li> </ul>			

**COPY/SUPPLY**



**FUNCTION**

Dedicated alcove or room for copier/printer/scanner/fax machine, storage for office supplies, and a work surface.

**RELATIONSHIP TO OTHER AREAS**

- Access to all office areas

**CRITICAL DIMENSIONS**

- 9' -0" vertical clearance (minimum)

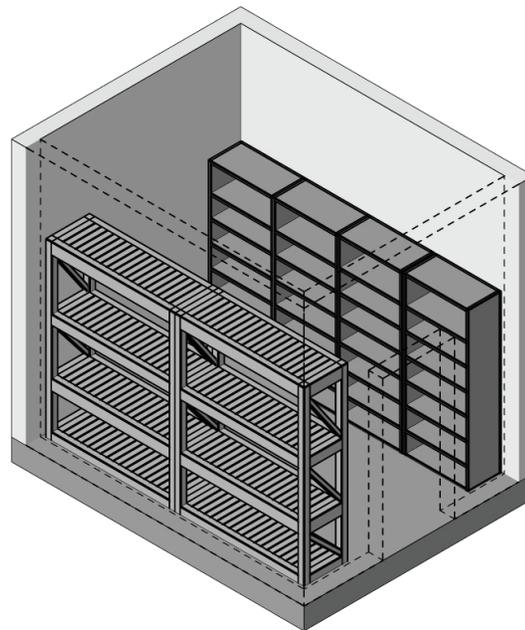
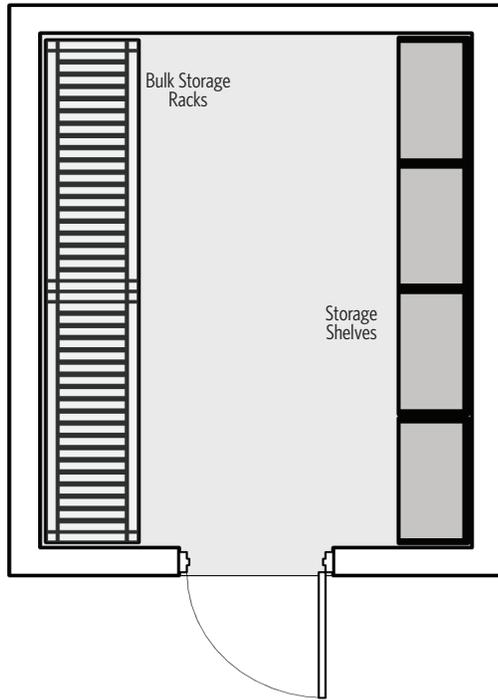
**EQUIPMENT/FURNISHINGS**

- Copier/printer/scanner/fax machine
- Work surface with cabinets below and above
- Filing cabinets
- Millwork

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
  - ✓ Provide one data outlet with four data ports
  - ✓ Provide box conduit rough-ins to three other locations in the room
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**RECORDS STORAGE**



**FUNCTION**

Secure area for the storage of files and records.

**RELATIONSHIP TO OTHER AREAS**

- N/A

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

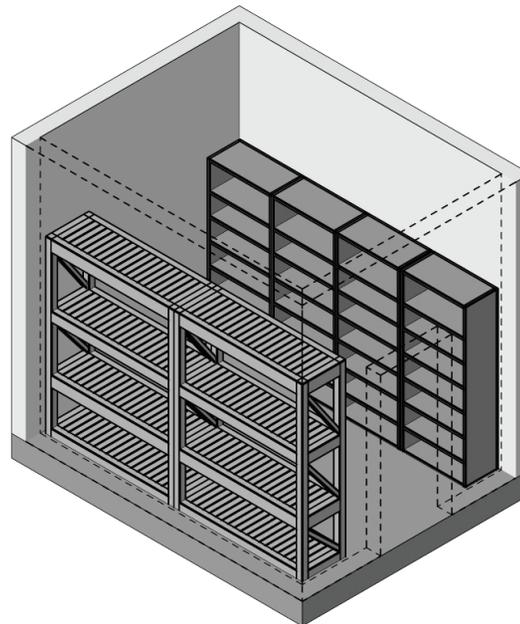
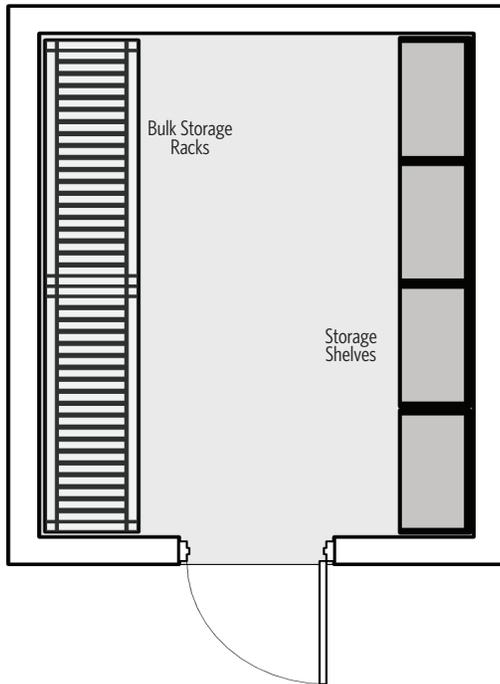
**EQUIPMENT/FURNISHINGS**

- Shelving
- Racking

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: No exterior exposure
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Keep consistent humidity levels
- Power:
  - ✓ LED lighting in accordance with IES recommendation (35 fc average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
- Lighting: Dimmable, indirect lighting with occupancy sensors

**ARCHIVE RECORDS STORAGE**



**FUNCTION**

Secure area for the long term storage of archived files and records.

**RELATIONSHIP TO OTHER AREAS**

- N/A

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

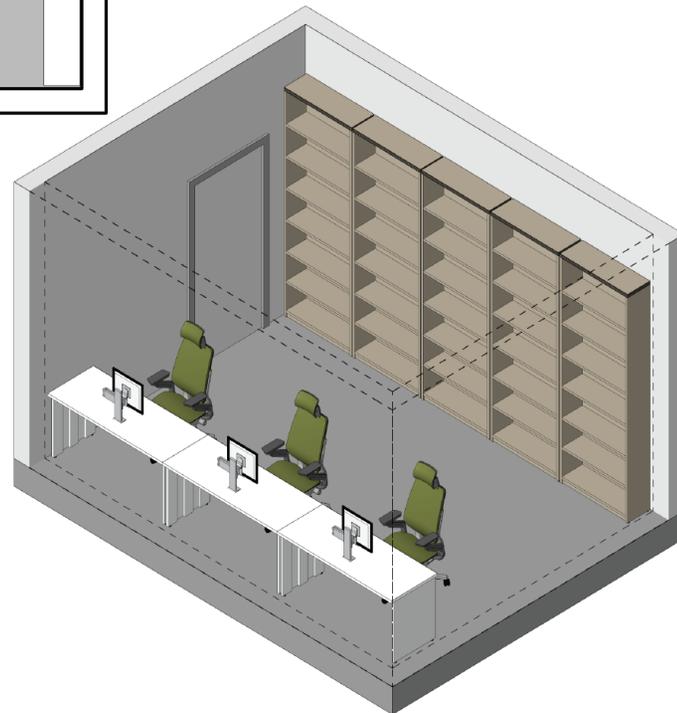
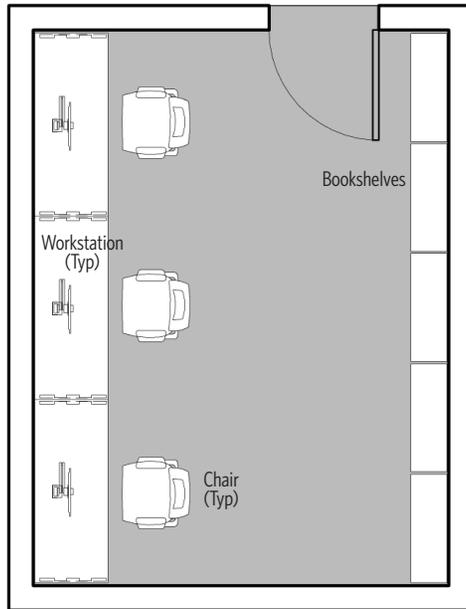
**EQUIPMENT/FURNISHINGS**

- Shelving
- Racking

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: No exterior exposure
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Keep consistent humidity levels
- Power:
  - ✓ LED lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
- Lighting: Dimmable, indirect lighting with occupancy sensors

**LIBRARY/ONLINE RESOURCES**



**FUNCTION**

Enclosed area for storage and reference of vehicle maintenance reference manuals and materials.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to Repair Bays
- Adjacent to Maintenance-Administration open office area

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

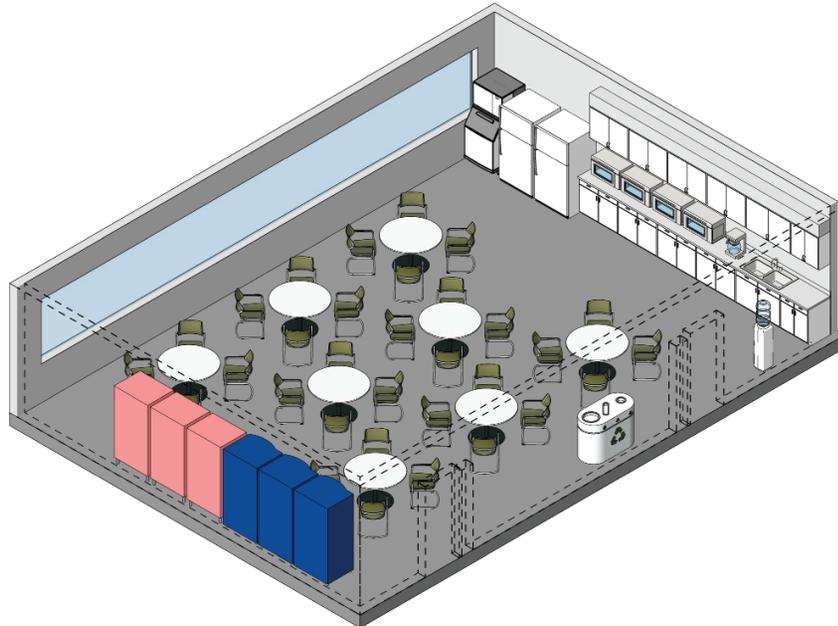
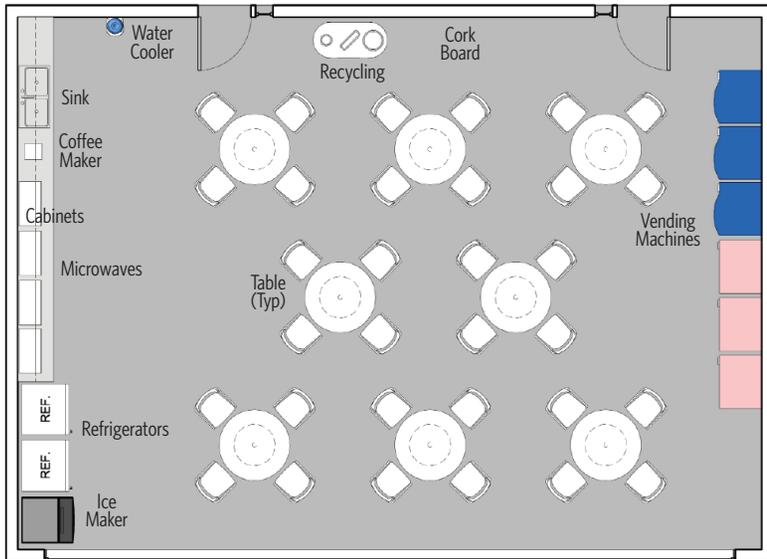
**EQUIPMENT/FURNISHINGS**

- Workstations
- Bookshelves
- Chairs

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc of indirect lighting average)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a quad receptacle at each workstation
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

**BREAK ROOM/KITCHENETTE/VENDING**



**FUNCTION**

Enclosed room for use by staff as a break area.

**RELATIONSHIP TO OTHER AREAS**

- Centrally located
- Access to all office areas, repair areas, and Restrooms

**CRITICAL DIMENSIONS**

- 9' -0" vertical clearance (minimum)

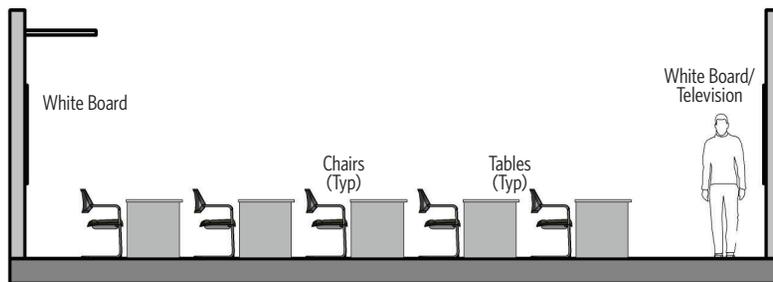
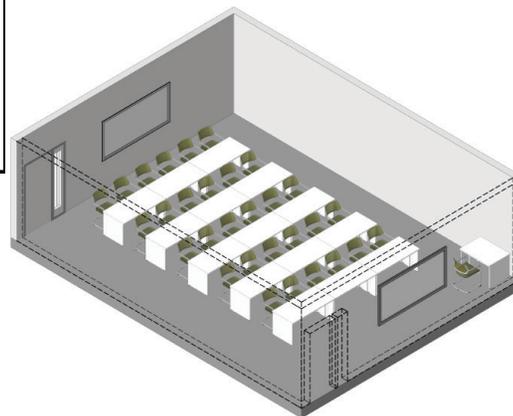
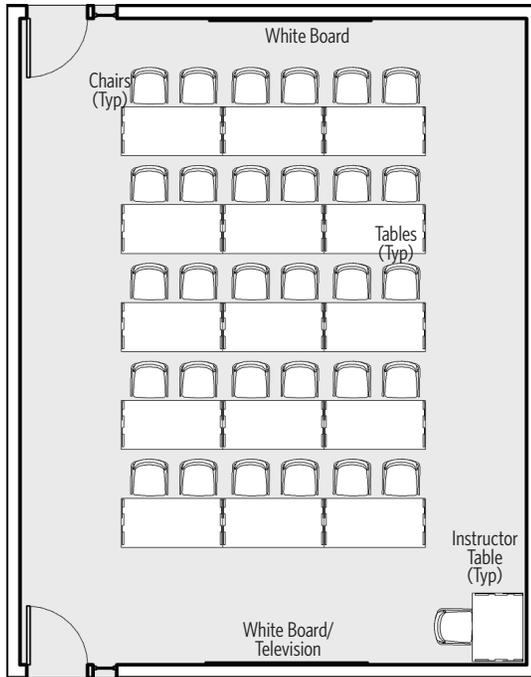
**EQUIPMENT/FURNISHINGS**

- Counter space, upper and lower cabinets, sink, microwaves, refrigerators, coffee maker, ice maker, water filter, vending machines, water coolers, tables, chairs, trash/recycling/compost bins
- Millwork

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" doors (two minimum) with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Provide CO2 detection
- Plumbing: Rough in for equipment
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
  - ✓ Provide data outlets with four data ports (two minimum)
  - ✓ Provide five GFCI outlets above kitchenette counter
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**TRAINING ROOM**



**FUNCTION**

Large room for staff to participate in training activities. This space will also be available as a Conference Room, with training as the primary activity.

**RELATIONSHIP TO OTHER AREAS**

- Accessible by Maintenance staff
- Adjacent to Maintenance Office area

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

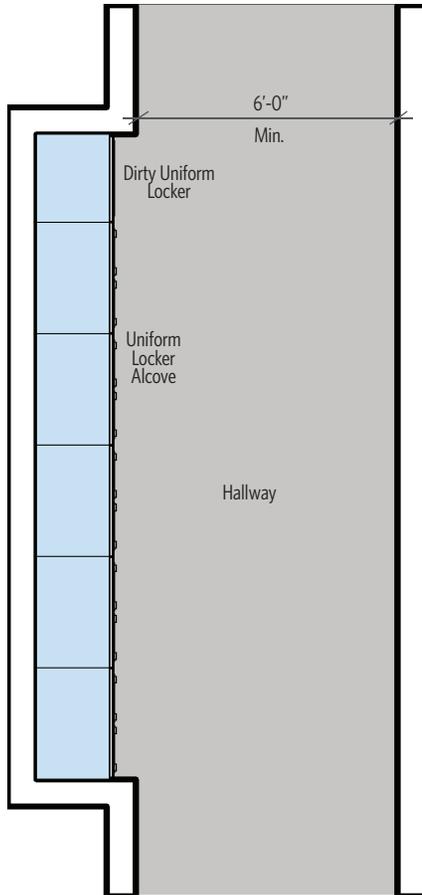
**EQUIPMENT/FURNISHINGS**

- Mayline Cohere Flip/nest table 60" by 30" laminate
- Cool mesh nesting chairs
- Whiteboard/Television
- Overhead projector
- Millwork

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Resilient floor covering with base (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Provide CO2 detection
- Power:
  - ✓ LED lighting in accordance with IES recommendations (35 fc average)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a guard receptacle in the floor under the middle of the table
  - ✓ Provide one data outlet with four data ports in the floor under the middle of the table
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in the room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

**UNIFORM ALCOVE**



**FUNCTION**

Co-ed locker area with an alcove for vendors to drop off and pick up uniforms (changing areas are located in the respective male/female restrooms).

**RELATIONSHIP TO OTHER AREAS**

- Accessible from Men's and Women's Lockers/Showers/Restroom
- Adjacent to an exterior door for vendor pickup/drop off

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

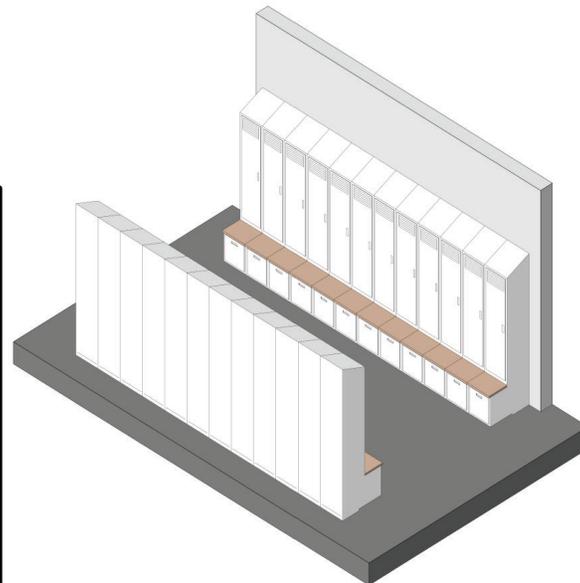
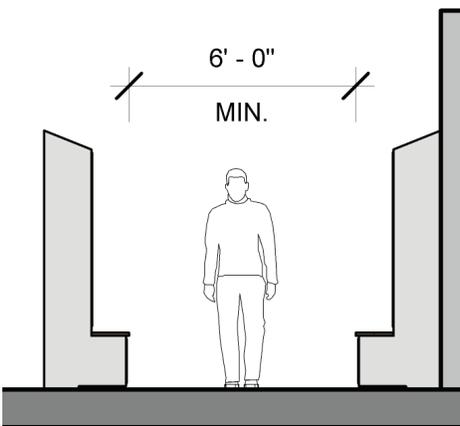
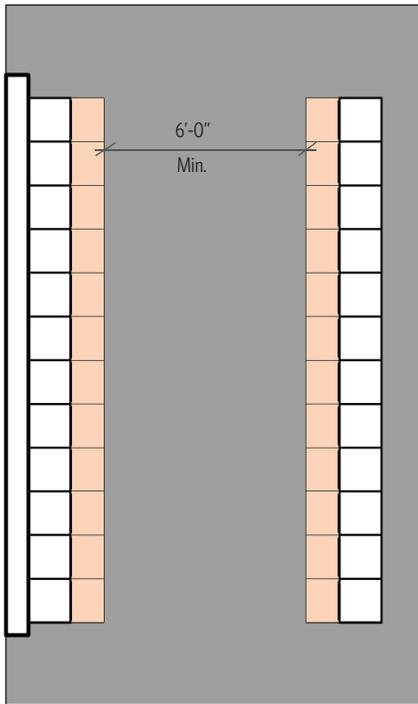
**EQUIPMENT/FURNISHINGS**

- Vendor provided well-ventilated uniform lockers, bin for dirty uniforms

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power: LED lighting in accordance with IES recommendation (15 fc average)
- Lighting: Dimmable, indirect lighting with occupancy sensor

**MEN'S AND WOMEN'S LOCKERS**



**FUNCTION**

Locker area for each male and female Bus Maintenance employees. Locker areas must be appropriately sized to meet the needs of Maintenance staff.

**RELATIONSHIP TO OTHER AREAS**

- Access by Repair and Shop Areas
- Located within each Men's and Women's Restrooms

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

**EQUIPMENT/FURNISHINGS**

- 6'-0" high gear, well-ventilated lockers with built-in bench
- Lockers must be ADA compliant and have mirrors
- Locker Dimensions: 24" by 24"
- Lockers to have sloped tops

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering or finished concrete (recommended)
  - ✓ Walls:
    - Tile covering or finished masonry
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors: Single leaf 3'-0" door
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating, ventilation, and exhaust (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (15 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)



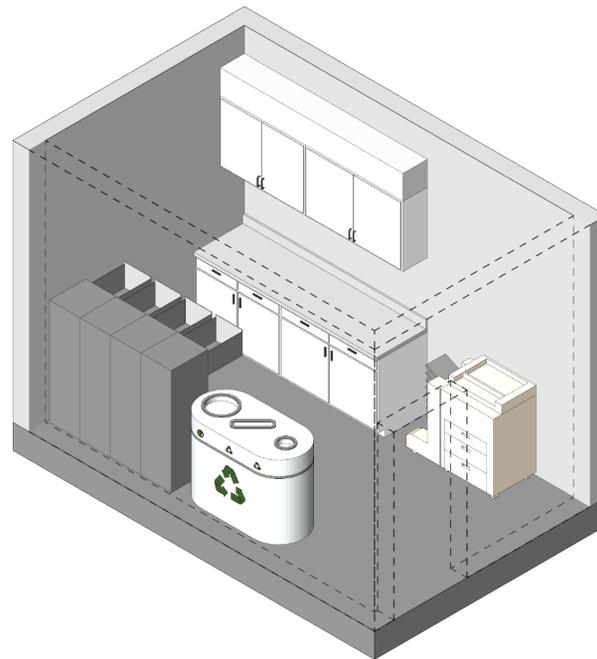
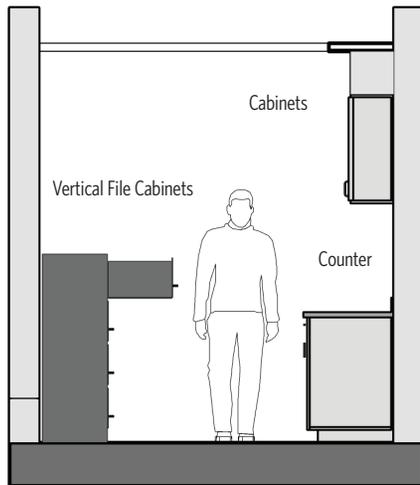
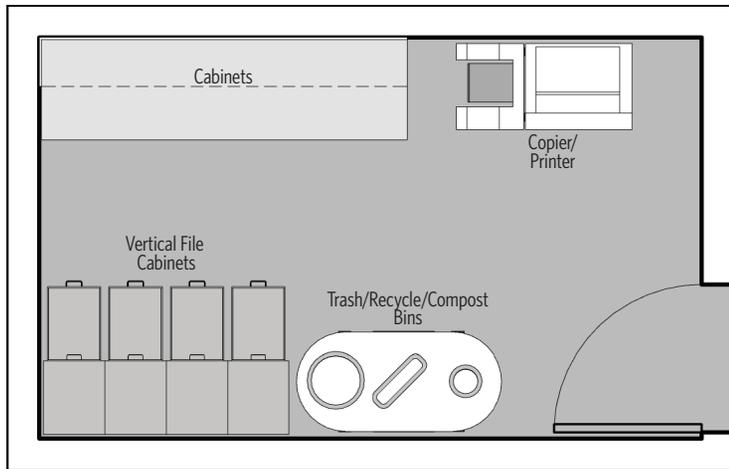
SECTION 5.8: OPERATIONS -  
ADMINISTRATION



GENERAL MODULE: OFFICE AREAS

SUPERINTENDENT	ASSISTANT SUPERINTENDENT	TRAINER	YARD STARTER OFFICE
<ul style="list-style-type: none"> <li>Reference <b>Office Module Private Office - 224 sf</b></li> <li>Adjacent to Assistant Superintendent</li> <li>Adjacent to Administrative Assistant</li> </ul>	<ul style="list-style-type: none"> <li>Reference <b>Office Module Private Office - 120 sf</b></li> <li>Adjacent to Administrative Assistant</li> <li>Adjacent to Superintendent</li> </ul>	<ul style="list-style-type: none"> <li>Reference <b>Office Module Workstation - 64 sf</b></li> <li>Access to Training Access Areas</li> </ul>	<ul style="list-style-type: none"> <li>Reference <b>Office Module Private Office - 120 sf</b></li> <li>Adjacent to facility exit</li> <li>Views of buses coming off ramps through facility to exit</li> </ul>
DISPATCH/RECEIVER	ADMINISTRATIVE ASSISTANT	HOTELING - WORKSTATION	UNION SHARED OFFICE
<ul style="list-style-type: none"> <li>Reference <b>Office Module Workstation - 64 sf</b></li> <li>Within the Operator check-in</li> <li>Adjacent to Break Room</li> <li>Adjacent to restrooms</li> </ul>	<ul style="list-style-type: none"> <li>Reference <b>Office Module Workstation - 64 sf</b></li> <li>Adjacent to Superintendent and Assistant Superintendent</li> </ul>	<ul style="list-style-type: none"> <li>Reference <b>Office Module Workstation - 64 sf</b></li> <li>Located within open office space</li> <li>Access to Copy/Supply</li> </ul>	<ul style="list-style-type: none"> <li>Reference <b>Office Module Private Office - 224 sf</b></li> <li>Accessible by union staff</li> </ul>

**COPY/SUPPLY**



**FUNCTION**

Dedicated alcove or room for copier/printer/scanner/fax machine, storage for office supplies, and with a work surface.

**RELATIONSHIP TO OTHER AREAS**

- Access to all office areas

**CRITICAL DIMENSIONS**

- 9' -0" vertical clearance (minimum)

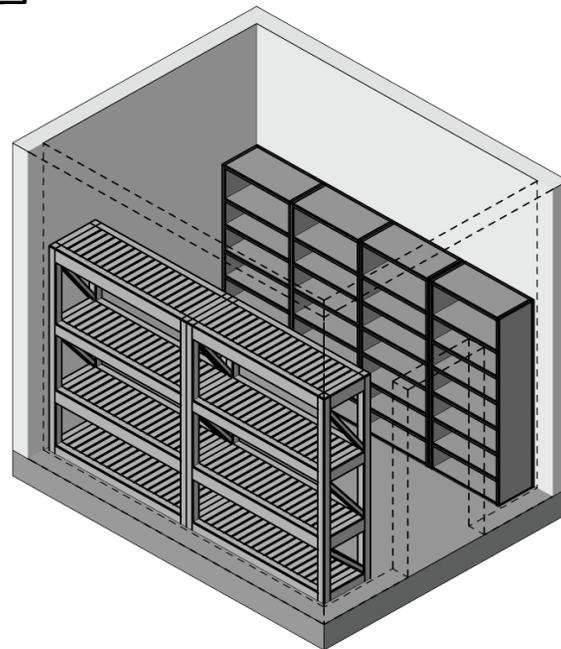
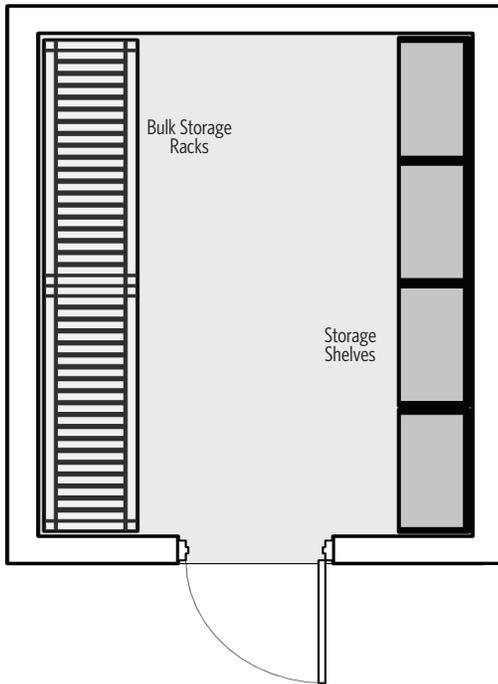
**EQUIPMENT/FURNISHINGS**

- Copier/printer/scanner/fax machine
- Millwork
- Work surface with cabinets below and above
- Filing cabinets

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
  - ✓ Provide one data outlet with four data ports
  - ✓ Provide box conduit rough-ins to three other locations in the room
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**RECORDS STORAGE**



**FUNCTION**

Secure area for the long term storage of archived files and records.

**RELATIONSHIP TO OTHER AREAS**

- N/A

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

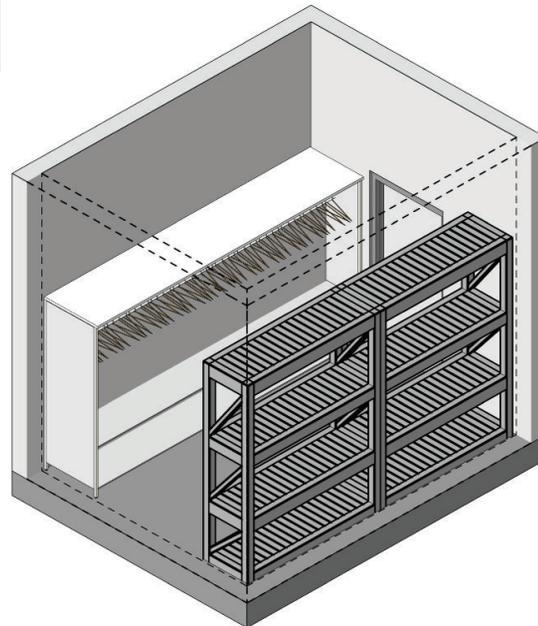
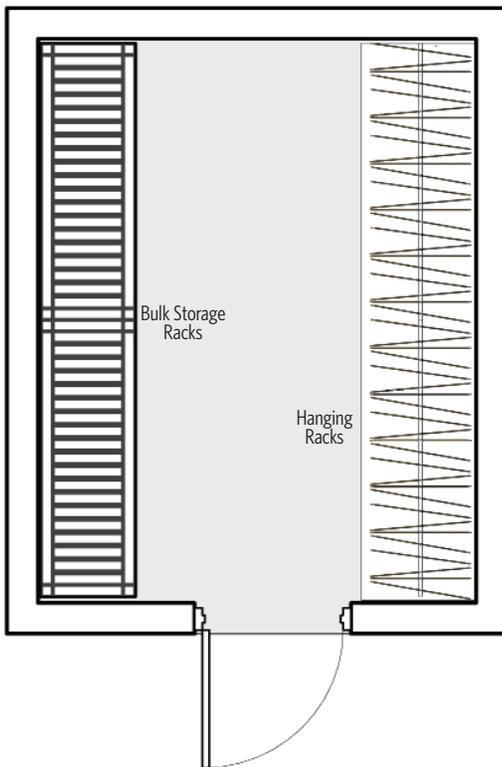
**EQUIPMENT/FURNISHINGS**

- Shelving
- Racking

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: No exterior exposure
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Keep consistent humidity levels
- Power:
  - ✓ LED lighting in accordance with IES recommendation (30 fc average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
- Lighting: Dimmable, indirect lighting with occupancy sensors

**UNIFORM STORAGE**



**FUNCTION**

Enclosed room for storage of Operator uniforms.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to Operator Check-in

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

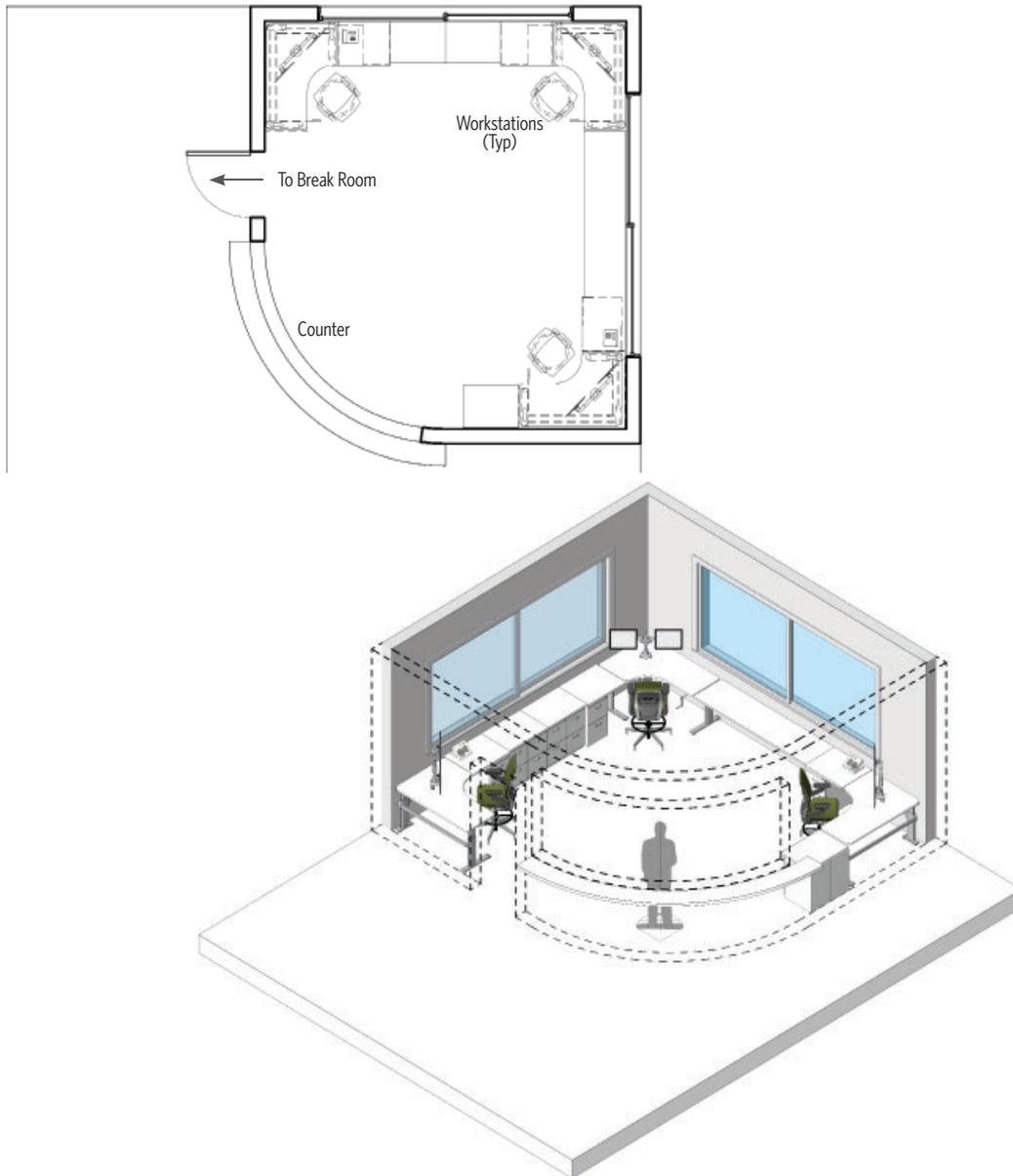
**EQUIPMENT/FURNISHINGS**

- Shelving
- Racking

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with loadable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED lighting in accordance with IES recommendation (15 fc average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
- Lighting: Dimmable, indirect lighting with occupancy sensor

**OPERATOR CHECK-IN/ DISPATCH/ RECEIVER**



**FUNCTION**

Area for Operators to report, receive information, and write reports.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to Break Room
- Adjacent to Dispatch/Receiver

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

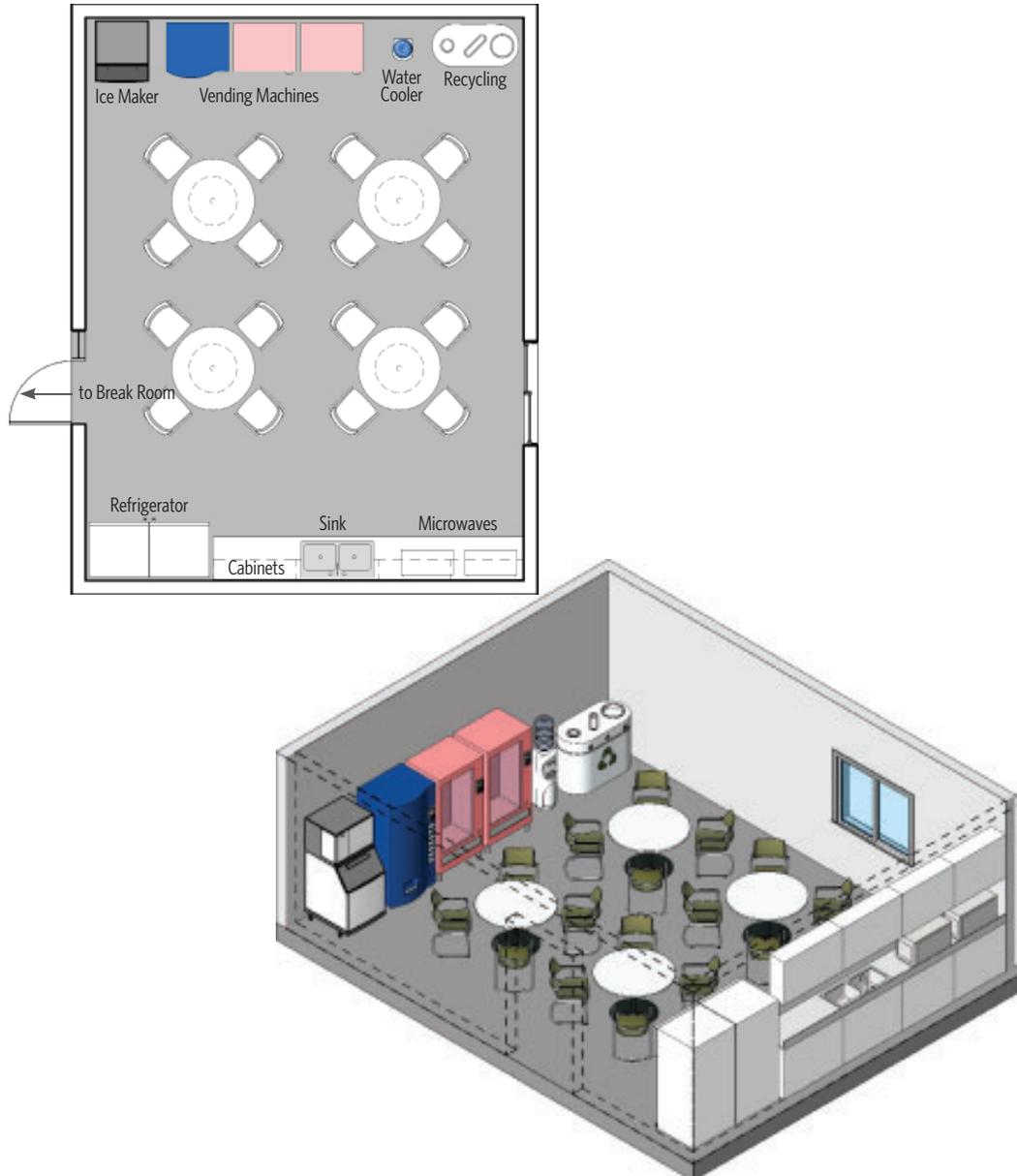
**EQUIPMENT/FURNISHINGS**

- Computer workstations
- Bulletin board
- Standing counter height, with portion of the counter at ADA accessible height

**DESIGN FEATURES**

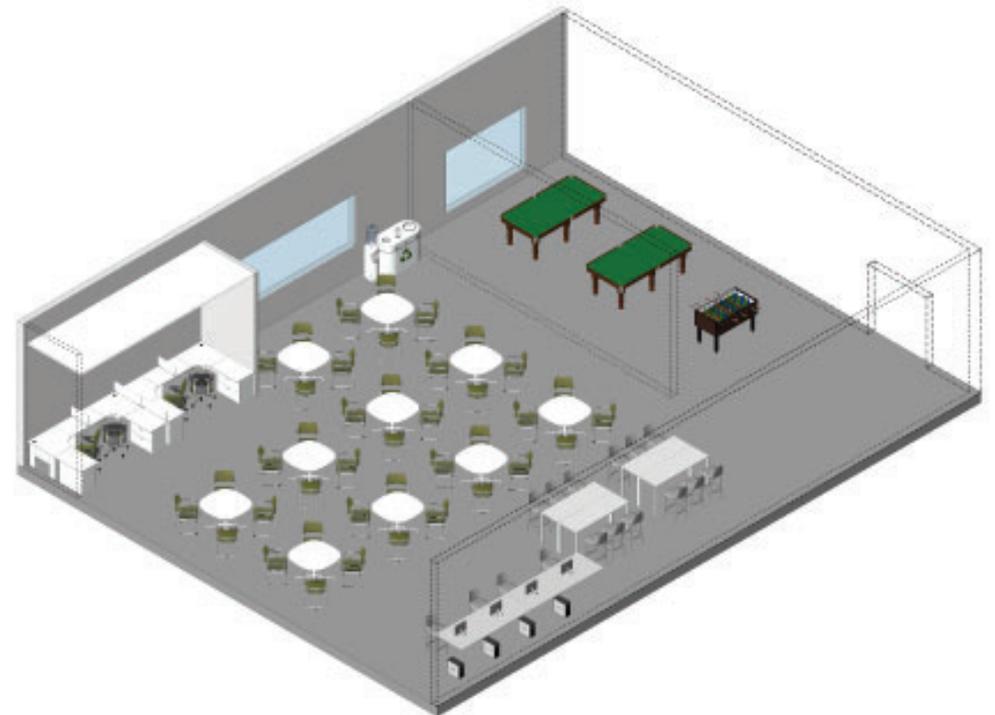
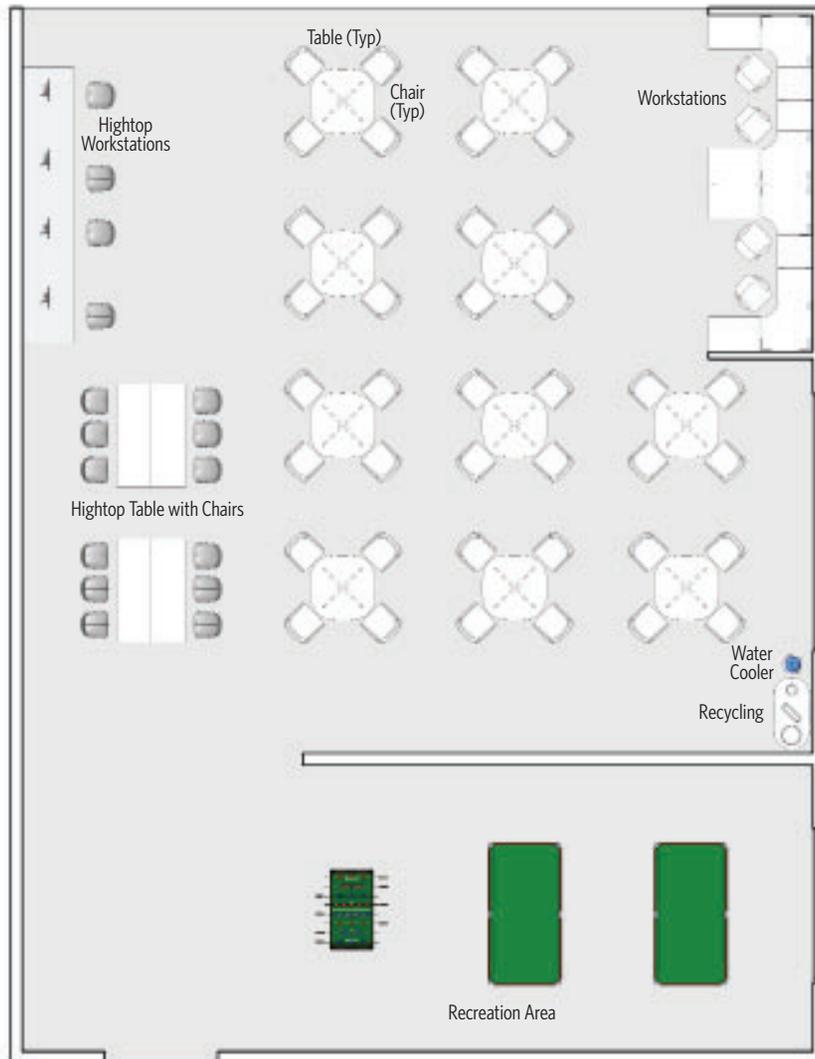
- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED lighting in accordance with IES recommendation (20 fc of indirect lighting average, no glare)
  - ✓ Provide general purpose duplex receptacles (three minimum)
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and conduit rough-ins to three other locations in room
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**KITCHENETTE/VENDING**



FUNCTION
Area used for staff to eat, prepare, and store food.
RELATIONSHIP TO OTHER AREAS
<ul style="list-style-type: none"> <li>• Adjacent to Break Room</li> </ul>
CRITICAL DIMENSIONS
<ul style="list-style-type: none"> <li>• 9' -0" vertical clearance (minimum)</li> </ul>
EQUIPMENT/FURNISHINGS
<ul style="list-style-type: none"> <li>• Counter, upper and lower cabinets, sink with water filter, microwaves, refrigerators, coffee maker, ice maker, water coolers, vending machines, trash/recycling/compost bins, tables, chairs</li> <li>• Millwork</li> </ul>
DESIGN FEATURES
<ul style="list-style-type: none"> <li>• Architectural:                         <ul style="list-style-type: none"> <li>✓ Furniture: Use owner furniture standards (if applicable)</li> <li>✓ Flooring: Resilient floor covering with base or finished concrete (recommended)</li> <li>✓ Walls:                                 <ul style="list-style-type: none"> <li>○ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)</li> <li>○ Wall protection as needed</li> </ul> </li> <li>✓ Ceiling: Acoustical ceiling tile (recommended)</li> <li>✓ Doors:                                 <ul style="list-style-type: none"> <li>○ Single leaf 3'-0" doors (two minimum) with lockable lever set hardware (recommended)</li> <li>○ Electronically secured entry (as required)</li> </ul> </li> </ul> </li> <li>• Daylighting: Exterior window desired</li> <li>• Mechanical:                         <ul style="list-style-type: none"> <li>✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)</li> <li>✓ Heating set point: 68 degrees Fahrenheit</li> <li>✓ Cooling set point: 74 degrees Fahrenheit</li> </ul> </li> <li>• Plumbing: Rough-in for equipment</li> <li>• Power:                         <ul style="list-style-type: none"> <li>✓ LED Lighting in accordance with IES recommendation (20 fc average)</li> <li>✓ Provide general purpose duplex receptacles (six minimum)</li> <li>✓ Provide three GFCI outlets above the kitchenette counter</li> </ul> </li> <li>• Lighting:                         <ul style="list-style-type: none"> <li>✓ Dimmable, indirect lighting with occupancy sensor</li> <li>✓ Task lighting (recommended)</li> </ul> </li> </ul>

BREAK ROOM/RECREATION AREA



**BREAK ROOM/RECREATION AREA**

**FUNCTION**

Area for Operators to gather, take breaks, and relax between shifts.

**RELATIONSHIP TO OTHER AREAS**

- Connected to Kitchenette/Vending
- Adjacent to:
  - ✓ TV Room
  - ✓ Quiet Room
  - ✓ Restrooms
  - ✓ Lockers
  - ✓ Mailboxes
  - ✓ Operator Check-In
  - ✓ Dispatch/Receiver

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

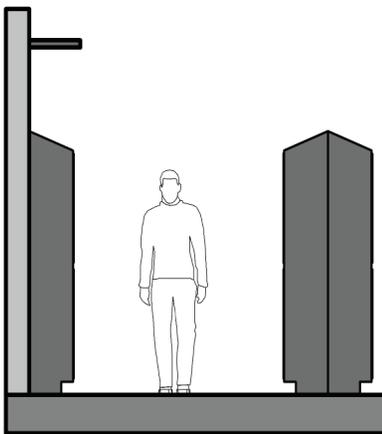
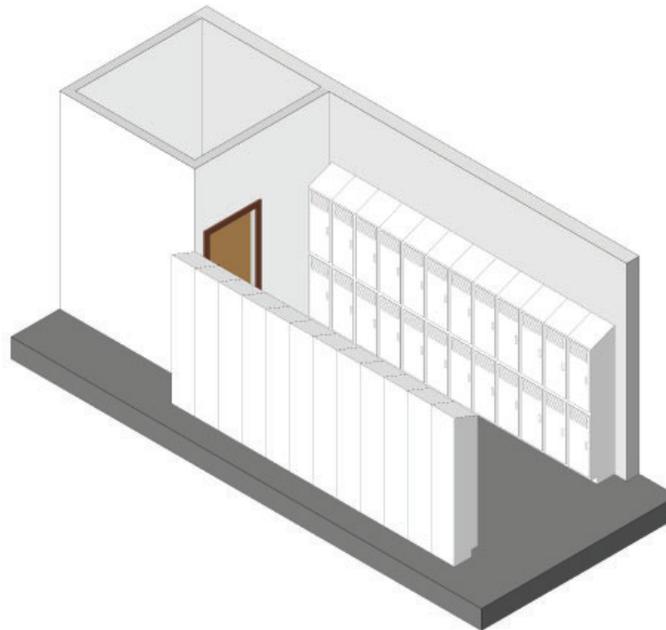
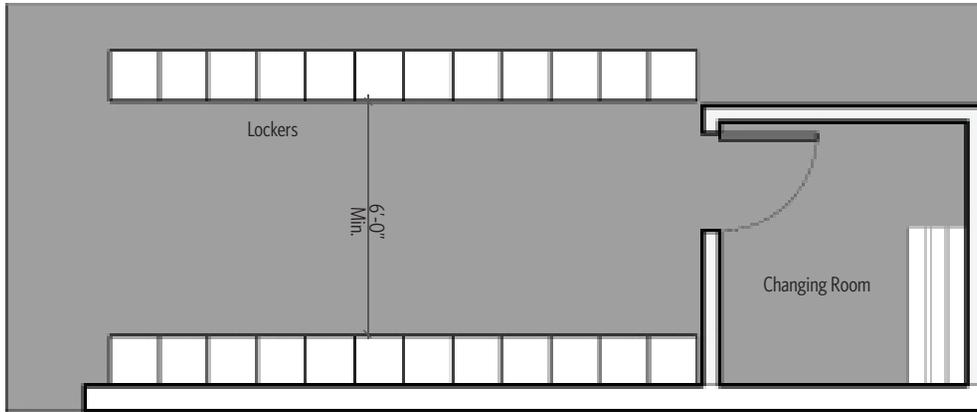
**EQUIPMENT/FURNISHINGS**

- Computer workstations
- Tables and chairs (no tables with attached chairs)
- Message and information televisions
- Chairs
- End tables
- Bulletin boards
- Recreation equipment
- Mailboxes
- Pool tables
- Alcove with workstation for incident reporting
- Millwork

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" doors (two minimum) with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Provide CO2 detection
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (30 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and conduit rough-ins to three other locations in room
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**LOCKERS**



**FUNCTION**

Co-ed locker room with alcove for Operators to store personal gear and clothing in half-height lockers (Single person occupancy private changing area within locker room and private changing areas in respective restrooms as well).

**RELATIONSHIP TO OTHER AREAS**

- Connected to Break Room
- Adjacent to Restroom/Showers

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

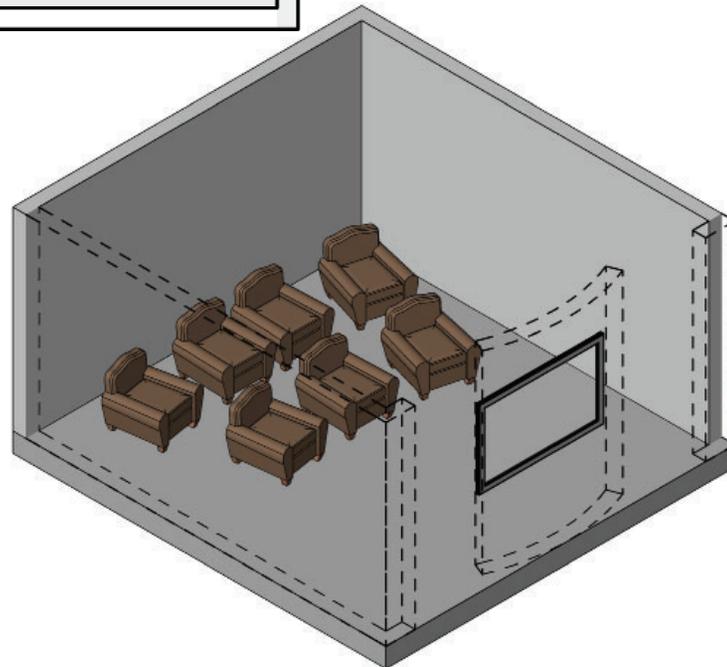
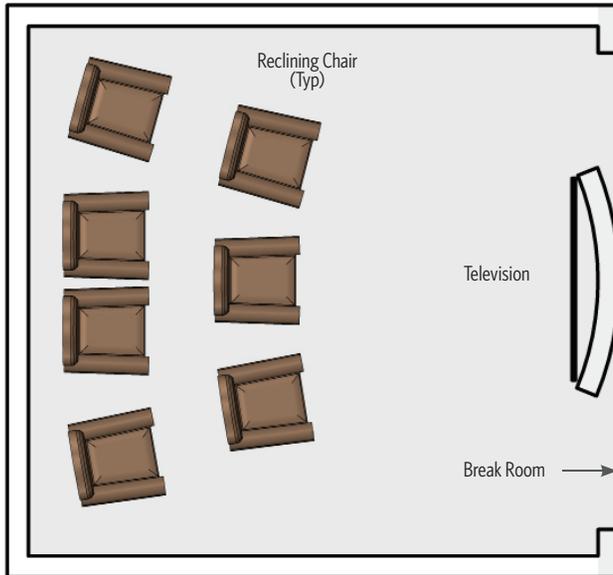
**EQUIPMENT/FURNISHINGS**

- Heavy duty, two tier, 3'-0", well-ventilated, half-height lockers; one each per Operator assigned to the facility
- Locker dimensions: 12" by 36"
- Lockers to have slant tops

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient covering or finished concrete (recommended)
  - ✓ Walls:
    - Tile covering or painted masonry (recommended)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors: Single leaf 3'-0" door
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating, ventilation, and exhaust (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

TV ROOM



FUNCTION

Enclosed room for Operators to watch television between, before, and after shifts.

RELATIONSHIP TO OTHER AREAS

- Adjacent to Break Room

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

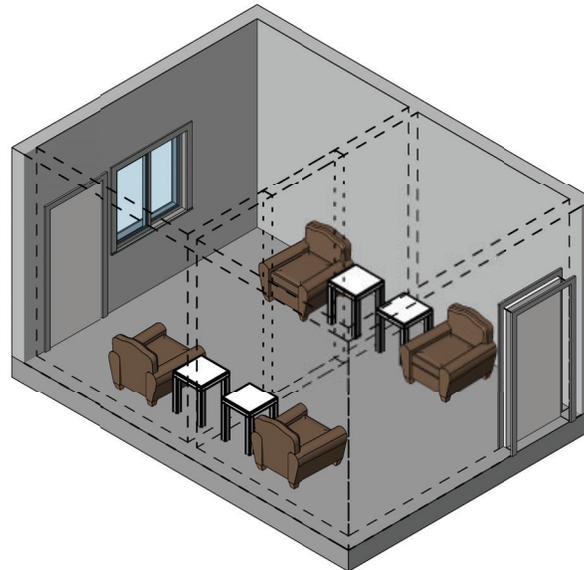
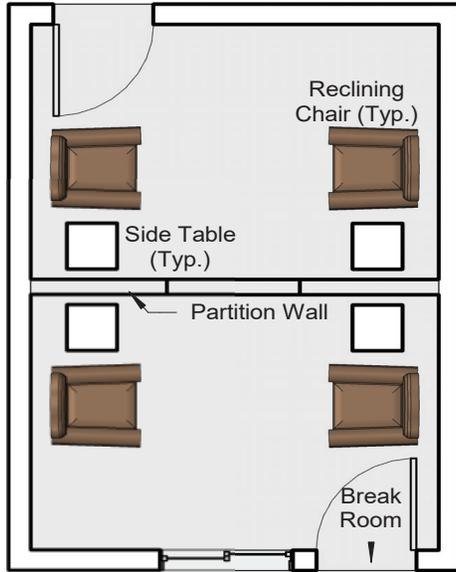
EQUIPMENT/FURNISHINGS

- Television
- Chairs
- End tables
- Table and chairs

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Carpet tile floor with rubber base or resilient floor covering with base (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
- Daylighting: No exterior openings
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (15 fc indirect lighting average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
  - ✓ Provide one data outlet with four data ports at back of TV
  - ✓ Provide coax cable to building MPOE
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**QUIET ROOM**



**FUNCTION**

Enclosed rooms for Operators to relax or sleep in a quiet environment between, before, and after shift.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to Break Room

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

**EQUIPMENT/FURNISHINGS**

- Chairs
- Side tables

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Carpet tile floor with rubber base or resilient floor covering with base (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors: Single leaf 3'-0" door
- Daylighting: No exterior openings
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Electrical:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc indirect lighting average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
- Lighting Control:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)



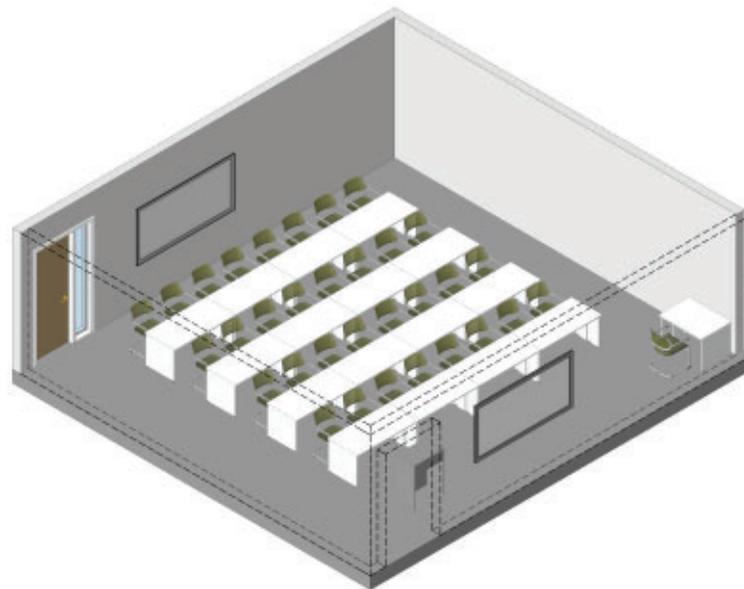
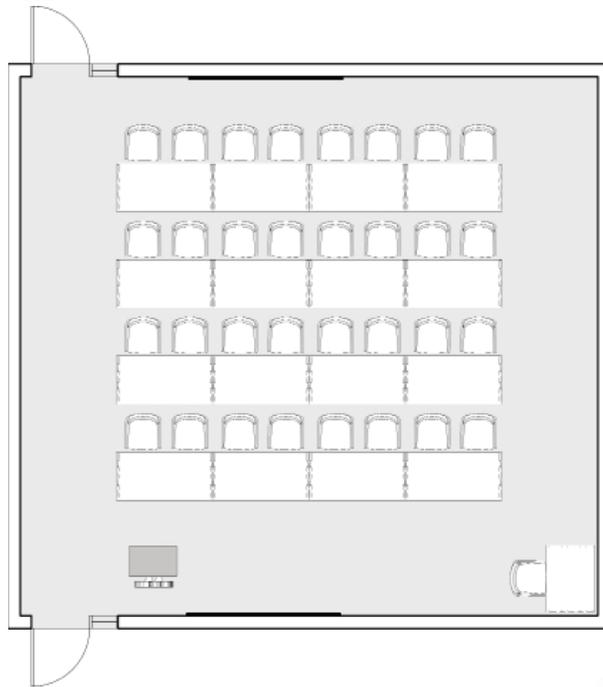
SECTION 5.9: TRANSIT SERVICES  
(MRO)



**GENERAL OFFICE MODULES**

<p><b>OPERATIONS MANAGER</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Private Office - 120 sf</b></li> <li>• Adjacent to Operations Manager</li> <li>• Adjacent to Junior Management Assistant</li> </ul>	<p><b>OPERATIONS MANAGER</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Private Office - 120 sf</b></li> <li>• Adjacent to Operations Manager</li> <li>• Adjacent to Junior Management Assistant</li> </ul>	<p><b>TRANSIT MANAGER II</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Workstation - 64 sf</b></li> <li>• Adjacent to Transit Operations Specialist</li> <li>• Adjacent to Junior Management Assistant</li> </ul>	<p><b>TRANSIT OPERATIONS SPECIALIST</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Workstation - 64 sf</b></li> <li>• Adjacent to Transit Manager II</li> <li>• Adjacent to Junior Management Assistant</li> </ul>
<p><b>MRO, STREET OPERATORS</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Workstation - 30 sf</b></li> <li>• Adjacent to Office Areas</li> </ul>		<p><b>JUNIOR MANAGEMENT ASSISTANT</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Workstation - 64 sf</b></li> <li>• Adjacent to Operations Manager</li> <li>• Adjacent to Operations Manager</li> </ul>	

**CONFERENCE ROOM**



**FUNCTION**

Room to accommodate up to ten people for meetings.

**RELATIONSHIP TO OTHER AREAS**

- Accessible from all departments in the building

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

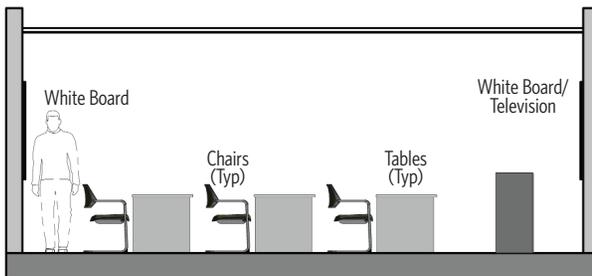
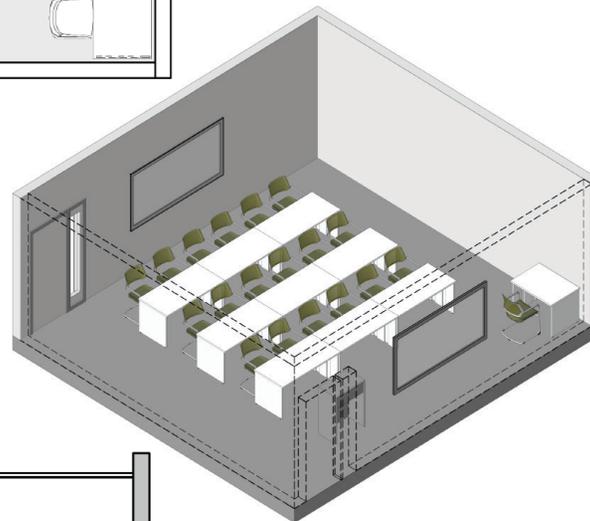
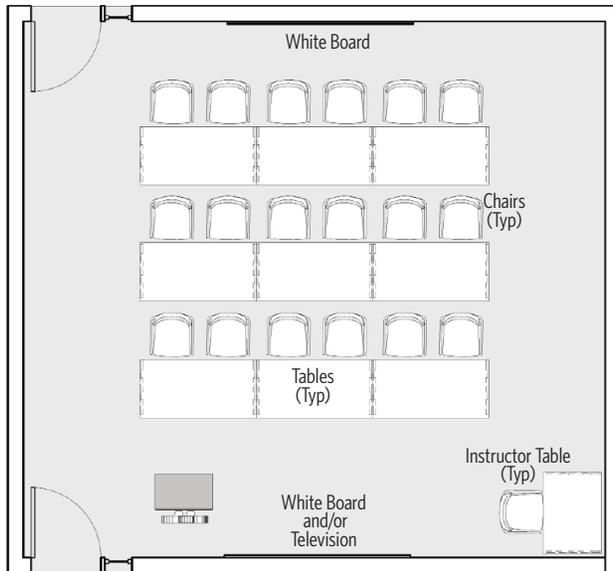
**EQUIPMENT/FURNISHINGS**

- Table
- Chairs
- White board and/or television
- Millwork

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Carpet tile floor with rubber base or resilient floor covering with base (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED lighting in accordance with IES recommendations (30 fc average)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a guard receptacle in the floor under the middle of the table
  - ✓ Provide one data outlet with four data ports in the floor under the middle of the table
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in the room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

**TRAINING ROOM**



**FUNCTION**

Room to accommodate up to 20 people for meetings or trainings.

**RELATIONSHIP TO OTHER AREAS**

- Accessible from all departments in the building

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

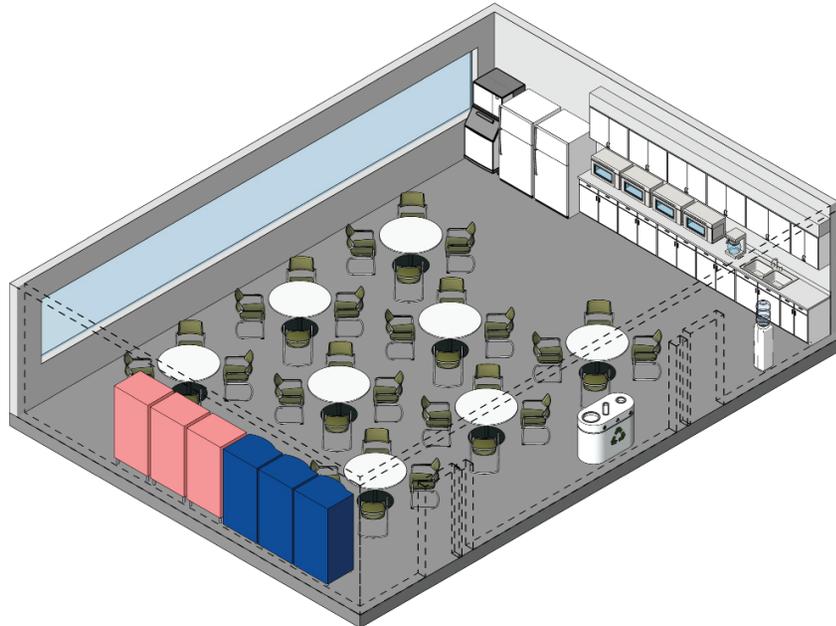
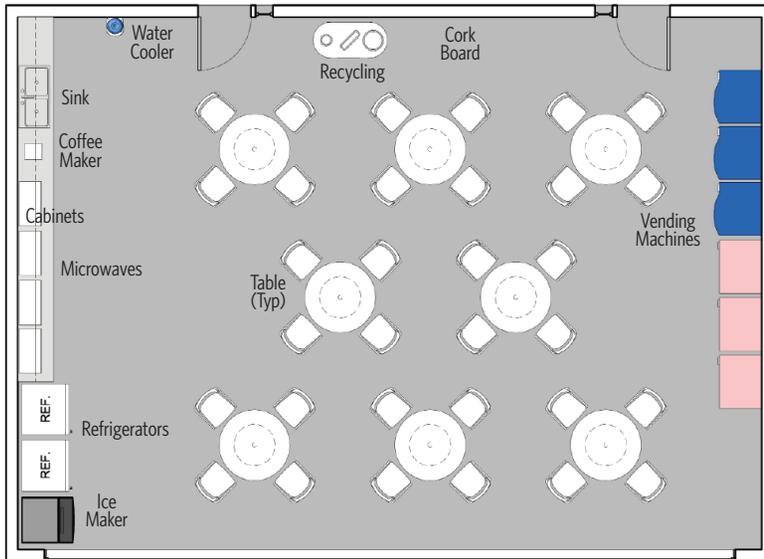
**EQUIPMENT/FURNISHINGS**

- Mayline Cohere Flip/nest table 60" by 30" laminate
- Cool mesh nesting chairs
- White board and/or television
- Millwork

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Carpet tile floor with rubber base or resilient floor covering with base (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" doors with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED lighting in accordance with IES recommendations (30 fc average)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a guard receptacle in the floor under the middle of the table
  - ✓ Provide one data outlet with four data ports in the floor under the middle of the table
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in the room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

**BREAK ROOM**



**FUNCTION**

Enclosed room used as a break area for staff.

**RELATIONSHIP TO OTHER AREAS**

- Centrally located
- Access to all office areas, repair areas, and Restrooms

**CRITICAL DIMENSIONS**

- 9' -0" vertical clearance (minimum)

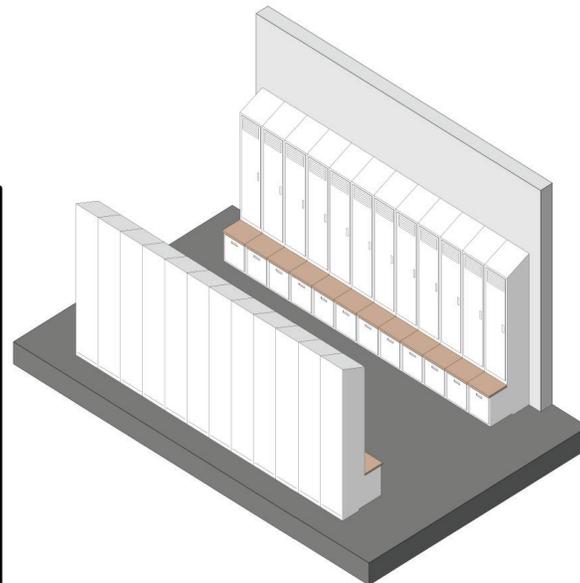
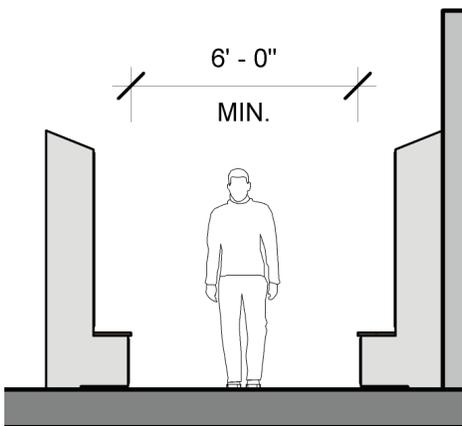
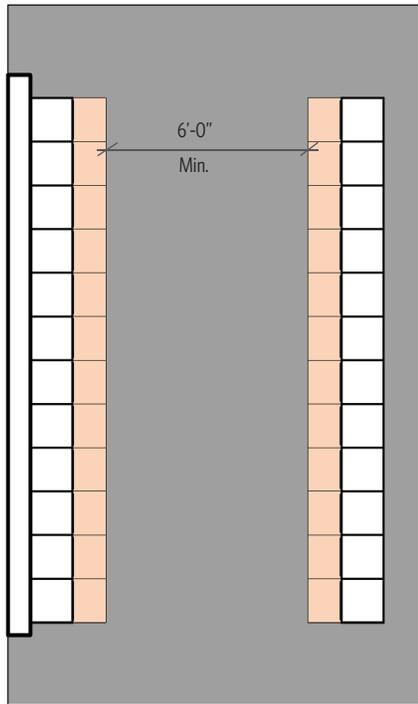
**EQUIPMENT/FURNISHINGS**

- Counter space, upper and lower cabinets, sink, microwaves, refrigerators, coffee maker, ice maker, water filter, vending machines, water coolers, tables, chairs, trash/recycling/compost bins
- Millwork

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" doors (two minimum) with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Provide CO2 detection
- Plumbing: Rough in for equipment
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
  - ✓ Provide data outlets with four data ports (two minimum)
  - ✓ Provide five GFCI outlets above kitchenette counter
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**LOCKERS**



**FUNCTION**

Locker area for each male and female Transit Services (MRO) employees. A few changing areas behind curtain or other partition will be provided.

**RELATIONSHIP TO OTHER AREAS**

- Access by Repair and Shop Areas
- Located within each Men's and Women's Restrooms

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

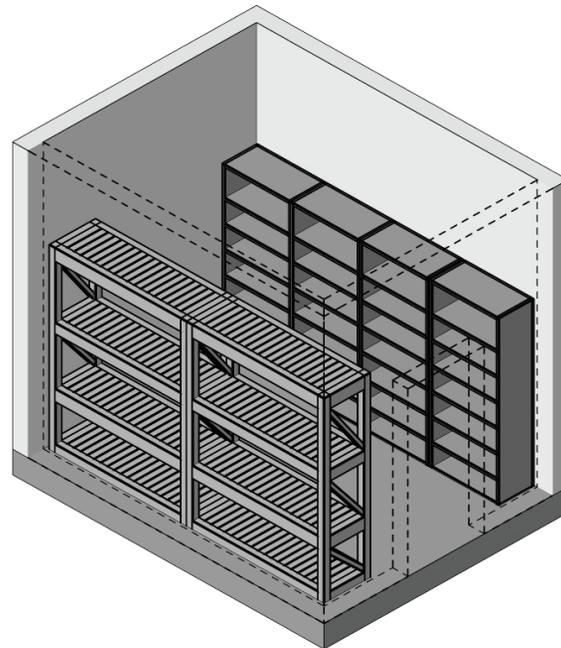
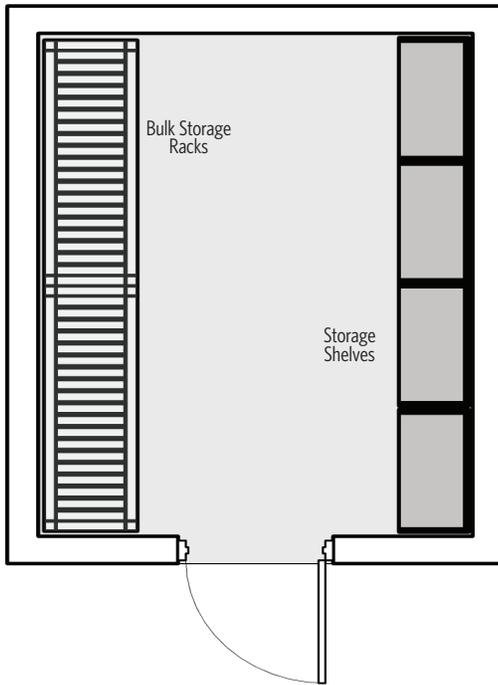
**EQUIPMENT/FURNISHINGS**

- 6'-0" high gear, well-ventilated lockers with built-in bench
- Lockers must be ADA compliant and have mirrors
- Locker Dimensions: 24" by 24"
- Lockers to have sloped tops

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering or finished concrete (recommended)
  - ✓ Walls:
    - Tile covering or finished masonry
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors: Single leaf 3'-0" door
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating, ventilation, and exhaust (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (15 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**STORAGE**



**FUNCTION**

Dedicated secure storage for Transit Service supplies.

**RELATIONSHIP TO OTHER AREAS**

- N/A

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

**EQUIPMENT/FURNISHINGS**

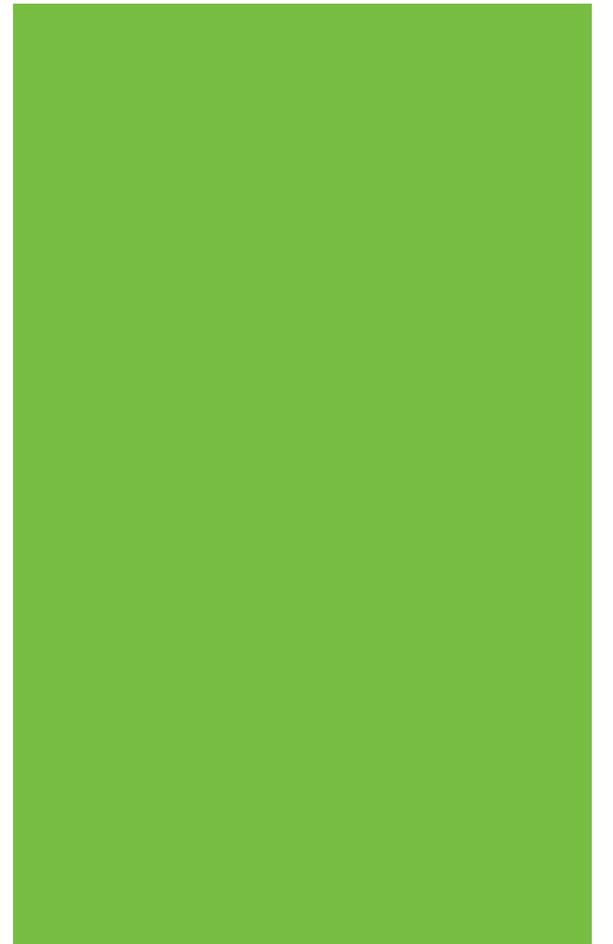
- Shelving
- Racking

**DESIGN FEATURES**

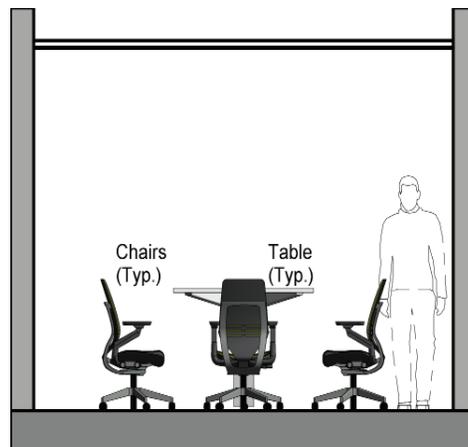
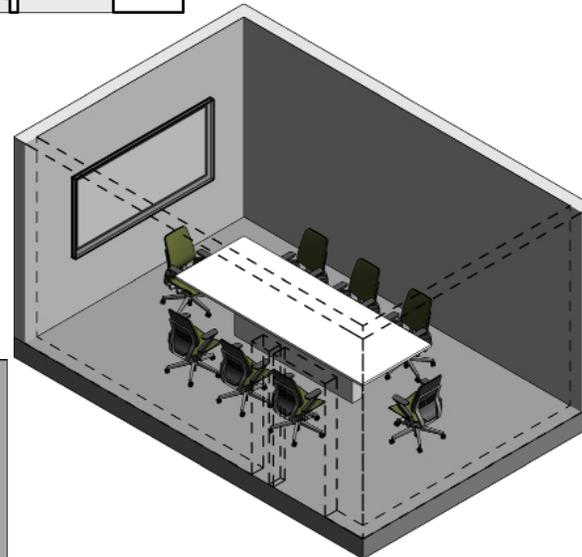
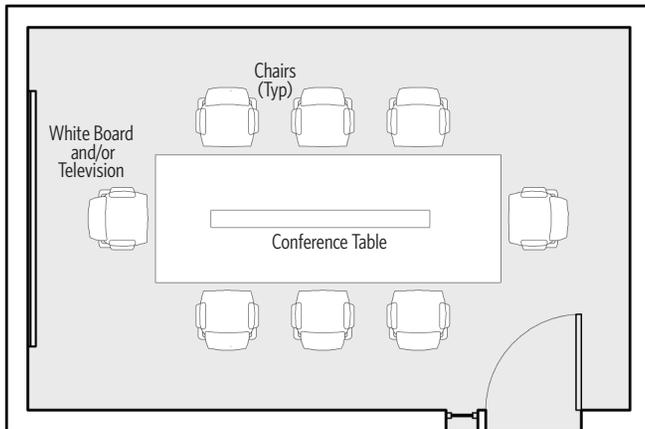
- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: No exterior exposure
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Keep consistent humidity levels
- Power:
  - ✓ LED lighting in accordance with IES recommendation (30 fc average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
- Lighting: Dimmable, indirect lighting with occupancy sensors



## SECTION 5.10: SHARED



MEDIUM CONFERENCE ROOM



FUNCTION

Room to accommodate up to ten people for meetings.

RELATIONSHIP TO OTHER AREAS

- Accessible from all departments in the building

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

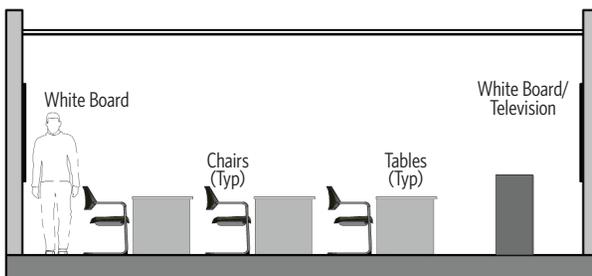
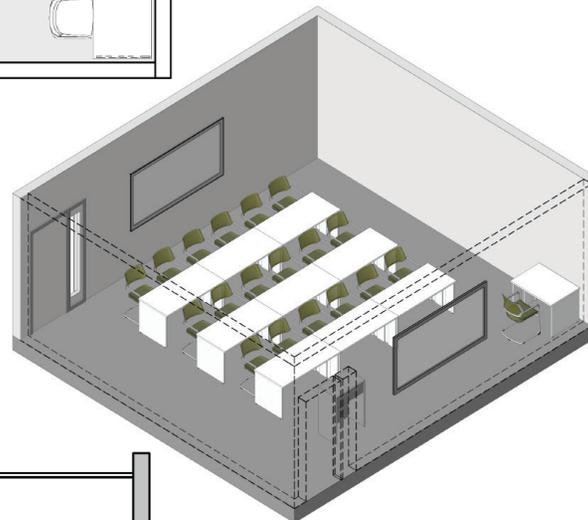
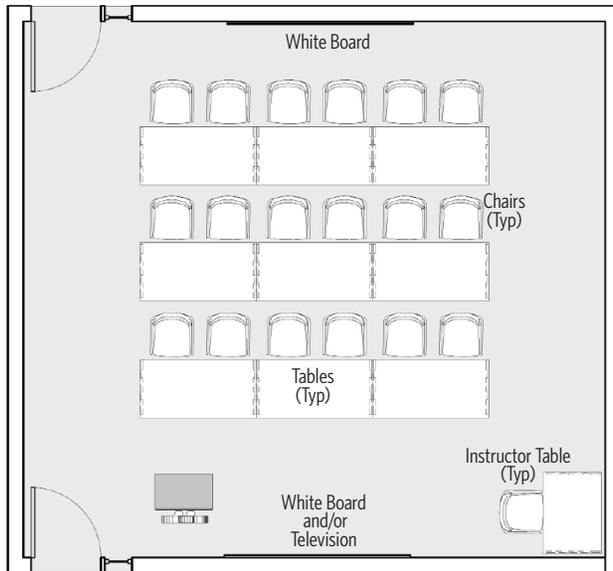
EQUIPMENT/FURNISHINGS

- Table
- Chairs
- White board and/or television
- Millwork

DESIGN FEATURES

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Carpet tile floor with rubber base or resilient floor covering with base (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED lighting in accordance with IES recommendations (30 fc average)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a guard receptacle in the floor under the middle of the table
  - ✓ Provide one data outlet with four data ports in the floor under the middle of the table
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in the room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

LARGE CONFERENCE/SMALL TRAINING



FUNCTION

Room to accommodate up to 20 people for meetings or trainings.

RELATIONSHIP TO OTHER AREAS

- Accessible from all departments in the building

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

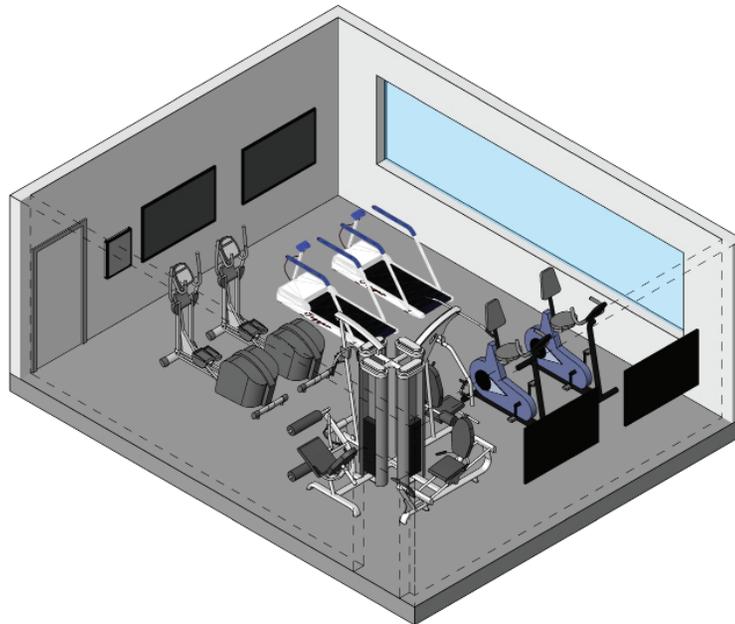
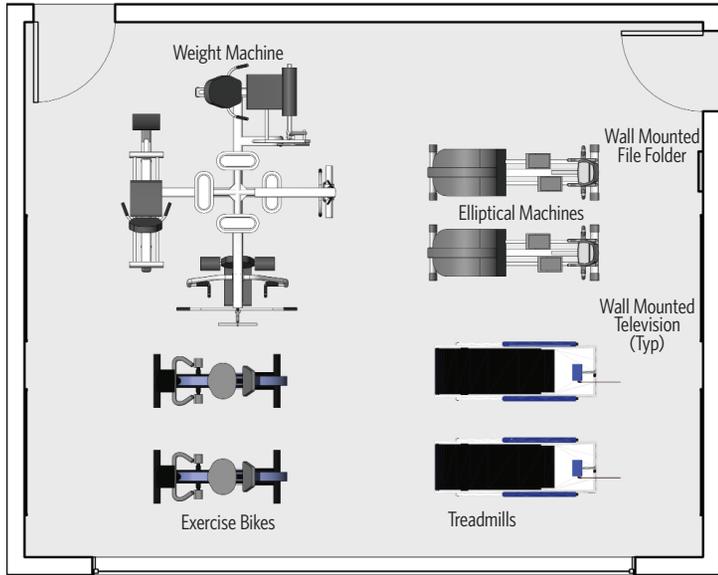
EQUIPMENT/FURNISHINGS

- Mayline Cohere Flip/nest table
- White board and/or television
- 60" by 30" laminate
- Millwork
- Cool mesh nesting chairs

DESIGN FEATURES

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Carpet tile floor with rubber base or resilient floor covering with base (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" doors with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED lighting in accordance with IES recommendations (30 fc average)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a guard receptacle in the floor under the middle of the table
  - ✓ Provide one data outlet with four data ports in the floor under the middle of the table
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in the room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

**FITNESS ROOM**



**FUNCTION**

Enclosed area with exercise equipment for employee fitness.

**RELATIONSHIP TO OTHER AREAS**

- Accessible from the Break Room, Lockers, and Restrooms and Showers

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

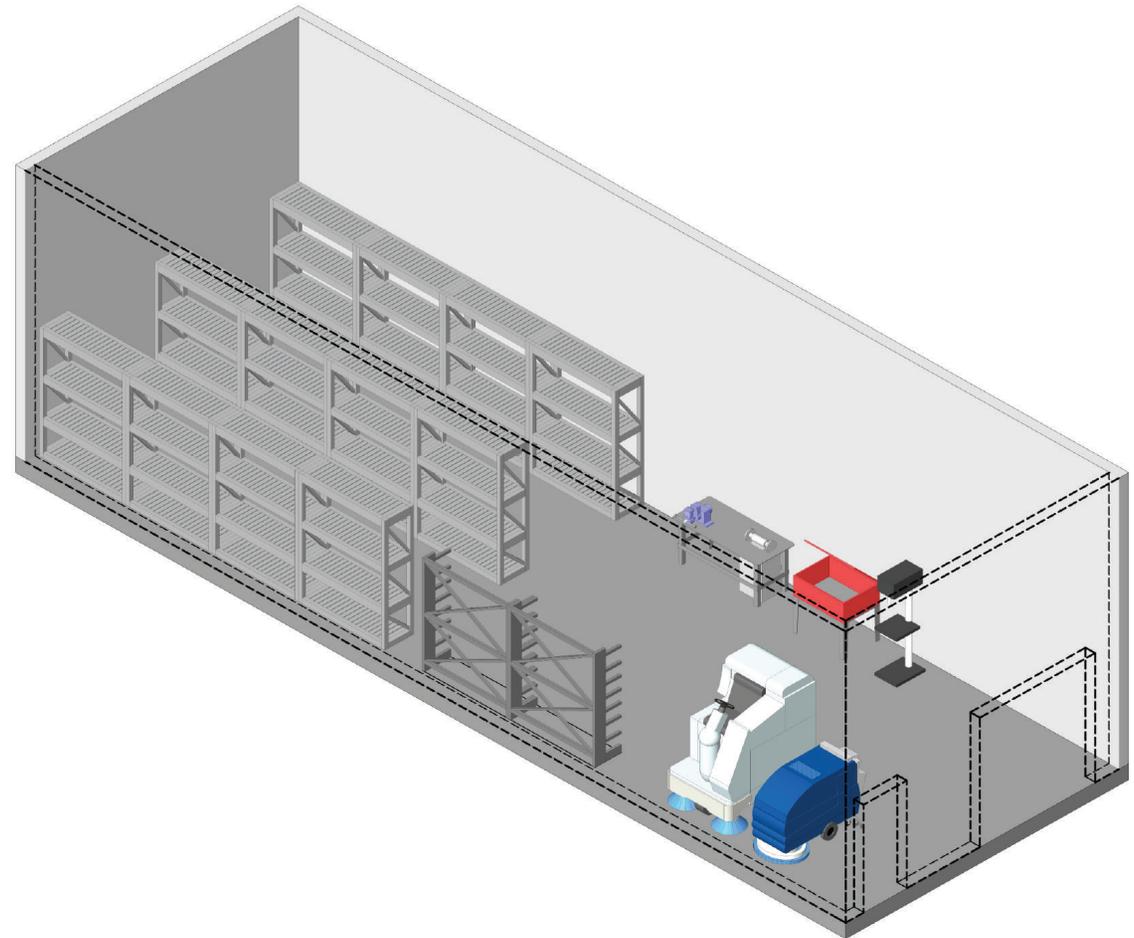
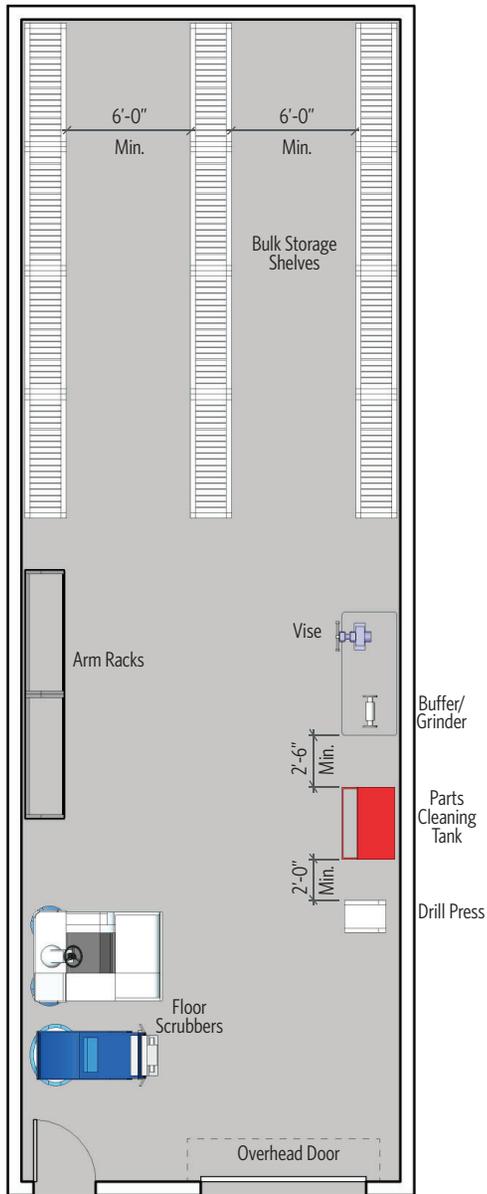
**EQUIPMENT/FURNISHINGS**

- Miscellaneous fitness equipment determined by the Owner
- Television

**DESIGN FEATURES**

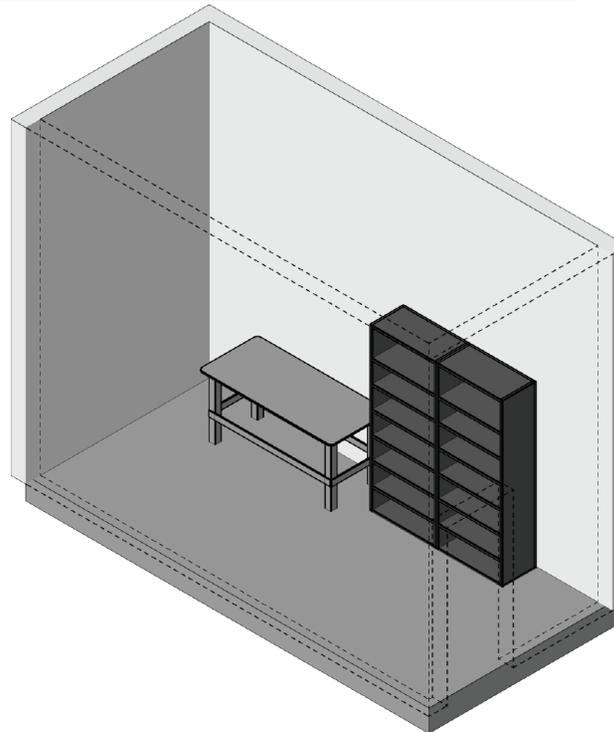
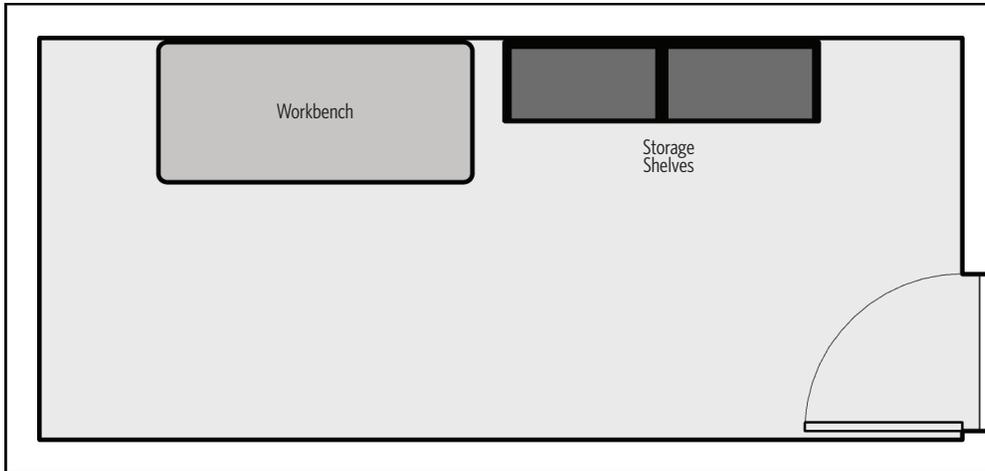
- Architectural:
  - ✓ Floor: Athletic rubber floor tiles with base (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors: Single leaf 3'-0" doors
- Daylighting: Exterior window desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (25 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

BUILDING ENGINEER/BUILDING STORAGE



BUILDING ENGINEER/BUILDING STORAGE		
<p><b>FUNCTION</b></p> <p>Enclosed, secure shop and materials storage and upkeep of materials related to maintenance buildings and site grounds.</p>	<p><b>ARCHITECTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Finishes:                             <ul style="list-style-type: none"> <li>✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer</li> <li>✓ Walls: Soil and grease resistant, with light colored finish, made of concrete or masonry</li> <li>✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities, light colored finish</li> </ul> </li> <li>• Doors:                             <ul style="list-style-type: none"> <li>✓ Personnel door with view panel to meet applicable code exit requirements</li> <li>✓ Exterior overhead doors: High lifting sectional, steel, insulated, 10'-0" by 12'-0" with view panels. Automatic operator, interior and exterior push button controls with lockout on exterior</li> <li>✓ Bollards on exterior at jambs of overhead door (two each)</li> </ul> </li> </ul>	<p><b>PLUMBING CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Compressed air drop:                             <ul style="list-style-type: none"> <li>✓ 2'-0" compressed air piping loop (minimum)</li> <li>✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF</li> <li>✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design</li> <li>✓ As required by equipment</li> </ul> </li> <li>• As required by equipment</li> </ul>
<p><b>RELATIONSHIP TO OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>• Access to all Restroom&gt;Showers and Break/Crew Room</li> </ul>	<p><b>STRUCTURAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Control joints in floor slab at adequate spacing</li> <li>• Structure as needed to support equipment</li> <li>• Floor slab designed to accommodate in-floor radiant heat (if desired)</li> </ul>	<p><b>ELECTRICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Power:                             <ul style="list-style-type: none"> <li>✓ All receptacles and outlets at 3'-6" AFF</li> <li>✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns</li> <li>✓ Dedicated computer receptacle, adjacent to data conduit on wall or column</li> <li>✓ As required by equipment</li> </ul> </li> <li>• Lighting:                             <ul style="list-style-type: none"> <li>✓ LED lighting in accordance with IES recommendation minimum (20 fc average)</li> <li>✓ Fixtures located to illuminate work spaces</li> </ul> </li> <li>• Communications:                             <ul style="list-style-type: none"> <li>✓ Paging/intercom system speakers</li> <li>✓ Data conduit on columns and/or walls</li> </ul> </li> </ul>
<p><b>CRITICAL DIMENSIONS</b></p> <ul style="list-style-type: none"> <li>• 14'-0" vertical clearance to structure and clearance</li> </ul>	<p><b>MECHANICAL CONSIDERATIONS</b></p> <ul style="list-style-type: none"> <li>• Heating set point: 65 degrees Fahrenheit</li> <li>• General ventilation (per code)</li> <li>• In-floor radiant heat (if desired)</li> <li>• As required by equipment</li> </ul>	
<p><b>EQUIPMENT/FURNISHINGS</b></p> <ul style="list-style-type: none"> <li>• Severe use workbench with vise</li> <li>• Buffer/grinder</li> <li>• Drill press</li> <li>• Parts cleaning tank</li> <li>• Shelving units</li> <li>• Arm racks</li> <li>• Floor scrubbers</li> </ul>		
<p><b>DESIGN FEATURES</b></p> <ul style="list-style-type: none"> <li>• Forklift access</li> <li>• Electronically secured entry</li> </ul>		

REVENUE OFFICE



FUNCTION

Secure area for storing specialized tools and equipment for fare retrieval, adaptable with space for workstation.

RELATIONSHIP TO OTHER AREAS

- Adjacent to Meet & Greet at entrance

CRITICAL DIMENSIONS

- 12'-0" vertical clearance to structure and fixtures

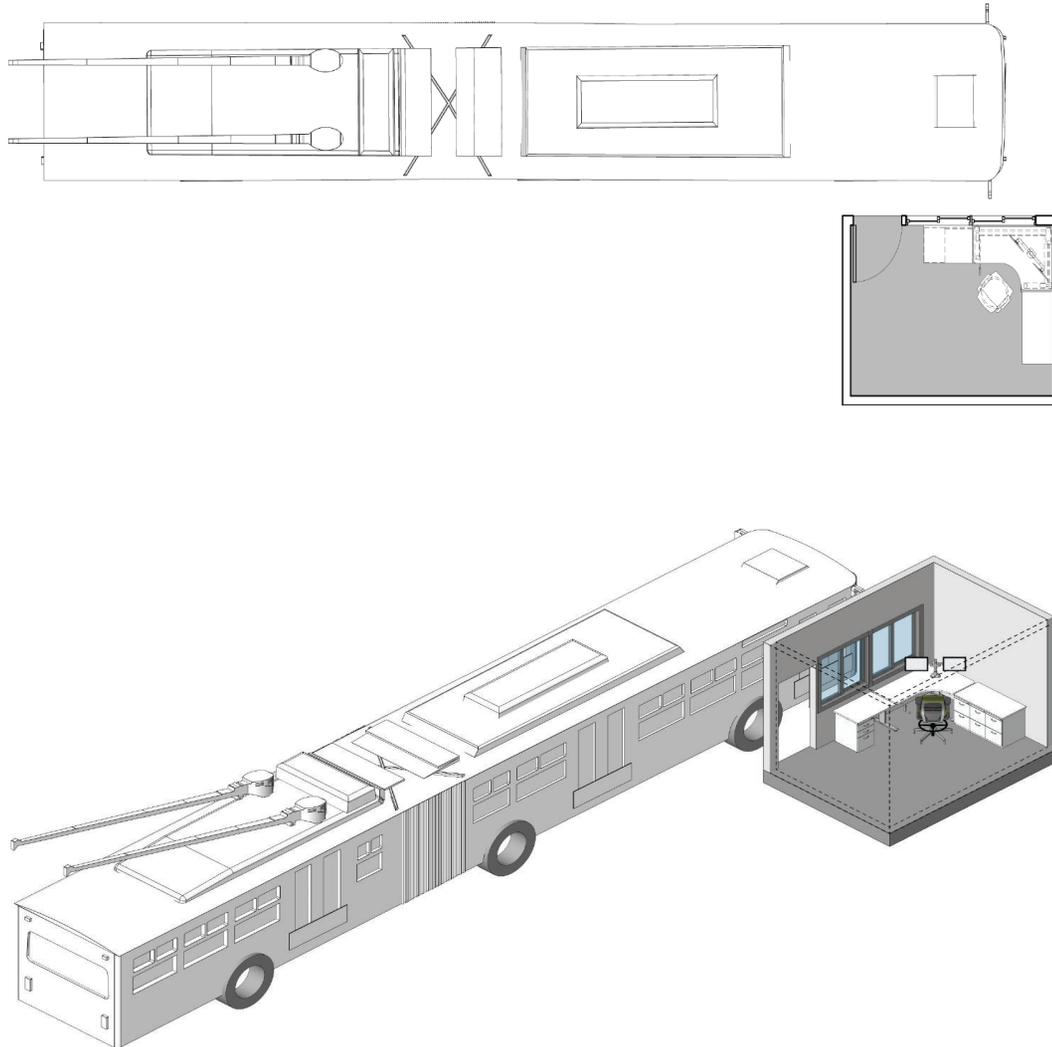
EQUIPMENT/FURNISHINGS

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Soil, grease, water, slip resistant concrete, with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities, with light colored finish
  - ✓ Doors: Personnel door with view panels to meet applicable code exit requirements (not required with wire mesh walls)
- Structural:
  - ✓ Control joints in floor slab at adequate spacing
  - ✓ Floor slab to accommodate in-floor radiant heat (if desired)
  - ✓ Structure as needed to support equipment
  - ✓ Floor slab designed to accommodate forklift access
- Mechanical:
  - ✓ In-floor radiant heat (if desired)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ General ventilation (per code)
  - ✓ As required by equipment
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting: LED lighting in accordance with IES recommendation minimum (20 fc average)

**MEET & GREET**



**FUNCTION**

Space for buses to be greeted as they enter the facility.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to entrance of facility
- Buses will use circulation aisle to access Meet & Greet

**CRITICAL DIMENSIONS**

- 19'-0" vertical clearance (minimum)

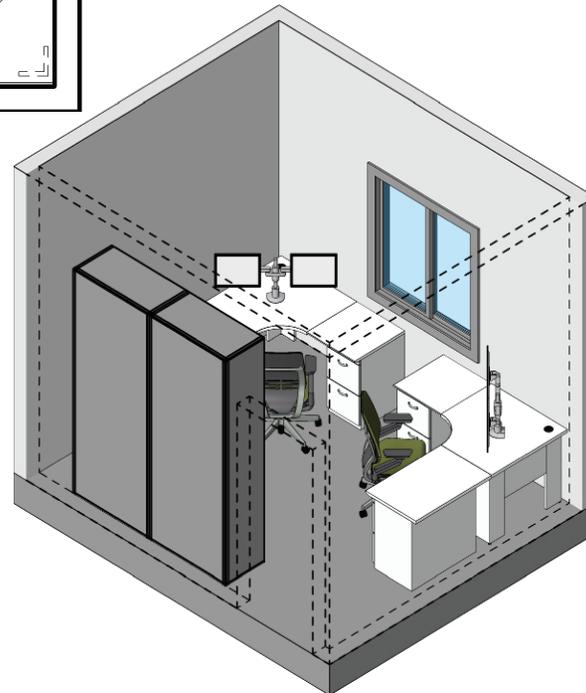
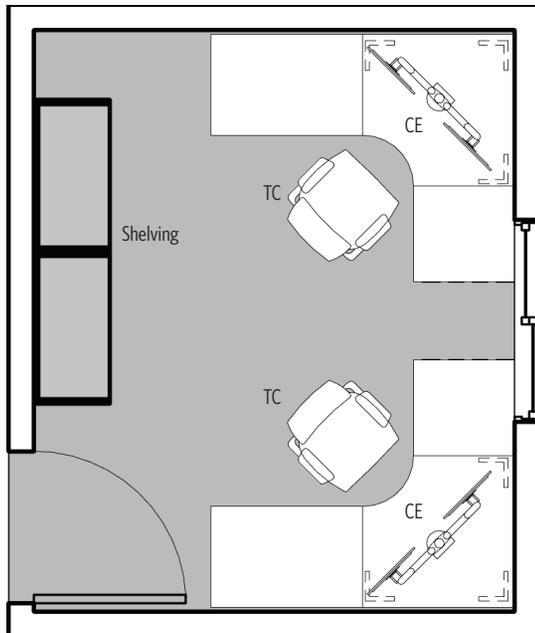
**EQUIPMENT/FURNISHINGS**

- Task chair
- Sit/stand workstation
- Under surface vertical files
- Cabinets
- Guest chairs

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring:
    - Carpet tile floor with rubber base for Administration or Operations areas (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
    - Resilient floor covering with base for maintenance areas (recommended).
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with loadable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (35 fc average)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a quad receptacle at each workstation
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

SECURITY OFFICE



FUNCTION

Office for security staff to monitor facility.

RELATIONSHIP TO OTHER AREAS

- Case specific (office areas specific to each group); reference general module

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

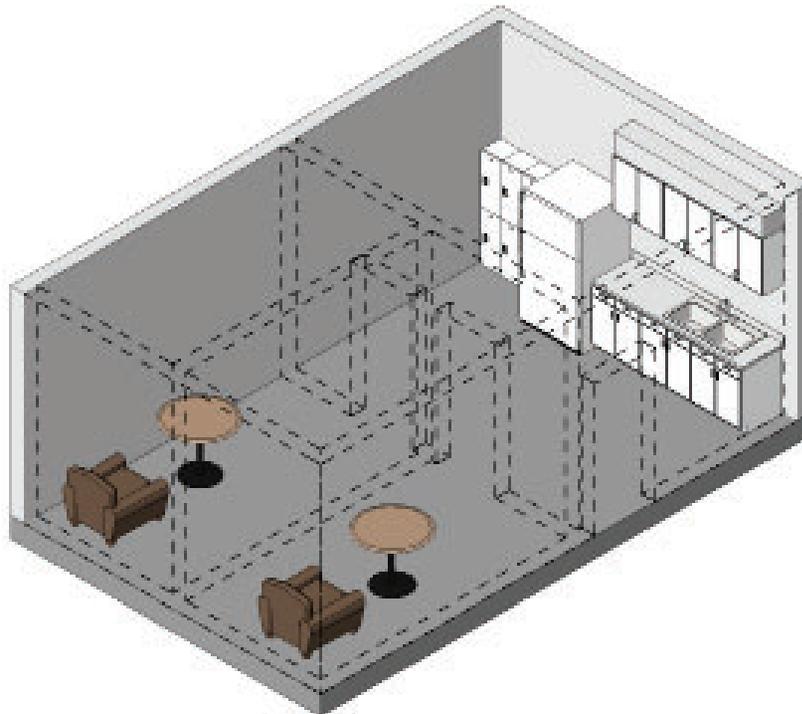
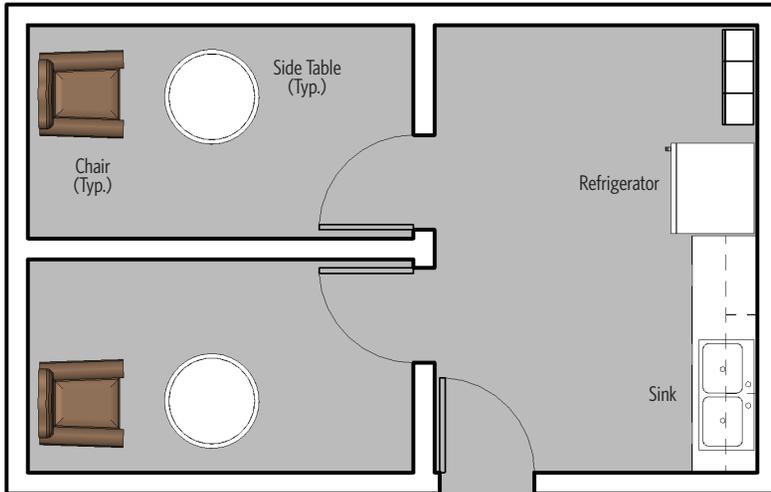
EQUIPMENT/FURNISHINGS

- Task chair
- Sit/stand workstation
- Under surface vertical files
- Cabinets
- Guest chairs

DESIGN FEATURES

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring:
    - Carpet tile floor with rubber base for Administration or Operations areas (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
    - Resilient floor covering with base for maintenance areas (recommended).
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with loadable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (35 fc average)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a quad receptacle at each workstation
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

LACTATION ROOM



FUNCTION

Dedicated room for employees who are breastfeeding to pump breast milk in private.

RELATIONSHIP TO OTHER AREAS

- Accessible from department office areas

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

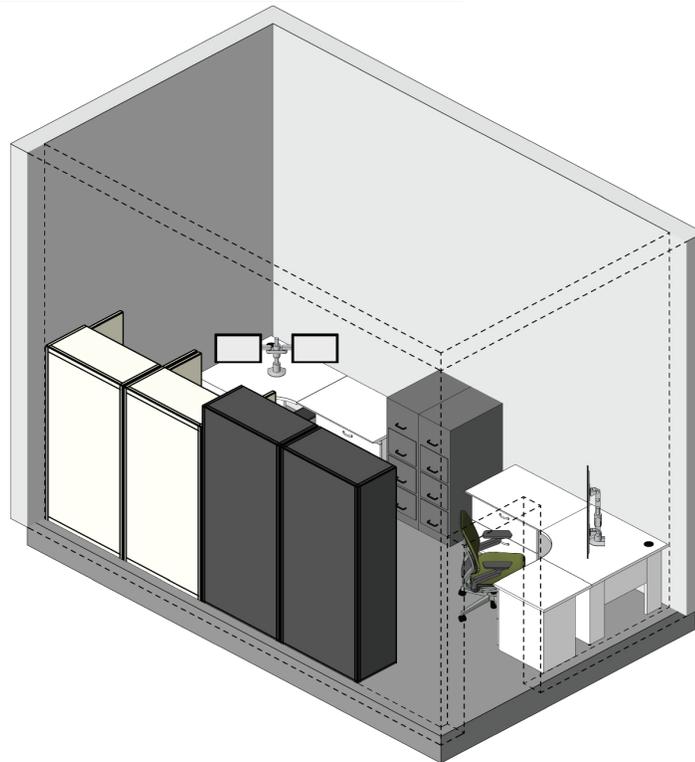
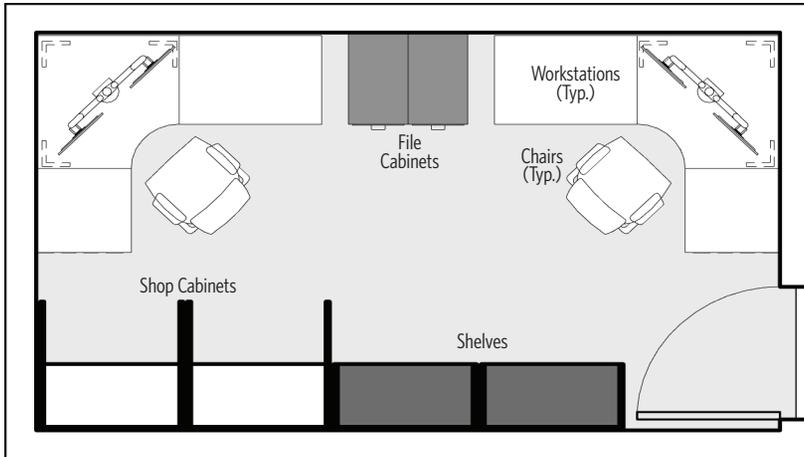
EQUIPMENT/FURNISHINGS

- Sink with countertops and cabinets
- Secure storage for equipment and supplies
- Lockers
- Side tables
- Refrigerator
- Chairs
- Door with interior lock

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf lockable 3'-0" door with loadable lever set hardware (recommended)
    - Electronically secured entry
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Plumbing: rough-in for fixtures
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc indirect lighting average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
  - ✓ Provide one GFCI outlet above counter
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

FACILITIES STATIONARY ENGINEER OFFICE/SHOP



FUNCTION

Workstations, Shop and Storage for Facilities Stationary Engineering staff.

RELATIONSHIP TO OTHER AREAS

- Access to Parts Window/Shopkeeper/Parts Storage/ Shipping and Receiving/ Dock

CRITICAL DIMENSIONS

- 12'-0" vertical clearance to structure and fixtures

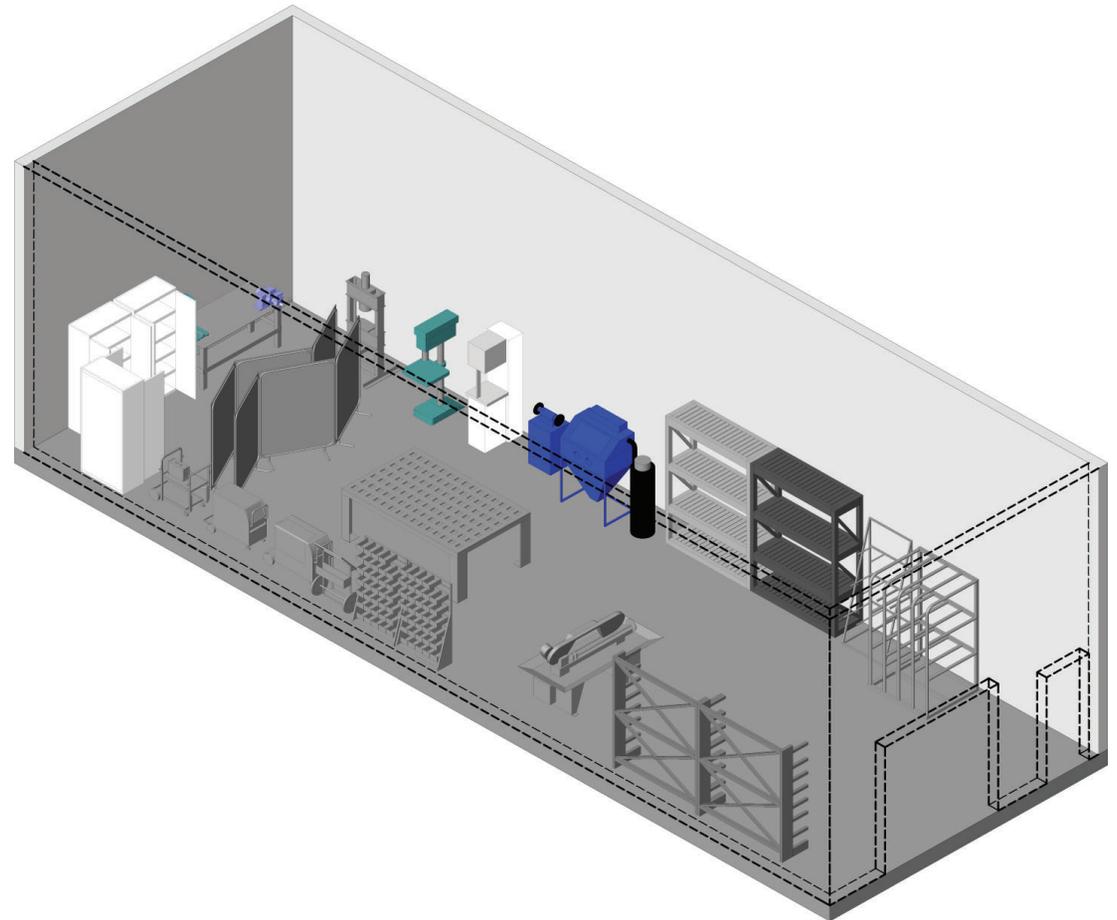
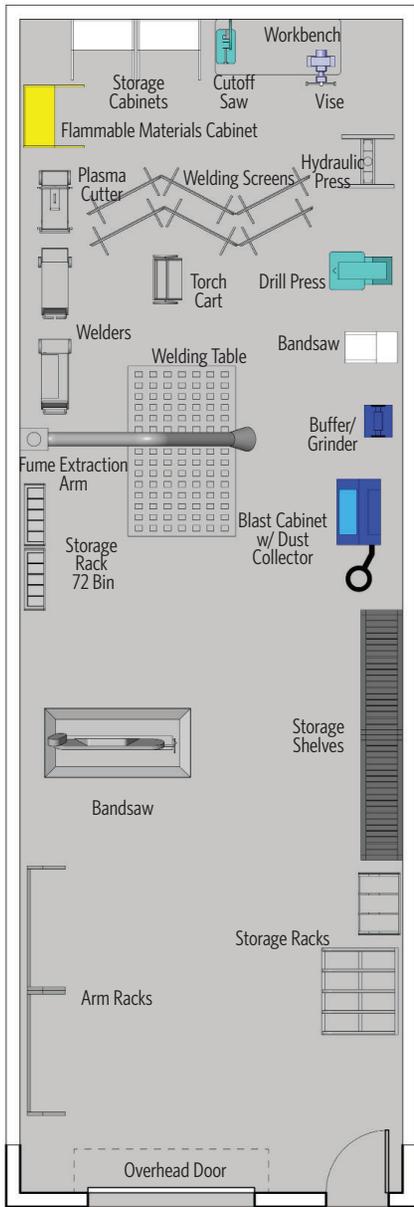
EQUIPMENT/FURNISHINGS

- Typical equipment is shown, reference Appendix A: Equipment Manual for specific project equipment

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Soil, grease, water, slip resistant concrete, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities, light colored finish
  - ✓ Doors: Personnel door with view panels to meet applicable code exit requirements (not required with wire mesh walls)
- Structural:
  - ✓ Control joints in floor slab at adequate spacing
  - ✓ Floor slab to accommodate in-floor radiant heat (if desired)
  - ✓ Structure as needed to support equipment
  - ✓ Floor slab designed to accommodate forklift access
- Mechanical:
  - ✓ In-floor radiant heat (if desired)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ General ventilation (per code)
  - ✓ As required by equipment
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting: LED lighting in accordance with IES recommendation minimum (20 fc average)

SHEET METAL SHOP



**SHEET METAL SHOP**

**FUNCTION**

Enclosed, secure shop and materials storage for metal fabrication.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to bus maintenance areas

**CRITICAL DIMENSIONS**

- 14'-0" vertical clearance to structure and clearance

**EQUIPMENT/FURNISHINGS**

- Reference Equipment Manual

**DESIGN FEATURES**

- Forklift access
- Electronically secured entry

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete with integral, non-metallic, light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, with light colored finish, made of concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit, and utilities, light colored finish
- Doors:
  - ✓ Personnel door with view panel to meet applicable code exit requirements
  - ✓ Exterior overhead doors: High lifting sectional, steel, insulated, 10'-0" by 12'-0" with view panels. Automatic operator, interior and exterior push button controls with lockout on exterior
  - ✓ Bollards on exterior at jambs of overhead door (two each)

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)

**MECHANICAL CONSIDERATIONS**

- Heating set point: 65 degrees Fahrenheit
- General ventilation (per code)
- In-floor radiant heat (if desired)
- As required by equipment

**PLUMBING CONSIDERATIONS**

- Compressed air drop:
  - ✓ 2'-0" compressed air piping loop (minimum)
  - ✓ Compressed air drops with shut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - ✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design
  - ✓ As required by equipment
- As required by equipment

**ELECTRICAL CONSIDERATIONS**

- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles (ten minimum) on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Lighting:
  - ✓ LED lighting in accordance with IES recommendation minimum (20 fc average)
  - ✓ Fixtures located to illuminate work spaces
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns and/or walls



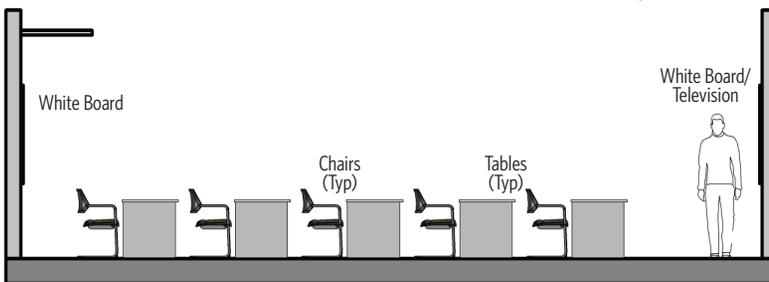
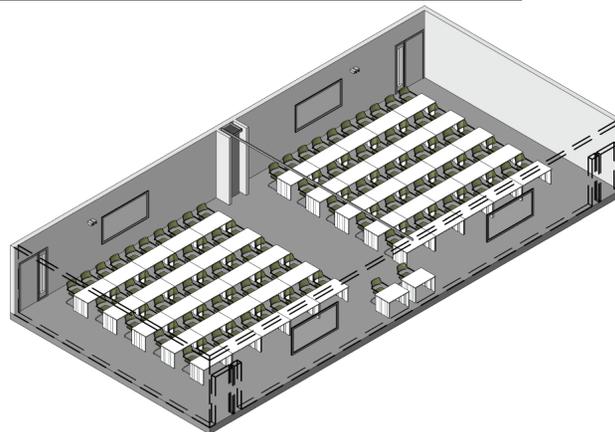
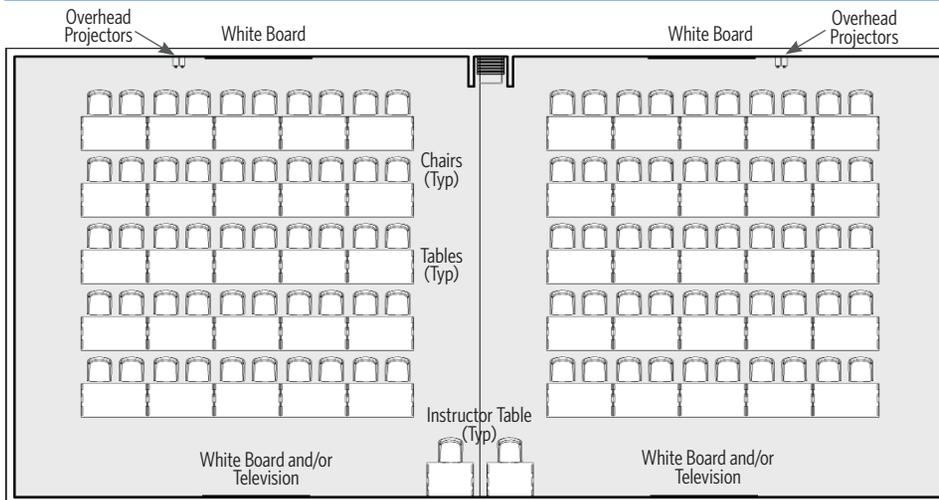
## SECTION 5.11: TRAINING



GENERAL OFFICE MODULES

<p><b>MANAGER</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Private Office - 224 sf</b></li> <li>• Adjacent to Superintendent</li> <li>• Adjacent to Assistant Superintendent</li> </ul>	<p><b>SUPERINTENDENT</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Private Office - 224 sf</b></li> <li>• Adjacent to Manager</li> <li>• Adjacent to Assistant Superintendent</li> </ul>	<p><b>ASSISTANT SUPERINTENDENT</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Private Office - 120 sf</b></li> <li>• Adjacent to Manager</li> <li>• Adjacent to Superintendent</li> </ul>	<p><b>SUPERVISOR</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Workstation - 64 sf</b></li> <li>• Adjacent to Verification of Transit Training</li> <li>• Adjacent to Instructors</li> </ul>
<p><b>CLERICAL STAFF</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Workstation - 64 sf</b></li> <li>• Adjacent to Team Leaders</li> </ul>	<p><b>TEAM LEADERS</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Workstation - 64 sf</b></li> <li>• Adjacent to Clerical Staff</li> </ul>	<p><b>CAT TRAINING</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Workstation - 64 sf</b></li> <li>• Adjacent to Supervisors</li> </ul>	<p><b>INSTRUCTORS</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Workstation - 30 sf</b></li> <li>• Adjacent to Training Room</li> <li>• Adjacent to Classroom</li> </ul>
<p><b>IT OFFICE</b></p> <ul style="list-style-type: none"> <li>• Reference <b>Office Module Private Office - 120 sf</b></li> <li>• Adjacent to Computer Lab</li> </ul>			

**CLASSROOM A & B**



**FUNCTION**

Large room(s) for staff training activities. Each space shall accommodate 50 students separately, 100 when combined. Classrooms A & B can be divided or joined via folding partition wall.

**RELATIONSHIP TO OTHER AREAS**

- Accessible to all departments in the building
- Adjacent to Training Office area

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

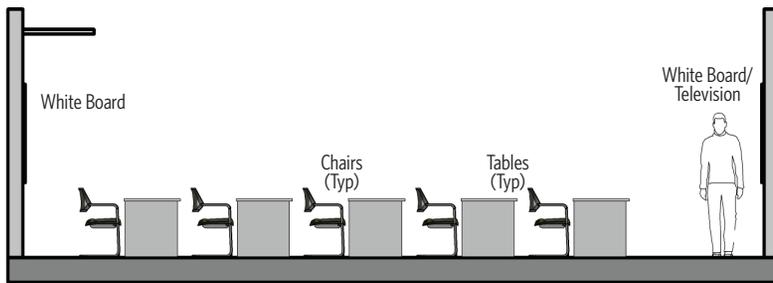
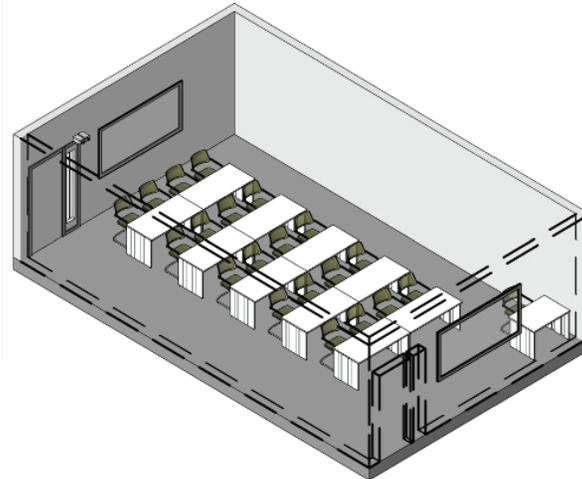
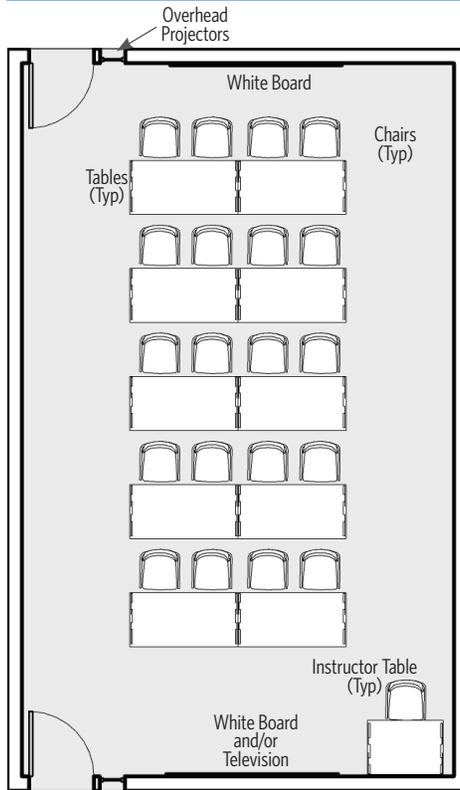
**EQUIPMENT/FURNISHINGS**

- Mayline Cohere Flip/nest table 60" by 30" laminate
- Cool mesh nesting chairs
- Whiteboard and/or television
- Overhead projectors

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Carpet tile floor with rubber base or resilient floor covering with base (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Provide CO2 detection
- Power:
  - ✓ LED lighting in accordance with IES recommendations (35 fc average)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a guard receptacle in the floor under the middle of the table
  - ✓ Provide one data outlet with four data ports in the floor under the middle of the table
  - ✓ Provide box and one inch or larger conduit rough-ins every ten feet in all walls in room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

CLASSROOM C & D



FUNCTION

Room(s) for staff training. This space accommodates 20 students and one instructor.

RELATIONSHIP TO OTHER AREAS

- Accessible to all departments in the building
- Adjacent to Training Office area

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

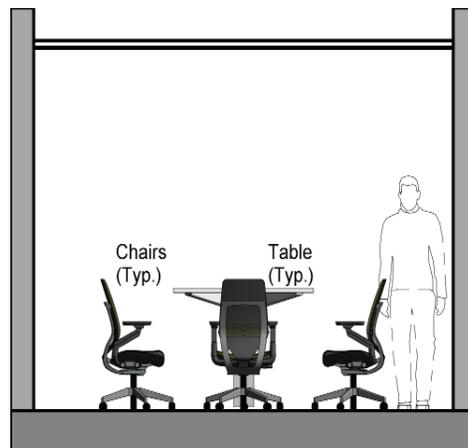
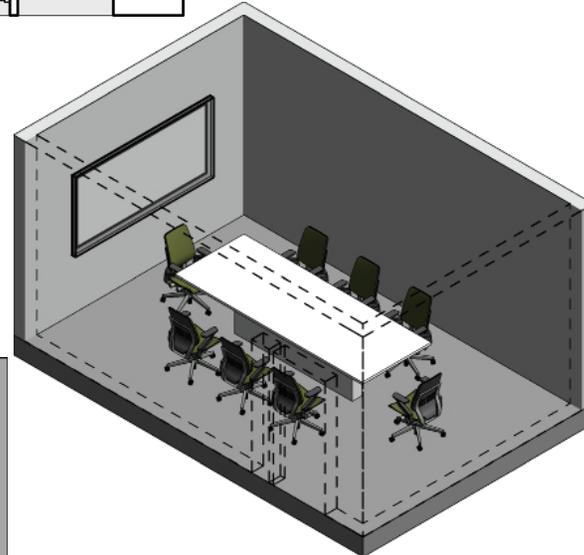
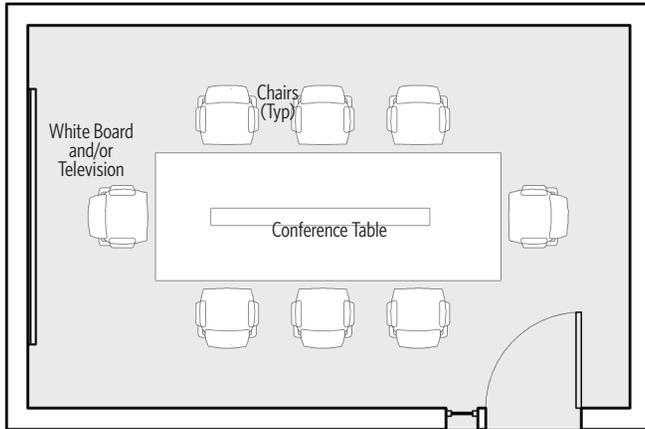
EQUIPMENT/FURNISHINGS

- Mayline Cohere Flip/nest table 60"
- Cool mesh nesting chairs
- Whiteboard and/or television by 30" laminate
- Overhead projector

DESIGN FEATURES

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Carpet tile floor with rubber base or resilient floor covering with base (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Provide CO2 detection
- Power:
  - ✓ LED lighting in accordance with IES recommendations (35 fc average)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a guard receptacle in the floor under the middle of the table
  - ✓ Provide one data outlet with four data ports in the floor under the middle of the table
  - ✓ Provide box and one inch or larger conduit rough-ins every ten feet in all walls in room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

CONFERENCE ROOM A & B



FUNCTION

Room to accommodate up to 10 people for meetings.

RELATIONSHIP TO OTHER AREAS

- Accessible from all departments in the building

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

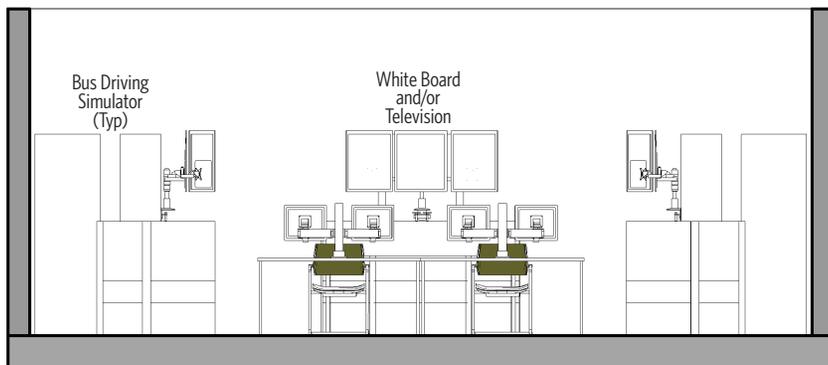
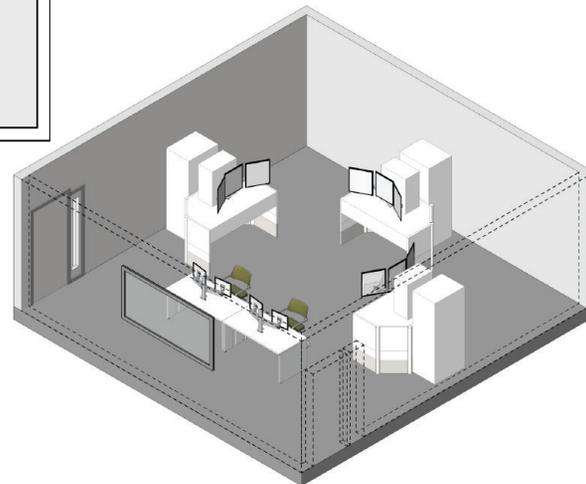
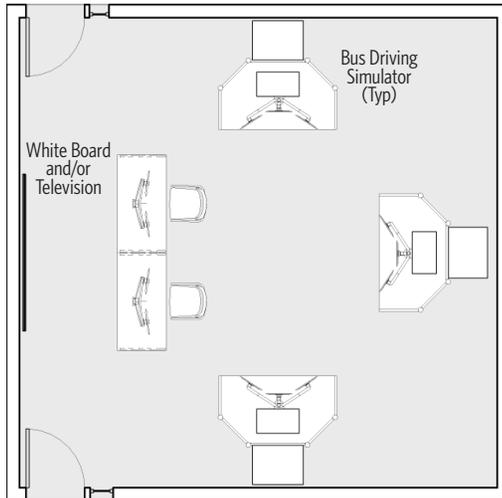
EQUIPMENT/FURNISHINGS

- Table
- Chairs
- White board and/or television
- Millwork

DESIGN FEATURES

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Carpet tile floor with rubber base or resilient floor covering with base (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED lighting in accordance with IES recommendations (30 fc average)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a guard receptacle in the floor under the middle of the table
  - ✓ Provide one data outlet with four data ports in the floor under the middle of the table
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in the room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

**SIMULATOR ROOM**



**FUNCTION**

Room for computer-based simulator training for staff.

**RELATIONSHIP TO OTHER AREAS**

- Accessible to all departments in the building
- Adjacent to Training Office area

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

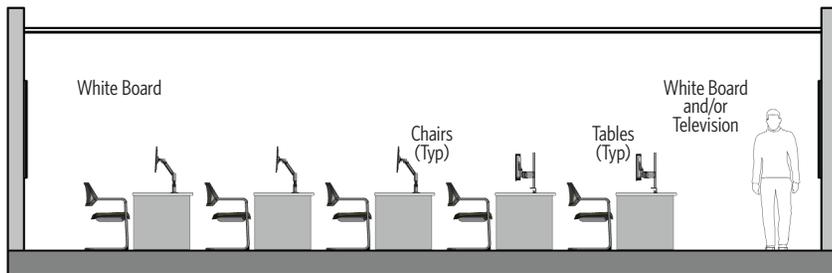
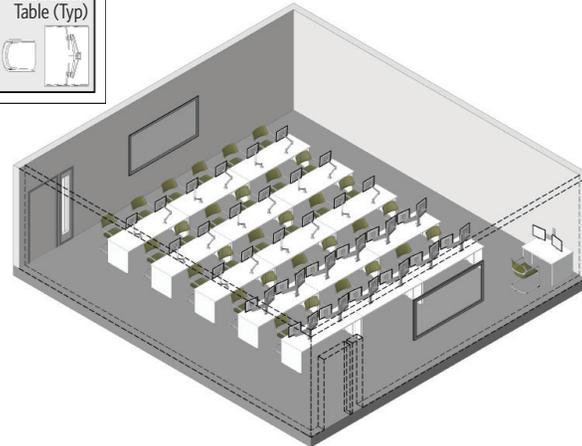
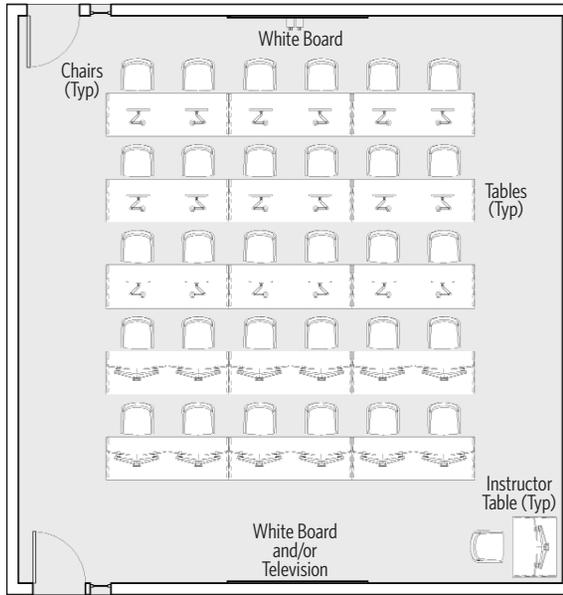
**EQUIPMENT/FURNISHINGS**

- Simulators
- Whiteboard and/or television

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Carpet tile floor with rubber base or resilient floor covering with base (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED lighting in accordance with IES recommendations. (20 fc indirect lighting average) (no glare)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a guard receptacle in the floor under the middle of the table
  - ✓ Provide one data outlet with four data ports in the floor under the middle of the table
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in the room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

COMPUTER LAB



FUNCTION

Room for computer-based training activities.

RELATIONSHIP TO OTHER AREAS

- Accessible from all departments in the building
- Adjacent to Training Office areas

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

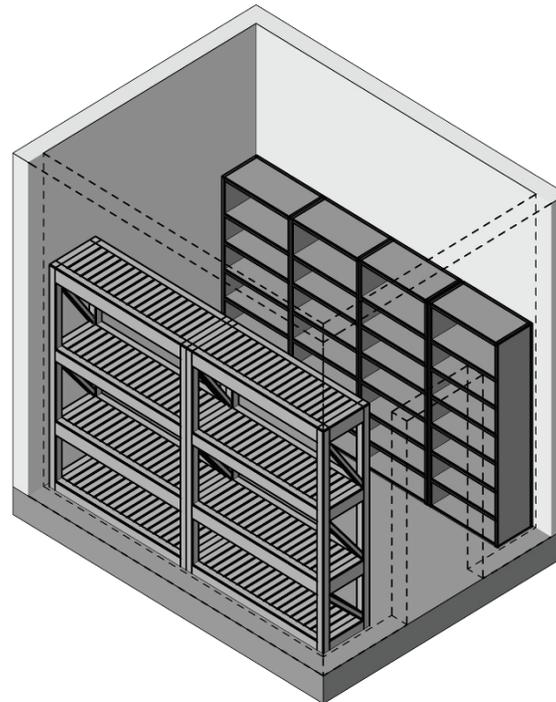
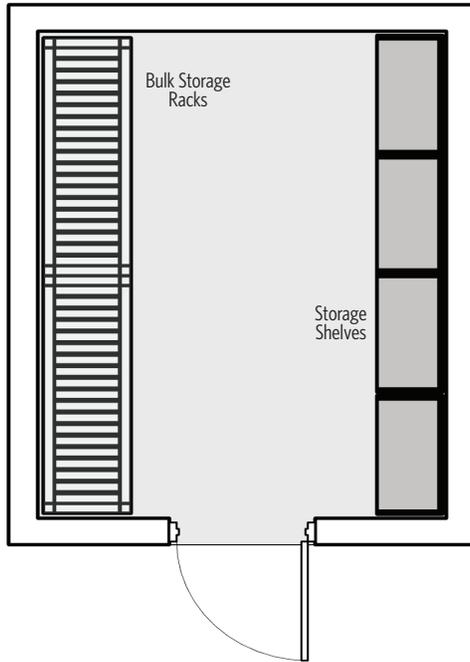
EQUIPMENT/FURNISHINGS

- Mayline Cohere Flip/nest table 60" by 30" laminate
- Cool mesh nesting chairs
- Whiteboard and/or television
- Computers
- Overhead projector

DESIGN FEATURES

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Carpet tile floor with rubber base or resilient floor covering with base (recommended). Carpet tile must comply with the specifications developed by the San Francisco Department of the Environment, dated June 8, 2018
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Provide CO2 detection
- Power:
  - ✓ LED lighting in accordance with IES recommendations. (20 fc indirect lighting average) (no glare)
  - ✓ Provide general purpose duplex receptacles (four minimum) and a guard receptacle in the floor under the middle of each of the tables
  - ✓ Provide one data outlet with four data ports in the floor under the middle of each table
  - ✓ Provide box and one inch or larger conduit rough-ins every ten feet in all walls in room
- Lighting:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

**HANDOUTS STORAGE**



**FUNCTION**

Secure room for storage of training handout materials and supplies.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to Classroom and Computer Lab

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

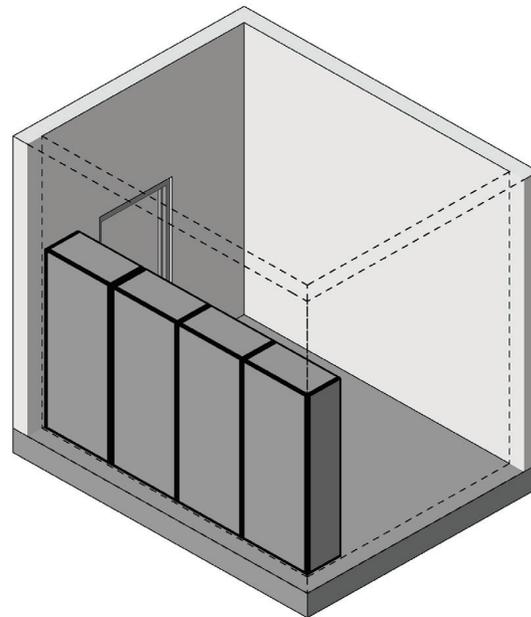
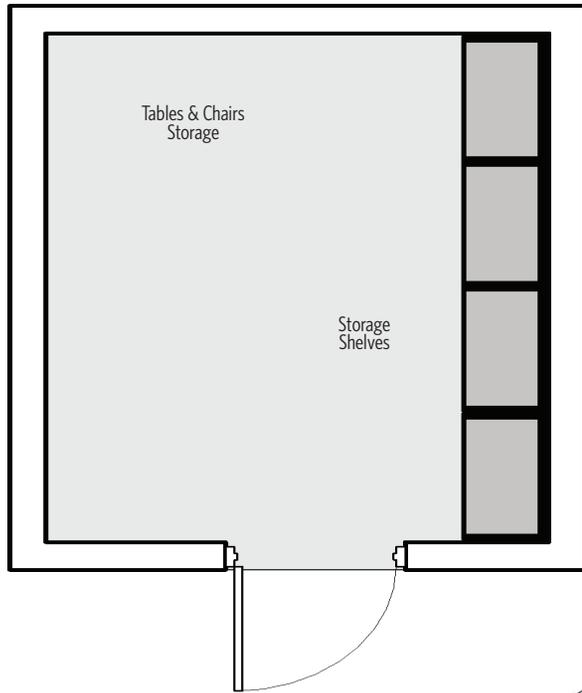
**EQUIPMENT/FURNISHINGS**

- Shelving
- Racking

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: No exterior exposure
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Keep consistent humidity levels
- Power:
  - ✓ LED lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
- Lighting: Dimmable, indirect lighting with occupancy sensors

TRAINING AID STORAGE



FUNCTION

Secure room for storage of training aid materials and supplies.

RELATIONSHIP TO OTHER AREAS

- Adjacent to Classroom and Computer Lab

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

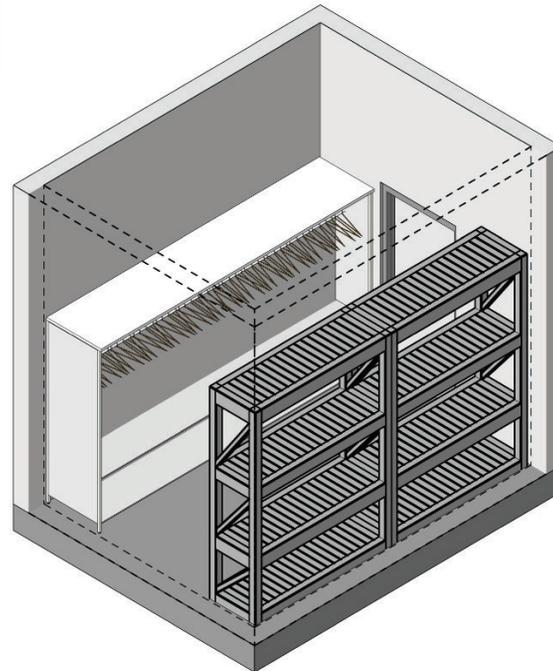
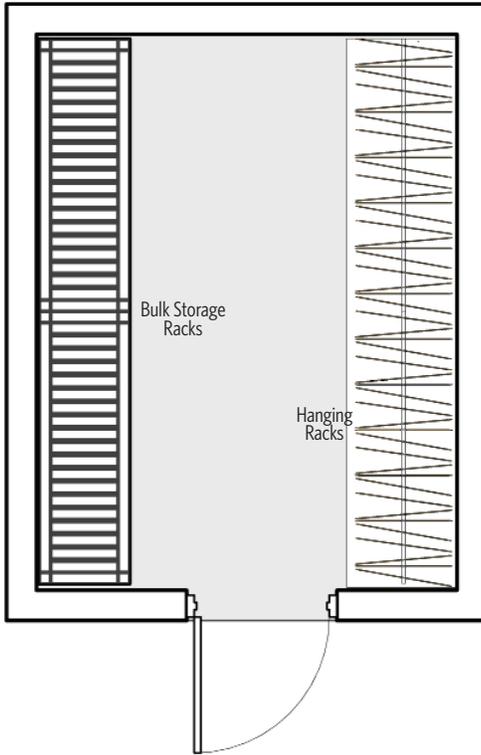
EQUIPMENT/FURNISHINGS

- Shelves
- Includes Tables and Chairs storage (as needed)

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors:
    - Single leaf 4'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: No exterior exposure
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Keep consistent humidity levels
- Power:
  - ✓ LED lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
- Lighting: Dimmable, indirect lighting with occupancy sensors

UNIFORM STORAGE



FUNCTION

Enclosed room for storage of operator uniforms and safety attire.

RELATIONSHIP TO OTHER AREAS

- Adjacent to Training Office areas

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

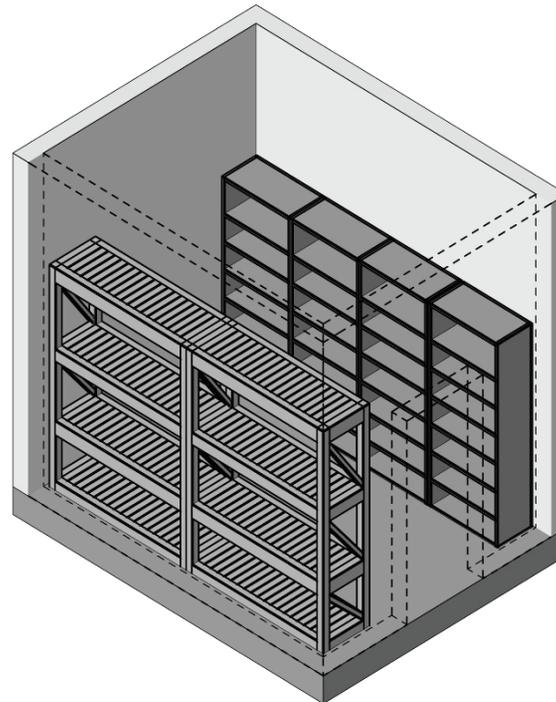
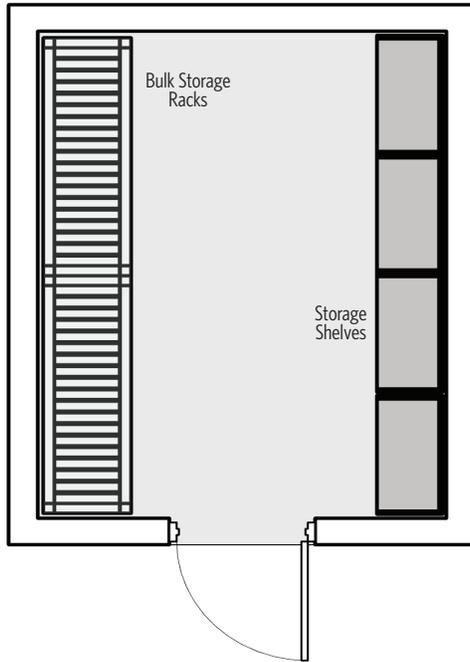
EQUIPMENT/FURNISHINGS

- Hanging racks
- Bulk storage racks

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with loadable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED lighting in accordance with IES recommendation (15 fc average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
- Lighting: Dimmable, indirect lighting with occupancy sensor

RECORDS STORAGE



FUNCTION

Secure area for the storage of files and records.

RELATIONSHIP TO OTHER AREAS

- N/A

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

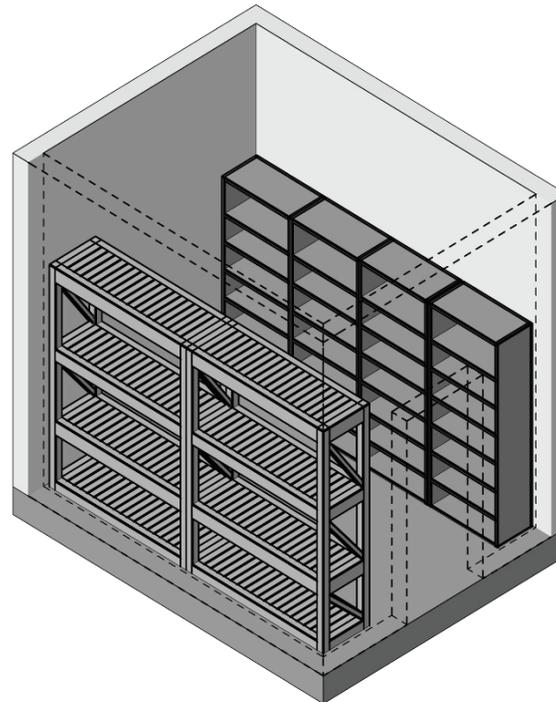
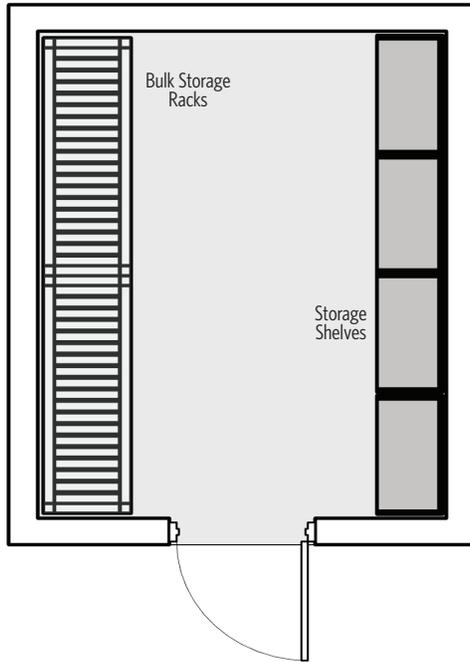
EQUIPMENT/FURNISHINGS

- Shelving
- Racking

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: No exterior exposure
- Plumbing: Rough in for equipment
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Keep consistent humidity levels
- Power:
  - ✓ LED lighting in accordance with IES recommendation (35 fc average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
- Lighting: Dimmable, indirect lighting with occupancy sensors

RECORDS ARCHIVE STORAGE



FUNCTION

Secure area for the long term storage of archived files and records.

RELATIONSHIP TO OTHER AREAS

- N/A

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

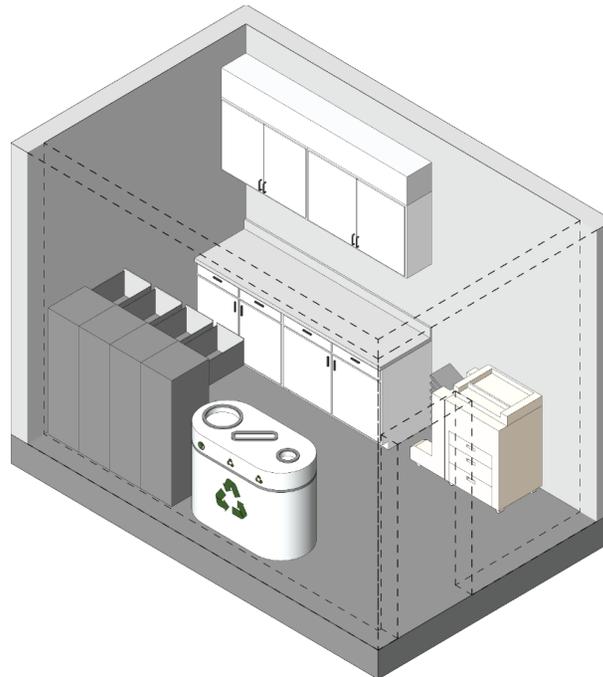
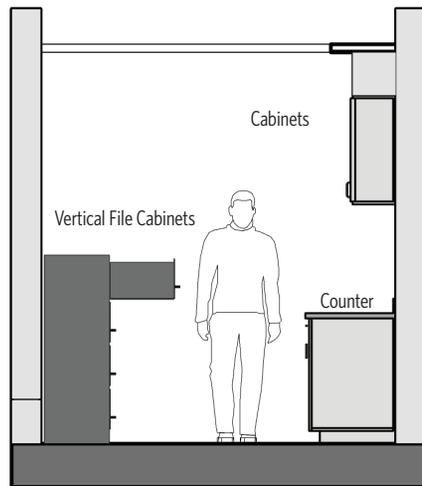
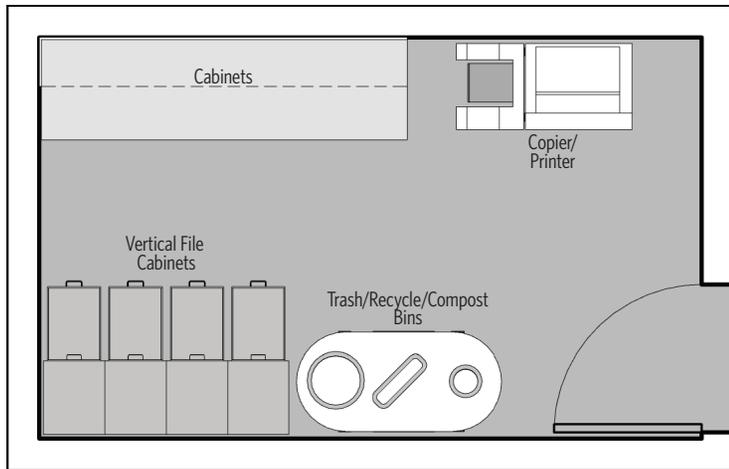
EQUIPMENT/FURNISHINGS

- Shelves
- Racks

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: No exterior exposure
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Keep consistent humidity levels
- Power:
  - ✓ LED lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
- Lighting: Dimmable, indirect lighting with occupancy sensors

COPY/SUPPLY



FUNCTION

Dedicated alcove or room for copier/printer/scanner/fax machine, storage for office supplies, and work surface.

RELATIONSHIP TO OTHER AREAS

- Access to all office areas

CRITICAL DIMENSIONS

- 9' -0" vertical clearance (minimum)

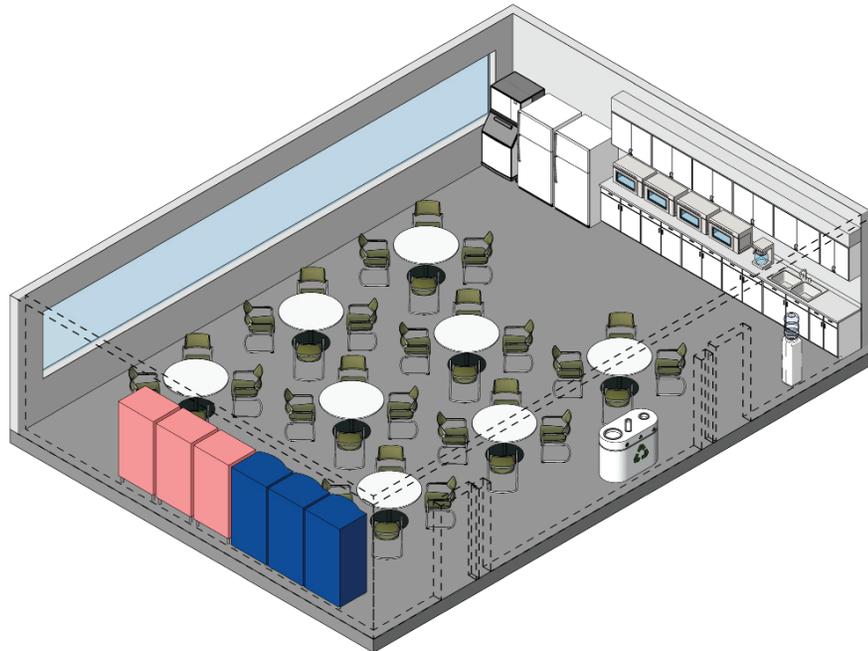
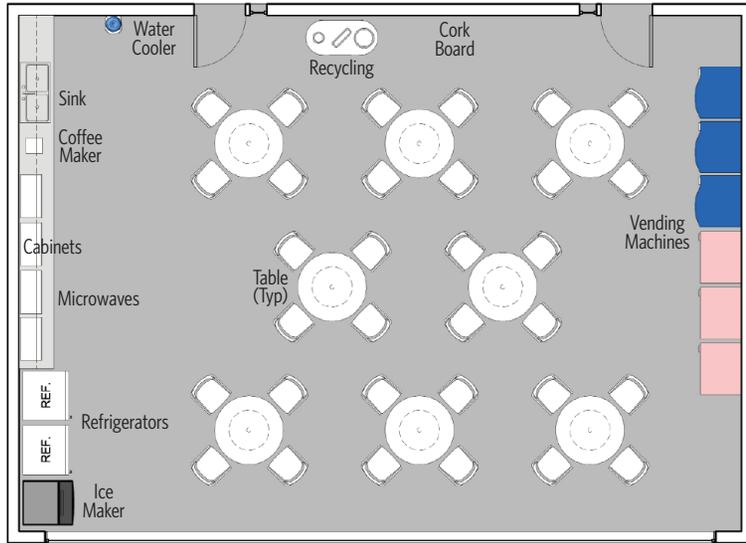
EQUIPMENT/FURNISHINGS

- Copier/printer/scanner/fax machine
- Work surface with cabinets below and above
- Filing cabinets
- Trash/recycling/compost bins
- Millwork

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" door with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
  - ✓ Provide one data outlet with four data ports
  - ✓ Provide box and one inch or larger conduit rough-ins to three other locations in the room
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**BREAK ROOM/KITCHENETTE/VENDING**



**FUNCTION**

Enclosed room for use as a break area for training staff.

**RELATIONSHIP TO OTHER AREAS**

- Access from all Training Office areas

**CRITICAL DIMENSIONS**

- 9' -0" vertical clearance (minimum)

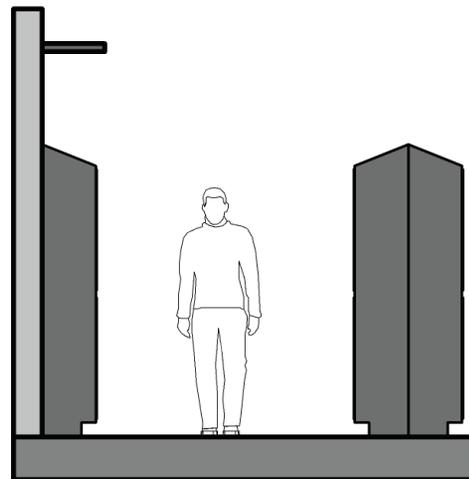
**EQUIPMENT/FURNISHINGS**

- Counter space, upper and lower cabinets, sink, microwaves, refrigerators, vending machines, water coolers, ice maker, water filter, coffee maker, tables, chairs, trash/recycling/compost bins
- Millwork

**DESIGN FEATURES**

- Architectural:
  - ✓ Furniture: Use owner furniture standards (if applicable)
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf 3'-0" doors (two minimum) with lockable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Daylighting: Exterior window desired
- Plumbing: Rough-in for fixtures
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Provide CO2 detection
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
  - ✓ Provide five GFCI outlets above kitchenette counter
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**OPERATOR LOCKERS**



**FUNCTION**

Co-ed locker room with private changing areas and locker space for Operators to store personal gear and clothing.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to Break Room/Kitchenette/Vending
- Adjacent to Men's and Women's Restrooms

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

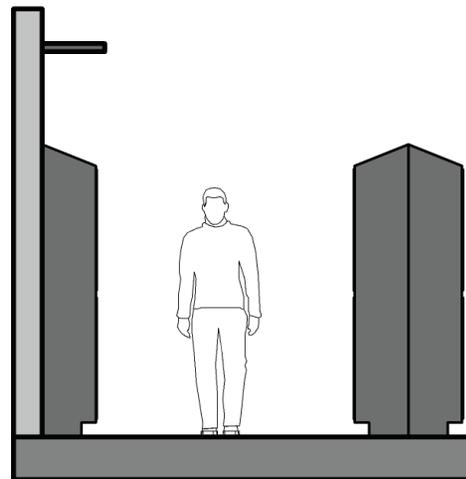
**EQUIPMENT/FURNISHINGS**

- Heavy duty, two tier, 3'-0", well-ventilated, slant top, half-height lockers; one each per Operator assigned to the facility

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering or finished concrete (recommended)
  - ✓ Walls:
    - Tile covering or painted masonry (recommended)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors: Single leaf 3'-0" door
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating, ventilation, and exhaust (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**INSTRUCTOR LOCKER**



**FUNCTION**

Co-ed locker room with private changing areas and locker space for Instructors to store personal gear and clothing.

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to Break Room/Kitchenette/Vending
- Adjacent to Men's and Women's Restroom

**CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

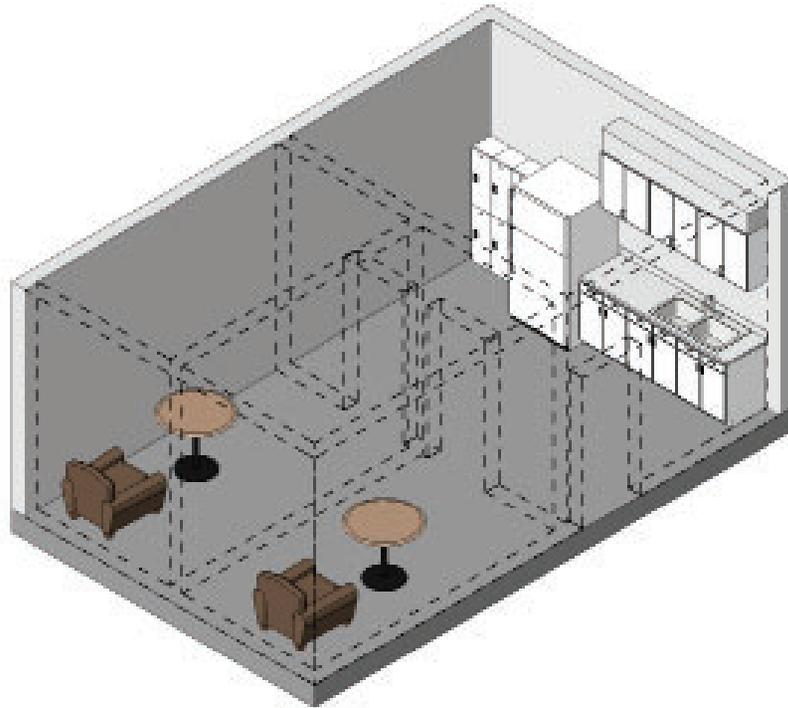
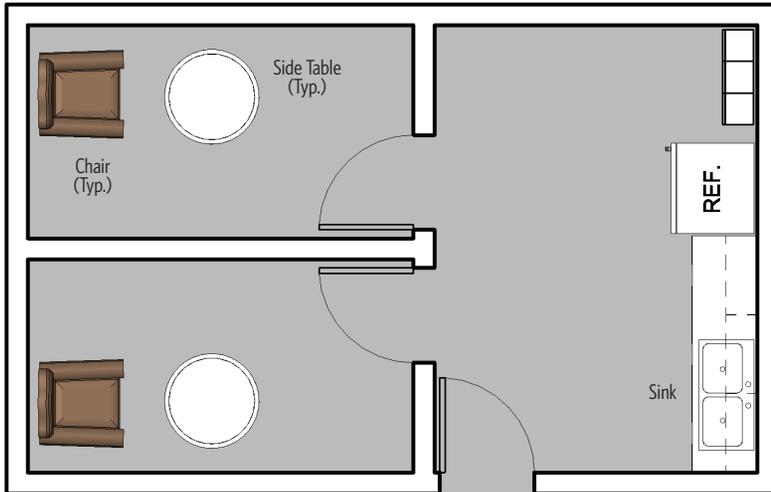
**EQUIPMENT/FURNISHINGS**

- Heavy duty, two tier, 3'-0", well-ventilated, slant top, half-height locker (one each per Instructor assigned to the facility)

**DESIGN FEATURES**

- Architectural:
  - ✓ Flooring: Resilient floor covering or finished concrete (recommended)
  - ✓ Walls:
    - Tile covering or painted masonry (recommended)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
  - ✓ Doors: Single leaf 3'-0" door
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating, ventilation, and exhaust (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide general purpose duplex receptacles (six minimum)
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

LACTATION ROOM



FUNCTION

Dedicated room for personal privacy and storage of first aid supplies and personal care items.

RELATIONSHIP TO OTHER AREAS

- Accessible from department office areas

CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

EQUIPMENT/FURNISHINGS

- Sink with countertops and cabinets
- Secure storage for equipment and supplies
- Lockers
- Side tables
- Refrigerator
- Chairs

DESIGN FEATURES

- Architectural:
  - ✓ Flooring: Resilient floor covering with base or finished concrete (recommended)
  - ✓ Walls:
    - Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
    - Wall protection as needed
  - ✓ Ceiling: Acoustical ceiling tile (recommended)
  - ✓ Doors:
    - Single leaf lockable 3'-0" door with loadable lever set hardware (recommended)
    - Electronically secured entry (as required)
- Plumbing: rough-in for fixtures
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Power:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc indirect lighting average)
  - ✓ Provide general purpose duplex receptacles (three minimum)
  - ✓ Provide one GFCI outlet above counter
- Lighting:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)



APPENDIX A:  
MAINTENANCE EQUIPMENT MANUAL



## Introduction

### Overview

The equipment listed in the Equipment List, Datasheets, and Cutsheets is the minimum expectation of the SFMTA for the purpose of the RFP. If SFMTA wishes to require a higher standard of equipment during the PDA phase, then that would be negotiated at that time. The purpose of this document is to reflect the preferences of the SFMTA and provide a high level of detail so that there may be clear expectations on the part of all parties for the type of equipment that is expected and the associated budget. This Appendix was commissioned by the SFMTA in fall of 2018, and it builds on the equipment narrative and strengths and weaknesses discussion in Section 4 of the Design Criteria Document. This Appendix includes:

- Introduction
- Equipment List- organized from low to high equipment ID number.
- Equipment Datasheets
- Equipment Cutsheets

These minimum requirements are based on existing equipment and potential equipment acquisitions. Maintenance equipment described in this Manual represents the needs of each functional area of the facility based on discussions with stakeholders.

Reference Appendix A.

Equipment List Definitions:

Discipline Coordination					Revision	Eqmnt	Description	Unit	Qty	Extended	Dimensions (inches)			Spec By	Furnish/	Projects Comments
Arch	Struc	Mech	Elec	Plum	Note	ID #		Price		Price	Length	Width	Height		Install	
							<b>Fleet Maintenance</b>									
							<b>PM/Inspection Bays (2)</b>									
						1860	Workbench, severe use, 6 feet	1400	2	2800	72	32	34	MDG	CF/CI	
						2832	Vise, swivel base, inches	760	2	1520	14	9-1/4		MI	CF/CI	
						3540	Tank, parts cleaning, 15 gal	100	1	100		22	60	MI	CF/CI	
						7190	Drops, air/electric,	120	2	240		2-1/4		MI		

Category:	Description:
Discipline Coordination:	Identifies other design team disciplines requiring coordination to properly accommodate equipment items in the facility design. Refer to Datasheets for detailed coordination issues.
Equipment Identifier:	All identical equipment items are assigned the same number. The Equipment Identifier coordinates this list with equipment layout drawings, datasheets, and, cutsheets. New equipment items are indicated by a 4-digit Equipment Identifier and owner supplied items are indicated by a 5-digit Equipment Identifier number.
Item Description:	Description for equipment.
Quantity:	The number of equipment items located within the functional area is listed.
Price:	All pricing is list from the manufacturer.
Dimensions:	Overall equipment length, width, and height respectively, listed in inches unless otherwise noted.
Furnish/Install:	Recommends responsibility to furnish and install equipment.
CF/CI	Contractor to furnish and install, usually by bid package specifications for General Contractor installation.
OF/OI	Owner to furnish and install, usually smaller office and shop equipment normally purchased by owner. This also includes any items owner will provide.
Project Comments:	Includes special requirements and other relevant data to be considered during detailed design for the project.

## Equipment Datasheets

The purpose of this document is to identify the various coordination issues and disciplines associated with the types of equipment recommended for facility operations. The Equipment Datasheets are for discipline coordination purposes only. Coordination issues are grouped per Equipment Datasheet according to the following disciplines:

- Architectural
- Structural
- Mechanical
- Electrical
- Plumbing

The equipment design in this document is minimum requirements, with final equipment selection to be made during the PDA phase.

## Equipment Cutsheets

The equipment Cutsheets aid in the identification of equipment and serves to assist the owner with establishing standards of quality items. The Cutsheets establish standards of quality, performance, feature, and construction.

## General Information

- All equipment shall be heavy duty industrial grade.
- All equipment shall be “equal to or better than” the listed equipment.
- Quantities have been established based on initial floor plans. All quantities need to be verified by the final design team.
- At each phase of the design process, the team will need to review the Equipment Layout Drawings and Equipment List with the SFMTA to verify that they are acceptable.

# Preliminary Equipment List

Discipline Coordination							Equip ID#	Description	Qty	Dimensions (inches)			Furnish/ Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment	Seismic Certification				Length	Width	Height		
							<b>MAINTENANCE</b>							
							<b>60' Bus Repair Bay (10)</b>							
			●				1128	Cabinet, computer, mobile	6	26	24	68	CF/CI	
							1184	Cabinet, storage, shop/locker	26	24	24	72	OF/OI	
							1396	Platform, work, roof, portable (set of two)	1				CF/CI	
							1425	Rack, arm, single face, six foot wide, 15,000 pound	1	72	61	144	CF/CI	
							1444	Storage unit, 42 bin	6	33-3/4	12	42	CF/CI	
							1800	Toolbox, rolling	40	24	48		OF/OI	
							1860	Workbench, severe use, six foot	10	72	32	34	CF/CI	
							2165	Jack, floor, five ton	2	62-1/4	16-3/4	48	CF/CI	
							2370	Dolly, wheel	6	39-1/2	43-1/2	35	CF/CI	
							2372	Dolly, wheel, high lift	10	47-1/2	42	72	CF/CI	
							2644	Recovery unit, refrigerant, rolling	4	36	24	50	CF/CI	
							2835	Vise, five inch	10	9	18	10	CF/CI	
			●				3540	Tank, parts cleaning, 15 gallon	6	36	22	38-1/2	OF/OI	
●	●		●	●			5630	Lift, axle, three post, 105,000 pound, shallow design	9	25-3/8	14-1/4	32-7/8	CF/CI	
●	●		●	●			5692	Lift, axle, scissor, adjustable, 90,000 pound	1	---	66	---	CF/CI	
●			●	●			7541	Pump, diaphragm, used fluid evacuation (UC)	6	14-3/4	10-3/4	16	CF/CI	

Discipline Coordination							Equip ID#	Description	Qty	Dimensions (inches)			Furnish/Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment	Seismic Certification				Length	Width	Height		
							<b>60' Bus Repair Bay (10) [Continued]</b>							
●	●			●			7780	Reel bank	6	---	---	---	CF/CI	
							9350	Harness, safety, I-beam, trolley, self-retracting		11-3/4	8-3/4	24	CF/CI	
								King Pins Press	2					Insufficient information on the equipment to provide a DCS
								Caliper Hoists	6					Insufficient information on the equipment to provide a DCS
							<b>60' Bus Preventative Maintenance (5)</b>							
							<b>Lower Level Work Area (LLWA)</b>							
							1185	Cabinet, storage, shop	5	36	18	78	CF/CI	
							1688	Shelving unit, eight shelf	5	36	18	84	CF/CI	
							1800	Toolbox, rolling	5	24	48		OF/OI	
							1860	Workbench, severe use, six foot	5	72	32	34	CF/CI	
							2835	Vise, five inch	5	9	18	10	CF/CI	
							5442	Lift, parts, straddle	1	84	62	372	CF/CI	
●	●	●	●	●			5558	Lift, man, mobile, LLWA	5	138	63	58	CF/CI	
●			●	●			7541	Pump, diaphragm, used fluid evacuation (UC)	2	14-3/4	10-3/4	16	CF/CI	
				●			7575	Hose and dispenser (GO)	5	2	2	10	CF/CI	
●	●						7993	Drain pan, rolling (UC)	5	33	24	11	CF/CI	

Discipline Coordination							Equip ID#	Description	Qty	Dimensions (inches)			Furnish/ Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment	Seismic Certification				Length	Width	Height		
							<b>Ground Level</b>							
			●				1128	Cabinet, computer, mobile	3	26	24	68	CF/CI	
							1860	Workbench, severe use, six foot	5	72	32	34	CF/CI	
							2835	Vise, five inch	5	9	18	10	CF/CI	
			●				3540	Tank, parts cleaning, 15 gallon	3	36	22	38-1/2	OF/OI	
●	●			●			7780	Reel bank	3	---	---	---	CF/CI	
●	●						9315	Cover, safety, metal	96	38	40-1/2	2	CF/CI	
							<b>Upper Level Work Platform (ULWP)</b>							
							1860	Workbench, severe use, six foot	2	72	32	34	CF/CI	
							2835	Vise, five inch	2	9	18	10	CF/CI	
●	●	●	●	●			5010	Crane, bridge, top running, 5 ton	2	0	0	0	CF/CI	
							<b>60' Bus Tire Bay (1)</b>							
							1860	Workbench, severe use, six foot	1	72	32	34	CF/CI	
							2835	Vise, five inch	1	9	18	10	CF/CI	
●	●		●	●			5692	Lift, axle, scissor, adjustable, 90,000 pound	1	---	66	---	CF/CI	
●	●			●			7710	Reel bank	2	---	---	---	CF/CI	

Discipline Coordination							Equip ID#	Description	Qty	Dimensions (inches)			Furnish/Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment	Seismic Certification				Length	Width	Height		
							<b>60' Bus Minor Body Repair (1)</b>							
			●				1128	Cabinet, computer, mobile	1	26	24	68	CF/CI	
							1860	Workbench, severe use, six foot	1	72	32	34	CF/CI	
							2835	Vise, five inch	1	9	18	10	CF/CI	
●	●		●	●			5630	Lift, axle, three post, 105,000 pound, shallow design	1	25-3/8	14-1/4	32-7/8	CF/CI	
							5645	Lift, parallelogram, 75,000 pounds, 48 feet	1	392-1/2	0	69	CF/CI	
●	●			●			7710	Reel bank	2	---	---	---	CF/CI	
							<b>Minor Body Shop</b>							
							1183	Cabinet, storage, heavy duty	1	48	24	78	CF/CI	
							1183	Cabinet, storage, heavy duty	1	48	24	78	CF/CI	
							1183	Cabinet, storage, heavy duty	?	48	24	78	CF/CI	
							1183	Cabinet, storage, heavy duty	3	48	24	78	CF/CI	
							1185	Cabinet, storage, shop	2	36	18	78	CF/CI	
							1200	Cart, parts	5	24	48	33-1/2	CF/CI	
							1421	Rack, arm, single face, six foot wide	1	74	22-1/4	84	CF/CI	
							1437	Rack, windshield, vertical	4	72	48	87	CF/CI	
	●						1456	Rack, bulk storage, six foot	2	72	24	96	CF/CI	
							1625	Rack, sheet metal, five bay	1	120	84	36	CF/CI	
							1688	Shelving unit, eight shelf	2	36	18	84	CF/CI	

Discipline Coordination							Equip ID#	Description	Qty	Dimensions (inches)			Furnish/Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment	Seismic Certification				Length	Width	Height		
							<b>Minor Body Shop [Continued]</b>							
							1801	Toolbox	2	28	17	35	OF/OI	
							1806	Workstation, electronics, static dissipative, six foot, with drawers	4	72	36	52	CF/CI	
							1860	Workbench, severe use, six foot	1	72	32	34	CF/CI	
							1950	Cabinet, flammable materials, large	5	43	18	65	CF/CI	
							2105	Press, air/hydraulic, 25 ton	1	42-1/2	30	81	CF/CI	
							2610	Drill press, variable speed, 20 inch	1	22	36	69	CF/CI	
							2678	Sander, belt/disc	1	24	31-1/4	54-1/2	CF/CI	
							2692	Saw, band, vertical, 14 inch	1	20	20	68	CF/CI	
							2698	Saw, cutoff, abrasive, 14 inch	1	11 3/4	19 3/4	25 1/4	CF/CI	
							2765	Torch, oxyacetylene, with cart	1	28	16-1/2	43-1/2	CF/CI	
							2780	Cutter, plasma	1	18	36	35	CF/CI	
							2780	Cutter, plasma	1	18	36	35	CF/CI	
							2835	Vise, five inch	1	9	18	10	CF/CI	
							2838	Vise, eight inch	4	10 3/4	20 1/2	13 1/4	CF/CI	
							2885	Buffer/grinder, eight inch, with pedestal	1	24	13	47	CF/CI	
							3085	Cabinet, abrasive blast, with dust collector	1	65	25	64	CF/CI	
								Plate Shear, table top, 8-inch (Dayton #4YG37A)	1				OF/OI	Insufficient information on the equipment to provide a DCS
								Clean air duster, down draft (ICA #00301)	1				OF/OI	Insufficient information on the equipment to provide a DCS
								Sander/Vacuum Combo (Festool Cleantec)	2				OF/OI	Insufficient information on the equipment to provide a DCS

Discipline Coordination						Equip ID#	Description	Qty	Dimensions (inches)			Furnish/ Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment				Seismic Certification	Length	Width		
							<b>Minor Body Shop [Continued]</b>						
							Sander/Vacuum Combo (Mirka)	2				OF/OI	Insufficient information on the equipment to provide a DCS
							Wet/Dry Vac, 19-gallon (Nilfisk #302001540)	2				OF/OI	Insufficient information on the equipment to provide a DCS
							Sander/Vacuum Combo, 17-gallon (Dynabrade #61301)	1				OF/OI	Insufficient information on the equipment to provide a DCS
							Ram Kit, hydraulic, 4-ton	1				OF/OI	Insufficient information on the equipment to provide a DCS
							Ram Kit, hydraulic, 10-ton	1				OF/OI	Insufficient information on the equipment to provide a DCS
							Heat lamps, portable (Infratech #SRV-1615)	2				OF/OI	Insufficient information on the equipment to provide a DCS
						2740	Welder, MIG, with cart	1	18	37	36	CF/CI	
						2742	Welder, MIG, portable	1	18	37	36	CF/CI	
						2740	Welder, MIG, with cart	1	18	37	36	CF/CI	
						2760	Welder, TIG	1	18-1/2	43	31-1/2	CF/CI	
							Tennsmith 52" Electric Shear (#LM410R)	1					Insufficient information on the equipment to provide a DCS
						2672	Roller, bender, plate, hand operated	1	68	22	50	CF/CI	
●	●			●		7710	Reel bank	1	---	---	---	CF/CI	
							Body Shop Office Furniture	1					Insufficient information on the equipment to provide a DCS
							Computer Workstations	2					Insufficient information on the equipment to provide a DCS
							<b>60' Bus Chassis Wash (1)</b>						
			●	●		5645	Lift, parallelogram, 75,000 pounds, 48 feet	1	576	112	63	CF/CI	

Discipline Coordination						Equip ID#	Description	Qty	Dimensions (inches)			Furnish/Install	Project Comments	
Arch	Struc	Mech	Elec	Plum	Priority Equipment				Seismic Certification	Length	Width			Height
							<b>Wash Equipment Room</b>							
●	●	●	●	●			3718	Washer, high pressure, hot water, NG, 4 GPM	2	47-1/2	21	51	CF/CI	
							<b>Common Work Area (CWA) (2)</b>							
							1185	Cabinet, storage, shop	4	36	18	78	CF/CI	
							1445	Storage unit, 48 bin	4	36	18	84	CF/CI	
							1860	Workbench, severe use, six foot	2	72	32	34	CF/CI	
	●						1950	Cabinet, flammable materials, large	4	43	18	65	CF/CI	
							2102	Press, hydraulic, 20 ton	2	31	30	74	CF/CI	
	●		●				2610	Drill press, variable speed, 20 inch	2	22	36	69	CF/CI	
			●				2689	Saw, band, horizontal, large	2	72	60	37	CF/CI	
			●				2698	Saw, cutoff, abrasive, 14 inch	2	11	19-3/4	23-5/8	CF/CI	
							2835	Vise, five inch	2	9	18	10	CF/CI	
			●				2880	Buffer/grinder, eight inch, with dust collector	2	24-3/4	41	41-3/4	CF/CI	
			●	●			3085	Cabinet, abrasive blast, with dust collector	2	38	25	64	CF/CI	
●	●	●	●	●			3555	Washer, parts, automatic, front load	2	50	62	69	CF/CI	
							1960	Gas Cylinder Storage (propane)	1	62	29	82	CF/CI	
							1960	Gas Cylinder Storage (acetylene)	1	62	29	82	CF/CI	
							1960	Gas Cylinder Storage (oxygen)	1	62	29	82	CF/CI	

Discipline Coordination							Equip ID#	Description	Qty	Dimensions (inches)			Furnish/Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment	Seismic Certification				Length	Width	Height		
							<b>Common Work Area (CWA) (2) [Continued]</b>							
							1960	Gas Cylinder Storage (argon)	1	62	29	82	CF/CI	
								Portable Fan, Large	2				OF/OI	Insufficient information on the equipment to provide a DCS
							<b>Portable Equipment Storage (PES) (2)</b>							
			●				2440	Scrubber, floor, walk behind, 28 inch path, battery operated	2	37-1/2	64	43	CF/CI	
			●				2740	Welder, MIG, with cart	2	18	36	35	CF/CI	
			●				2750	Welder, multiprocess	2	38	23	30	CF/CI	
			●				2760	Welder, TIG	2	18-1/2	43	31-1/2	CF/CI	
							2770	Screen, welding	2	144	18	77-1/2	CF/CI	
			●	●			3275	Extractor, fume, welding, portable, 1,200 CFM	2	24	49-1/4	31-1/4	CF/CI	
				●			7995	Receiver, 25 gallon, portable (UC)	2	24	24	45	CF/CI	
				●			7996	Receiver, 25 gallon, portable (UO)	2	24	24	45	CF/CI	
							<b>Tool Box Storage</b>							
							Tool boxes provided by the SFMTA or Mechanics/Technicians							

Discipline Coordination							Equip ID#	Description	Qty	Dimensions (inches)			Furnish/ Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment	Seismic Certification				Length	Width	Height		
							<b>Tool Storage</b>							
	●						1098	Board, peg, tool	4	72	1/2	36	CF/CI	
							1185	Cabinet, storage, shop	2	36	18	78	CF/CI	
							1688	Shelving unit, eight shelf	2	36	18	84	CF/CI	
							<b>Cleaning Equipment Storage (Ground Level)</b>							
							1185	Cabinet, storage, shop	2	36	18	78	CF/CI	
							1204	Cart, cleaning	4	21-3/4	46	38-3/8	CF/CI	
		●					1456	Rack, bulk storage, six foot	4	72	24	96	CF/CI	
							1688	Shelving unit, eight shelf	4	36	18	84	CF/CI	
		●					1950	Cabinet, flammable materials, large	2	43	18	65	CF/CI	
							1966	Pallet, containment, hazardous materials, four drum	2	49	49	10-1/4	CF/CI	
							<b>AC Shop/Storage</b>							
							10001	Rack, AC	2	---	---	---	OF/OI	
							1185	Cabinet, storage, shop	2	36	18	78	CF/CI	
							1188	Cabinet, storage, shop, overhead	1	36	13	27	CF/CI	
							1860	Workbench, severe use, six foot	2	72	32	34	CF/CI	
		●					1950	Cabinet, flammable materials, large	2	43	18	65	CF/CI	

Discipline Coordination						Equip ID#	Description	Qty	Dimensions (inches)			Furnish/Install	Project Comments	
Arch	Struc	Mech	Elec	Plum	Priority Equipment				Seismic Certification	Length	Width			Height
							<b>AC Shop/Storage [Continued]</b>							
							2835	Vise, five inch	2	9	18	10	CF/CI	
							3288	Fume extraction arm, bench mounted	1	15	11	60	CF/CI	
							<b>Battery Rebuild Shop</b>							
							10002	Rack, battery	1				OF/OI	SFMTA will custom build
							1185	Cabinet, storage, shop	2	36	18	78	CF/CI	
							1860	Workbench, severe use, six foot	1	72	32	34	CF/CI	
							1950	Cabinet, flammable materials, large	2	43	18	65	CF/CI	
							2835	Vise, five inch	1	9	18	10	CF/CI	
							<b>Tire Shop/Storage</b>							
							1632	Carousel, storage, tire, 44 inch	2	179	112	---	CF/CI	
							1636	Rack, tire, heavy duty, one tier	1	60	26	47-1/2	CF/CI	
							1860	Workbench, severe use, six foot	1	72	32	34	CF/CI	
							2353	Changer, heavy duty, 44 inch max tire	1	78	48	36	CF/CI	
							2363	Balancer, tire, heavy duty	1	93	62	84	CF/CI	
							2365	Cage, inflation, tire	1	28	36	60	CF/CI	
							2368	Spreader, tire	1	25	35	17	CF/CI	

Discipline Coordination						Equip ID#	Description	Qty	Dimensions (inches)			Furnish/Install	Project Comments	
Arch	Struc	Mech	Elec	Plum	Priority Equipment				Seismic Certification	Length	Width			Height
							<b>Tire Shop/Storage [Continued]</b>							
							2835	Vise, five inch	1	9	18	10	CF/CI	
●	●			●			7710	Reel bank	1	---	---	---	CF/CI	
							<b>Lube/Compressor Room</b>							
				●			7520	Pump, air piston, 10:1 ratio	6	8 dia.	---	28-1/2	CF/CI	
●				●			7531	Pump, diaphragm, non-mixing (EC)	1	14-3/4	10-1/4	16	CF/CI	
	●						7907	Tank, double wall, polyethylene, 275 gallon	1	47 dia.	---	58-1/2	CF/CI	
	●	●	●	●			7970	Tank, double wall, cube, 500 gallon	7	61	46	61	CF/CI	
●	●	●	●	●			8276	Compressor, air, screw, rotary, 40 HP, with integral dryer	2	69-5/8	35-3/8	60-1/4	CF/CI	
●	●			●			8637	Receiver, vertical mounted, 400 gallon	1	36 dia.	---	101	CF/CI	
							<b>Electronic Bench Shop</b>							
							10003	Equipment, test, electronic	1				OF/OI	
	●						1110	Cabinet, 10 drawer, modular	4	30	27-3/4	59	CF/CI	
							1185	Cabinet, storage, shop	2	36	18	78	CF/CI	
							1745	Stool, electronic station, anti-static	6	18	18	34-1/4	CF/CI	
			●				1805	Workstation, electronics, static dissipative, five foot, with shelf	6	60	30	33-1/2	CF/CI	
							3288	Large fume/dust hood	1	15-1/4	11-3/4	60	CF/CI	Dimensions

Discipline Coordination							Equip ID#	Description	Qty	Dimensions (inches)			Furnish/ Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment	Seismic Certification				Length	Width	Height		
							<b>Electronic Bench Shop [Continued]</b>							
								Signal Cabinet Testing Rack	2				OF/OI	Insufficient information on the equipment to provide a DCS
								Strong hold cabinet (OF/CI)	3				OF/OI	
							<b>FARE BOX AND CLIPPER CARD READER REPAIR SHOP (Not included in Equipment Layout Drawings)</b>							
							<b>Incoming and Outgoing Device Storage</b>							
		●					1456	Rack, bulk storage, six foot	4	72	24	96	CF/CI	
							1688	Shelving unit, eight shelf	4	36	18	84	CF/CI	
							<b>Shop</b>							
							1185	Cabinet, storage, shop	2	36	18	78	CF/CI	
							1688	Shelving unit, eight shelf	2	36	18	84	CF/CI	
							1860	Workbench, severe use, six foot	2	72	32	34	CF/CI	
							1950	Cabinet, flammable materials, large	1	43	18	65	CF/CI	
		●		●			2610	Drill press, variable speed, 20 inch	1	22	36	69	CF/CI	
							2835	Vise, five inch	2	9	18	10	CF/CI	
							2885	Buffer/grinder, eight inch, with pedestal	1	24	13	47	CF/CI	
							3288	Fume extraction arm, bench mounted	1	15-1/4	11-1/4	60	CF/CI	

Discipline Coordination							Equip ID#	Description	Qty	Dimensions (inches)			Furnish/ Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment	Seismic Certification				Length	Width	Height		
							<b>Storage</b>							
							1185	Cabinet, storage, shop	5	36	18	78	CF/CI	
							1688	Shelving unit, eight shelf	5	36	18	84	CF/CI	
							<b>Parts Storage</b>							
							1110	Cabinet, 10 drawer, modular	2	30	28	59	CF/CI	
		●					1456	Rack, bulk storage, six foot	8	72	24	96	CF/CI	
							1688	Shelving unit, eight shelf	8	36	18	84	CF/CI	
			●				5410	Forklift, electric, 10,000 pound	3	127-3/4	58-3/4	91	OF/CI	
							<b>OFFICE</b>							
								Safe	2				OF/OI	Insufficient information on the equipment to provide a DCS
							<b>SERVICE AND CLEAN</b>							
							<b>Service Position (Level 2)</b>							
	●	●			●		3300	Tank, mop, with wringer	2	40	25	42	CF/CI	
	●	●		●			3610	Vacuum, canister, stainless steel	4	20-1/8	26	52	CF/CI	
	●	●			●		7710	Reel bank	3	---	---	---	CF/CI	
								96-gallon trash containers (black, blue, + green)	6				OF/OI	Insufficient information on the equipment to provide a DCS
								Biohazard Bin	1				OF/OI	Insufficient information on the equipment to provide a DCS

Discipline Coordination							Equip ID#	Description	Qty	Dimensions (inches)			Furnish/ Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment	Seismic Certification				Length	Width	Height		
							<b>Service Position (Level 3)</b>							
●	●			●			3300	Tank, mop, with wringer	2	40	25	42	CF/CI	
●	●		●				3610	Vacuum, canister, stainless steel	4	20-1/8	26	52	CF/CI	
●	●			●			7710	Reel bank	3	---	---	---	CF/CI	
								96-gallon trash containers (black, blue, + green)	6				OF/OI	Insufficient information on the equipment to provide a DCS
								Biohazard Bin	1				OF/OI	Insufficient information on the equipment to provide a DCS
							<b>Bus Washer (1) (Level 2)</b>							
●	●	●	●	●			3834	Washer, bus, drive through, four brush	1	1020	192	170	CF/CI	
							<b>Bus Washer (2) (Level 3)</b>							
●	●	●	●	●			3834	Washer, bus, drive through, four brush	1	1020	192	170	CF/CI	
							<b>Wash Equipment Room (1) (Level 2)</b>							
●	●	●	●	●			3718	Washer, high pressure, hot water, NG, 4 GPM	2	47-1/2	21	51	CF/CI	
							<b>Wash Equipment Room (2) (Level 3)</b>							
●	●	●	●	●			3718	Washer, high pressure, hot water, NG, 4 GPM	2	47-1/2	21	51	CF/CI	

Discipline Coordination						Equip ID#	Description	Qty	Dimensions (inches)			Furnish/ Install	Project Comments	
Arch	Struc	Mech	Elec	Plum	Priority Equipment				Seismic Certification	Length	Width			Height
							<b>Cleaning Equipment Storage (on Bus Garage Level 2)</b>							
							1185	Cabinet, storage, shop	4	36	18	78	CF/CI	
							1204	Cart, cleaning	8	21-3/4	46	38-3/8	CF/CI	
		●					1456	Rack, bulk storage, six foot	10	72	24	96	CF/CI	
							1688	Shelving unit, eight shelf	4	36	18	84	CF/CI	
		●					1950	Cabinet, flammable materials, large	4	43	18	65	CF/CI	
							1966	Pallet, containment, hazardous materials, four drum	4	49	49	10-1/4	CF/CI	
							<b>Cleaning Equipment Storage (on Bus Garage Level 3)</b>							
							1185	Cabinet, storage, shop	4	36	18	78	CF/CI	
							1204	Cart, cleaning	8	21-3/4	46	38-3/8	CF/CI	
		●					1456	Rack, bulk storage, six foot	10	72	24	96	CF/CI	
							1688	Shelving unit, eight shelf	4	36	18	84	CF/CI	
		●					1950	Cabinet, flammable materials, large	4	43	18	65	CF/CI	
							1966	Pallet, containment, hazardous materials, four drum	4	49	49	10-1/4	CF/CI	
							<b>PARTS</b>							
							<b>Parts Storage</b>							
	●						1098	Board, peg, tool	4	72	1/2	36	CF/CI	
	●	●					1106	Cabinet, six drawer, modular, underbench	10	30	27-3/4	33-1/2	CF/CI	

Discipline Coordination						Equip ID#	Description	Qty	Dimensions (inches)			Furnish/ Install	Project Comments	
Arch	Struc	Mech	Elec	Plum	Priority Equipment				Seismic Certification	Length	Width			Height
							<b>Parts Storage [Continued]</b>							
●	●	●	●				1500	Storage system, 2,000 pound capacity, with rack mounted crane	1	203	436	184	CF/CI	
	●						1536	Rack, pallet, ten foot, two tier	2	126	36	120	CF/CI	
							1688	Shelving unit, eight shelf	42	36	18	84	CF/CI	
●	●	●	●	●			1730	Storage system, automated, vertical tray	2	---	---	---	CF/CI	
							1753	Table, layout, stainless steel top, eight foot	3	96	36	34	CF/CI	
			●				5404	Forklift, electric, 4,000 pound, stand up	1	93	40-1/4	95	CF/CI	
							5420	Forklift, 10,000 pound, LPG	1	175	69	90-1/2	CF/CI	
							1950	Cabinet, flammable materials, large	8	43	18	65	OF/CI	
							<b>Battery Storage</b>							
	●						1536	Rack, pallet, ten foot, two tier	2	126	36	120	CF/CI	
							1688	Shelving unit, eight shelf	2	36	18	84	CF/CI	
							<b>SHARED</b>							
							<b>Building Storage</b>							
							1185	Cabinet, storage, shop	2	36	18	78	CF/CI	
	●						1456	Rack, bulk storage, six foot	2	72	24	96	CF/CI	
							1688	Shelving unit, eight shelf	2	36	18	84	CF/CI	
	●						1950	Cabinet, flammable materials, large	2	43	18	65	CF/CI	

Discipline Coordination						Equip ID#	Description	Qty	Dimensions (inches)			Furnish/Install	Project Comments	
Arch	Struc	Mech	Elec	Plum	Priority Equipment				Seismic Certification	Length	Width			Height
							<b>Meet and Greet</b>							
●	●	●	●	●			5558	Lift, man, mobile, LLWA	1	138	63	58	CF/CI	
							7242	Fluid management system, wired	1	---	---	---	CF/CI	
							<b>Revenue Office</b>							
							1215							
							1688	Shelving unit, eight shelf	2	36	18	84	CF/CI	
			●				1805	Workstation, electronics, static dissipative, five foot, with shelf	1	60	30	33-1/2	CF/CI	
●							9900	Vault, collection, revenue	2	32	36	66	CF/CI	
●	●		●				9910	Probe, farebox, with software system	2	---	---	---	CF/CI	
								Isolation Boxes	2					Insufficient information on the equipment to provide a DCS
							<b>Sheet Metal Shop</b>							
							1185	Cabinet, storage, shop	2	36	18	78	CF/CI	
	●						1421	Rack, arm, single face, six foot wide	1	74-3/8	22-1/8	84	CF/CI	
							1435	Rack, vertical	1	36	24	84	CF/CI	
	●						1436	Rack, sheet, vertical	1	50	44	84	CF/CI	
							1445	Storage unit, 48 bin	1	36	18	84	CF/CI	
	●						1456	Rack, bulk storage, six foot	2	72	24	96	CF/CI	
							1793	Table, welding, large	1	98	62	38	CF/CI	

Discipline Coordination						Equip ID#	Description	Qty	Dimensions (inches)			Furnish/Install	Project Comments	
Arch	Struc	Mech	Elec	Plum	Priority Equipment				Seismic Certification	Length	Width			Height
							<b>Sheet Metal Shop [Continued]</b>							
							1860	Workbench, severe use, six foot	1	72	32	34	CF/CI	
		●					1950	Cabinet, flammable materials, large	1	43	18	65	CF/CI	
		●					2102	Press, hydraulic, 20 ton	1	31	30	74	CF/CI	
		●		●			2610	Drill press, variable speed, 20 inch	1	22	36	69	CF/CI	
		●		●			2690	Saw, band, horizontal, small	1	40	84	49	CF/CI	
				●			2698	Saw, cutoff, abrasive, 14 inch	1	11	19-3/4	23-5/8	CF/CI	
		●		●			2742	Welder, MIG, portable	1	19	40	30	CF/CI	
				●			2760	Welder, TIG	1	18-1/2	43	31-1/2	CF/CI	
							2765	Torch, oxyacetylene, with cart	1	28	16-1/2	43-1/2	CF/CI	
							2770	Screen, welding	2	144	18	77-1/2	CF/CI	
				●	●		2780	Cutter, plasma	1	18	36	35	CF/CI	
							2835	Vise, five inch	1	9	18	10	CF/CI	
				●			2880	Buffer/grinder, eight inch, with dust collector	1	24-3/4	41	41-3/4	CF/CI	
				●	●		3085	Cabinet, abrasive blast, with dust collector	1	38	25	64	CF/CI	
●	●	●	●				3290	Fume extraction arm, welding	1	---	---	---	CF/CI	

Discipline Coordination							Equip ID#	Description	Qty	Dimensions (inches)			Furnish/Install	Project Comments
Arch	Struc	Mech	Elec	Plum	Priority Equipment	Seismic Certification				Length	Width	Height		
							<b>Facilities Stationary Engineer</b>							
	●						1098	Board, peg, tool	1	72	1/2	36	CF/CI	
	●	●					1106	Cabinet, six drawer, modular, underbench	2	30	27-3/4	33-1/2	CF/CI	
		●					1110	Cabinet, 10 drawer, modular	2	30	27-3/4	59	CF/CI	
							1185	Cabinet, storage, shop	1	36	18	78	CF/CI	
		●					1456	Rack, bulk storage, six foot	1	72	24	96	CF/CI	
							1688	Shelving unit, eight shelf	2	36	18	84	CF/CI	

# Equipment Datasheets/Cutsheets

## 1098 Equipment Datasheet

<b>Manufacturer:</b>		<b>Kennedy Manufacturing Company</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>50004UGY</b>				<b>Equipment</b>		<b>72</b>		<b>1/2</b>		<b>36</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>36</b>	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Wall mounted 36 inches above finish floor typically.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Board, peg, tool</b>										<b>1098</b>				

# 1098 Equipment Cutsheet

Equipment Description:

**Board, peg, tool**

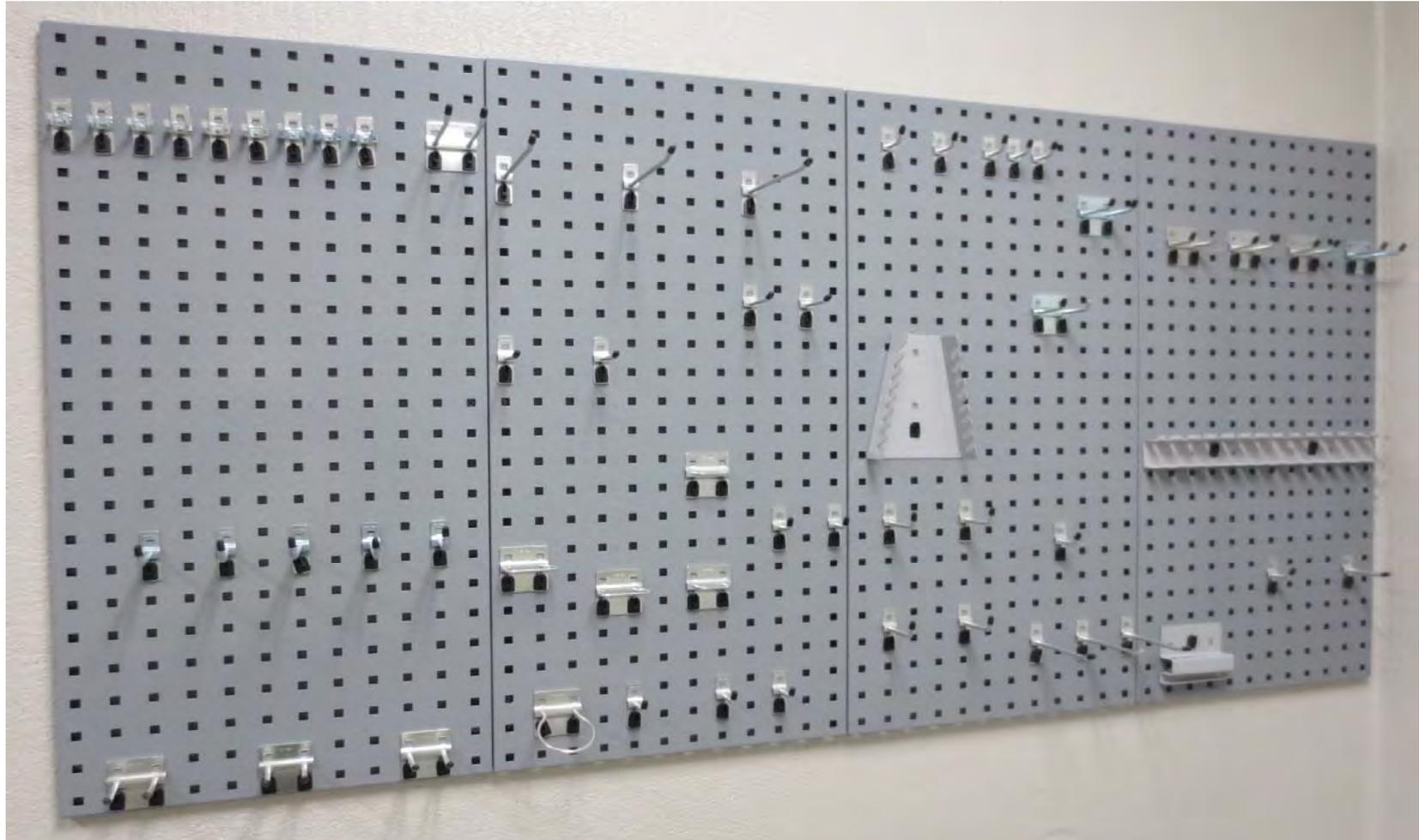
EQ ID Number:

**1098**

Manufacturer:

Kennedy Manufacturing Company

Model No.: 50004UGY



## 1106 Equipment Datasheet

<b>Manufacturer:</b>		<b>Equipto</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>4433</b>				<b>Equipment</b>		<b>30</b>		<b>27-3/4</b>		<b>33-1/2</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>42</b>	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Unit to be installed below workbench or architectural millwork; Coordinate with equipment to determine millwork location and height AFF.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Unit to be anchored to the floor.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		----				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Cabinet, six drawer, modular, underbench</b>										<b>1106</b>				

# 1106 Equipment Cutsheet

Equipment Description: <b>Cabinet, six drawer, modular, underbench</b>	EQ ID Number: <b>1106</b>
---	------------------------------

Manufacturer: Equipto	Model No.: 4433
-----------------------	-----------------



## 1110 Equipment Datasheet

<b>Manufacturer:</b>		<b>Equipto</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>4424</b>					<b>Equipment</b>		<b>30</b>		<b>27-3/4</b>		<b>59</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>48</b>	<b>Above</b>	<b>12</b>	
									<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Structural</b>		Unit weight: 462 pounds; full weight: 4,462 pounds					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)			---			
									Volume (CFM)			---			
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		---	---	---		
									Voltage		---	---	---		
									Phase		---	---	---		
									Horsepower (HP)		---	---	---		
									Amps		---	---	---		
							<b>Connection Type</b>		---						
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)		---				
									Flow Rate (GPM)		---				
									Capacity (PSI)		---				
							<b>Natural Gas</b>		Connection (inches)		---				
									Capacity (BTU)		---				
							<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
							<b>Compressed Air</b>		Connection (inches)		---				
									Volume (CFM)		---				
									Capacity (PSI)		---				
<b>Equipment Description:</b>															
<b>Cabinet, 10 drawer, modular</b>										<b>EQ ID Number:</b>					
										<b>1110</b>					

# 1110 Equipment Cutsheet

Equipment Description:

**Cabinet, 10 drawer, modular**

EQ ID Number:

**1110**

Manufacturer: **Equipto**

Model No.: 4424



## 1128 Equipment Datasheet

<b>Manufacturer:</b>		<b>Strong Hold</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>26-CC-LCD-240-1SOSRK with casters</b>				<b>Equipment</b>		<b>26</b>		<b>24</b>		<b>68</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>6</b>	<b>Front</b>	<b>36</b>	<b>Above</b>	<b>---</b>
									<b>Right</b>	<b>6</b>	<b>Back</b>	<b>6</b>	<b>Below</b>	<b>---</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		<b>---</b>				
								Volume (CFM)		<b>---</b>				
<b>Electrical</b>		Unit is mobile; provide standard grounded receptacles and data receptacles throughout usable area(s).				<b>Connection Size</b>		Requirements		<b>Unit</b>	<b>Fan</b>	<b>---</b>		
								Voltage		<b>120</b>	<b>120</b>	<b>---</b>		
								Phase		<b>1</b>	<b>1</b>	<b>---</b>		
								Horsepower (HP)		<b>---</b>	<b>---</b>	<b>---</b>		
								Amps		<b>15</b>	<b>15</b>	<b>---</b>		
						<b>Connection Type</b>		<b>Provide standard grounded receptacle</b>						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		<b>---</b>				
								Flow Rate (GPM)		<b>---</b>				
								Capacity (PSI)		<b>---</b>				
						<b>Natural Gas</b>		Connection (inches)		<b>---</b>				
								Capacity (BTU)		<b>---</b>				
						<b>Drain</b>		Floor Sink (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		<b>---</b>				
								Volume (CFM)		<b>---</b>				
								Capacity (PSI)		<b>---</b>				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Cabinet, computer, mobile</b>										<b>1128</b>				

# 1128 Equipment Cutsheet

Equipment Description: <b>Cabinet, computer, mobile</b>	EQ ID Number: <b>1128</b>
Manufacturer: Strong Hold	Model No.: 26-CC-LCD-240-1SOSRK with casters



## 1185 Equipment Datasheet

<b>Manufacturer:</b>		<b>Equipto</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>1710</b>					<b>Equipment</b>		<b>36</b>		<b>18</b>		<b>78</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>36</b>	<b>Above</b>	---	
									<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)		---				
									Volume (CFM)		---				
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		---	---	---		
									Voltage		---	---	---		
									Phase		---	---	---		
									Horsepower (HP)		---	---	---		
									Amps		---	---	---		
							<b>Connection Type</b>		---						
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)		---				
									Flow Rate (GPM)		---				
									Capacity (PSI)		---				
							<b>Natural Gas</b>		Connection (inches)		---				
									Capacity (BTU)		---				
							<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
							<b>Compressed Air</b>		Connection (inches)		---				
									Volume (CFM)		---				
									Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Cabinet, storage, shop</b>										<b>1185</b>					

# 1185 Equipment Cutsheet

Equipment Description:

**Cabinet, storage, shop**

EQ ID Number:

**1185**

Manufacturer: Ekipto

Model No.: 1710



## 1204 Equipment Datasheet

<b>Manufacturer:</b>		<b>Rubbermaid Commercial Products</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>6173-88 with accessories</b>				<b>Equipment</b>		<b>21-3/4</b>		<b>46</b>		<b>38-3/8</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Cart, cleaning</b>										<b>1204</b>				

# 1204 Equipment Cutsheet

Equipment Description:

**Cart, cleaning**

EQ ID Number:

**1204**

Manufacturer: Rubbermaid Commercial Products

Model No.: 6173-88 with accessories



## 1421 Equipment Datasheet

<b>Manufacturer:</b>		<b>Equipto</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)								
<b>Model No.:</b>		<b>1062-72 with 1063</b>				<b>Equipment</b>		<b>74-3/8</b>		<b>22-1/8</b>		<b>84</b>								
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>24</b>	<b>24</b>	<b>Front</b>	<b>Back</b>	<b>72</b>	<b>0</b>	<b>Above</b>	<b>24</b>	<b>Below</b>	<b>---</b>
<b>DISCIPLINE COORDINATION:</b>																				
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>								
<b>Structural</b>		Coordinate anchor bolt requirements with local codes; Weight: 162 pounds; 4,550 Total Capacity.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>								
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---		---								
								Volume (CFM)		---		---								
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---		---		---						
								Voltage		---		---		---						
								Phase		---		---		---						
								Horsepower (HP)		---		---		---						
								Amps		---		---		---						
						<b>Connection Type</b>		---		---		---								
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---		---								
								Flow Rate (GPM)		---		---								
								Capacity (PSI)		---		---								
						<b>Natural Gas</b>		Connection (inches)		---		---								
								Capacity (BTU)		---		---								
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>		---								
						<b>Compressed Air</b>		Connection (inches)		---		---								
								Volume (CFM)		---		---								
								Capacity (PSI)		---		---								
<b>Equipment Description:</b>													<b>EQ ID Number:</b>							
<b>Rack, arm, single face, six foot wide</b>													<b>1421</b>							

## 1421 Equipment Cutsheet

Equipment Description:

**Rack, arm, single face, six foot wide**

EQ ID Number:

**1421**

Manufacturer: Ekipto

Model No.: 1062-72 with 1063



## 1435 Equipment Datasheet

<b>Manufacturer:</b>		<b>SPG/Jarke/Cillis</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)	
<b>Model No.:</b>		<b>CR-834</b>					<b>Equipment</b>		<b>36</b>		<b>24</b>		<b>84</b>	
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>36</b>	<b>Above</b>	<b>24</b>
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>		
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>		
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)			---		
									Volume (CFM)			---		
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements			---	---	---
									Voltage			---	---	---
									Phase			---	---	---
									Horsepower (HP)			---	---	---
									Amps			---	---	---
							<b>Connection Type</b>		---					
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)			---		
									Flow Rate (GPM)			---		
									Capacity (PSI)			---		
							<b>Natural Gas</b>		Connection (inches)			---		
									Capacity (BTU)			---		
							<b>Drain</b>		Floor Drain (Y/N)			<b>N</b>		
							<b>Compressed Air</b>		Connection (inches)			---		
									Volume (CFM)			---		
									Capacity (PSI)			---		
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Rack, vertical</b>										<b>1435</b>				

# 1435 Equipment Cutsheet

Equipment Description: <b>Rack, vertical</b>	EQ ID Number: <b>1435</b>
---	------------------------------

Manufacturer: <b>SPG/Jarke/Cillis</b>	Model No.: <b>CR-834</b>
---------------------------------------	--------------------------



## 1436 Equipment Datasheet

<b>Manufacturer:</b>		<b>Vestil Manufacturing</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>VSSR-15</b>				<b>Equipment</b>		<b>50</b>		<b>44</b>		<b>84</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>48</b>	<b>Above</b>	<b>18</b>
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Approximate unit weight: 400 pounds. Weight capacity: 6,000 pounds (1,500 pounds per bay) Unit to be anchored to the floor.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Rack, sheet, vertical</b>										<b>1436</b>				

# 1436 Equipment Cutsheet

Equipment Description:

**Rack, sheet, vertical**

EQ ID Number:

**1436**

Manufacturer: Vestil Manufacturing

Model No.: VSSR-15



## 1445 Equipment Datasheet

<b>Manufacturer:</b>		<b>Equipto</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>673-9S starter and 673-9A add-on with accessories</b>				<b>Equipment</b>		<b>36</b>		<b>18</b>		<b>84</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>48</b>	<b>Above</b>	<b>24</b>
								<b>Right</b>	---	<b>Back</b>	<b>2</b>	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Empty weight: 381 pounds; full weight: 1,081 pounds.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Storage unit, 48 bin</b>										<b>1445</b>				

# 1445 Equipment Cutsheet

Equipment Description:

**Storage unit, 48 bin**

EQ ID Number:

**1445**

Manufacturer: Equipto

Model No.: 673-9S starter and 673-9A add-on with accessories



**Starter**

**Add-On**

## 1456 Equipment Datasheet

<b>Manufacturer:</b>		<b>Equipto</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		1028D62S starter and 1028D62A add-on with accessories				<b>Equipment</b>		<b>72</b>		<b>24</b>		<b>96</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>72</b>	<b>Above</b>	<b>48</b>
								<b>Right</b>	---	<b>Back</b>	<b>6</b>	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Unit to be anchored to the floor.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Rack, bulk storage, six foot</b>										<b>1456</b>				

## 1456 Equipment Cutsheet

Equipment Description:

**Rack, bulk storage, six foot**

EQ ID Number:

**1456**

Manufacturer: Equipto

Model No.: 1028D62S starter and 1028D62A add-on with accessories



## 1500 Equipment Datasheet

<b>Manufacturer:</b>		<b>Stanley Vidmar</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>2k Stak System</b>					<b>Equipment</b>		<b>203</b>		<b>436</b>		<b>184</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	Y	<b>Operational Clearance</b>		<b>Left</b>	<b>6</b>	<b>Front</b>	<b>96</b>	<b>Above</b>	<b>36</b>	
									<b>Right</b>	<b>6</b>	<b>Back</b>	<b>6</b>	<b>Below</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		Coordinate OSHA clearances, overhead door clearances, duct and piping routing with mechanical/plumbing and design with structural.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Structural</b>		Coordinate the design of slab with manufacturer to accommodate the weight of system and its loaded pallets. Reference design details.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Mechanical</b>		Coordinate duct routing and HVAC equipment with equipment to avoid conflicts with bridge crane travel.					<b>Venting</b>		Connection (inches)			<b>---</b>			
									Volume (CFM)			<b>---</b>			
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		<b>Unit</b>		<b>---</b>		<b>---</b>
									Voltage		<b>460</b>		<b>---</b>		<b>---</b>
									Phase		<b>3</b>		<b>---</b>		<b>---</b>
									Horsepower (HP)		<b>1</b>		<b>---</b>		<b>---</b>
									Amps		<b>30</b>		<b>---</b>		<b>---</b>
							<b>Connection Type</b>		<b>Provide disconnect</b>						
<b>Plumbing</b>		Coordinate pipe routing with equipment to avoid conflicts with bridge crane travel.					<b>Domestic Water</b>		Connection (inches)			<b>---</b>			
									Flow Rate (GPM)			<b>---</b>			
									Capacity (PSI)			<b>---</b>			
							<b>Natural Gas</b>		Connection (inches)			<b>---</b>			
									Capacity (BTU)			<b>---</b>			
							<b>Drain</b>		Floor Drain or Floor Sink (Y/N)			<b>N</b>			
							<b>Compressed Air</b>		Connection (inches)			<b>---</b>			
									Volume (CFM)			<b>---</b>			
									Capacity (PSI)			<b>---</b>			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Storage system, 2,000 pound capacity, with rack mounted crane</b>										<b>1500</b>					

## 1500 Equipment Cutsheet

Equipment Description:

**Storage system, 2,000 pound capacity, with rack mounted crane**

EQ ID Number:

**1500**

Manufacturer: Stanley Vidmar

Model No.: 2k Stak System



## 1536 Equipment Datasheet

<b>Manufacturer:</b>		<b>Lyon Workspace Products</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		Uprights 36M120, Beams S120, Decking WD5836H with accessories				<b>Equipment</b>		<b>126</b>		<b>36</b>		<b>120</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	144	<b>Above</b>	60
									<b>Right</b>	---	<b>Back</b>	6	<b>Below</b>	---
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Coordinate anchor bolt requirements with local codes.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Rack, pallet, ten foot, two tier</b>										<b>1536</b>				

# 1536 Equipment Cutsheet

Equipment Description:

**Rack, pallet, ten foot, two tier**

EQ ID Number:

**1536**

Manufacturer: Lyon Workspace Products

Model No.: Uprights 36M120, Beams S120, Decking  
WD5836H with accessories



## 1632 Equipment Datasheet

<b>Manufacturer:</b>		<b>Vidir Vertical Storage Systems</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		HT54162-0563-12 OR HT54193-0663-12 OR HT54225-0763-12 OR HT54256-0863-12 OR HT54288-0963-12 OR HT54319-1063-12				<b>Equipment</b>		<b>179</b>		<b>112</b>		<b>---</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>6</b>	<b>Front</b>	<b>72</b>	<b>Above</b>	<b>6</b>
									<b>Right</b>	<b>24</b>	<b>Back</b>	<b>6</b>	<b>Below</b>	<b>0</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Coordinate with building clear heights.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Coordinate with building clear heights. Approximate unit weight: 4,500 pounds. Unit to be anchored to the floor.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---		
								Voltage		<b>460</b>	---	---		
								Phase		<b>3</b>	---	---		
								Horsepower (HP)		<b>4</b>	---	---		
								Amps		<b>15</b>	---	---		
						<b>Connection Type</b>		<b>Provide disconnect</b>						
<b>Plumbing</b>		Verify fire protection requirements with local authority having jurisdiction.				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Carousel, storage, tire, 44 inch</b>										<b>1632</b>				

# 1632 Equipment Cutsheet

Equipment Description:

**Carousel, storage, tire, 44 inch**

EQ ID Number:

**1632**

Manufacturer: Vidir Vertical Storage Systems

Model No.: HT54162-0563-12 OR HT54193-0663-12 OR  
HT54225-0763-12 OR HT54256-0863-12 OR



## 1636 Equipment Datasheet

<b>Manufacturer:</b>		<b>Jarke Manufacturing</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>TW-3943</b>				<b>Equipment</b>		<b>60</b>		<b>26</b>		<b>47-1/2</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>48</b>	<b>Above</b>	<b>12</b>
								<b>Right</b>	---	<b>Back</b>	<b>12</b>	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Provide seismic bracing and anchorage to meet any local, state, and national codes and provisions.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Provide seismic bracing and anchorage to meet any local, state, and national codes and provisions.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Rack, tire, heavy duty, one tier</b>										<b>1636</b>				

# 1636 Equipment Cutsheet

Equipment Description:

**Rack, tire, heavy duty, one tier**

EQ ID Number:

**1636**

Manufacturer: Jarke Manufacturing

Model No.: TW-3943



### 1688 Equipment Datasheet

<b>Manufacturer:</b>		<b>Equipto</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)	
<b>Model No.:</b>		<b>773-8S starter with 773-8A add on with accessories</b>					<b>Equipment</b>		<b>36</b>		<b>18</b>		<b>84</b>	
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	48	<b>Above</b>	12
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)		---			
									Volume (CFM)		---			
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		---	---	---	
									Voltage		---	---	---	
									Phase		---	---	---	
									Horsepower (HP)		---	---	---	
									Amps		---	---	---	
							<b>Connection Type</b>		---					
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)		---			
									Flow Rate (GPM)		---			
									Capacity (PSI)		---			
							<b>Natural Gas</b>		Connection (inches)		---			
									Capacity (BTU)		---			
							<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>			
							<b>Compressed Air</b>		Connection (inches)		---			
									Volume (CFM)		---			
									Capacity (PSI)		---			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Shelving unit, eight shelf</b>										<b>1688</b>				

# 1688 Equipment Cutsheet

Equipment Description:

**Shelving unit, eight shelf**

EQ ID Number:

**1688**

Manufacturer:

Equipto

Model No.: 773-8S starter with 773-8A add on with accessories



Add-on



Starter

## 1730 Equipment Datasheet

<b>Manufacturer:</b>		<b>Kardex Remstar</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)	
<b>Model No.:</b>		<b>XP HD 500</b>					<b>Equipment</b>		---		---		---	
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	Y	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>60</b>	<b>Above</b>	<b>24</b>
								<b>Right</b>	<b>48</b>	<b>Back</b>	---	<b>Below</b>	---	---
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Coordinate OSHA clearances, ducting clearances, piping clearances, and design with structural.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>	
<b>Structural</b>		Provide foundation design per Design Details.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>	
<b>Mechanical</b>		Coordinate ducting and HVAC equipment with equipment and architectural to avoid conflicts with unit.					<b>Venting</b>		Connection (inches)		---			
									Volume (CFM)		---			
<b>Electrical</b>		Provide disconnect near unit; Provide data connection adjacent to unit; Provide additional lighting near unit for parts retrieval.					<b>Connection Size</b>		Requirements		<b>Unit</b>		---	
									Voltage		<b>460</b>		---	
									Phase		<b>3</b>		---	
									Horsepower (HP)		---		---	
									Amps		<b>14.2</b>		---	
							<b>Connection Type</b>		<b>Provide disconnect</b>					
<b>Plumbing</b>		Coordinate piping with architectural to avoid conflicts with unit.					<b>Domestic Water</b>		Connection (inches)		---			
									Flow Rate (GPM)		---			
									Capacity (PSI)		---			
							<b>Natural Gas</b>		Connection (inches)		---			
									Capacity (BTU)		---			
							<b>Drain</b>		Floor Sink (Y/N)		<b>N</b>			
							<b>Compressed Air</b>		Connection (inches)		---			
									Volume (CFM)		---			
									Capacity (PSI)		---			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Storage system, automated, vertical tray</b>										<b>1730</b>				

# 1730 Equipment Cutsheet

Equipment Description:

**Storage system, automated, vertical tray**

EQ ID Number:

**1730**

Manufacturer: **Kardex Remstar**

Model No.: **XP HD 500**

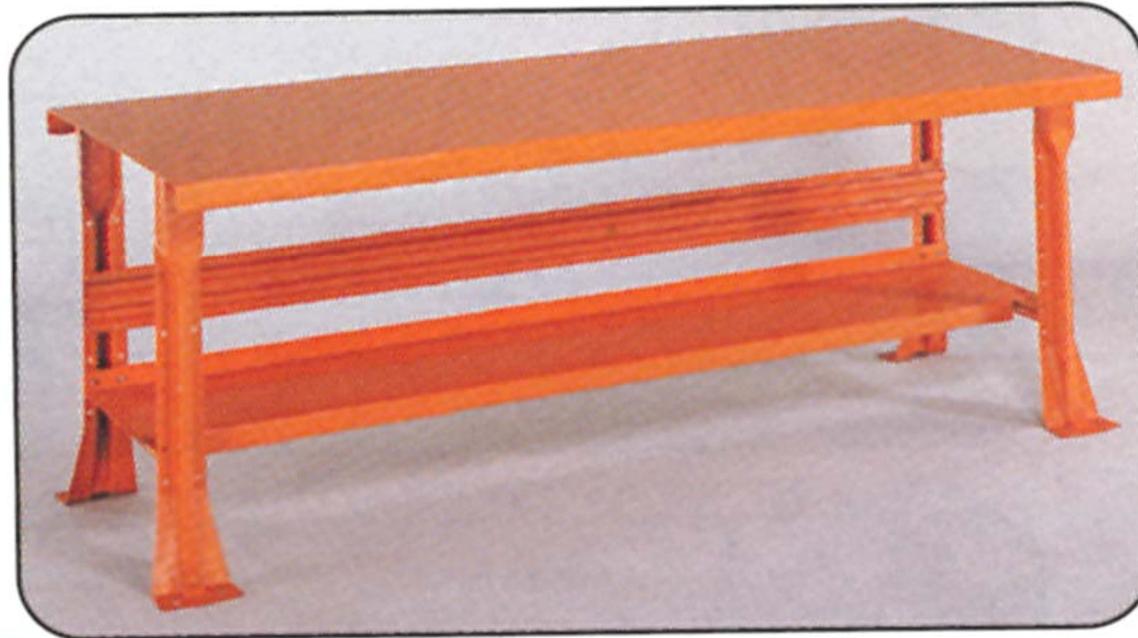


## 1753 Equipment Datasheet

<b>Manufacturer:</b>		<b>Equipto</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)			
<b>Model No.:</b>		<b>2333D8 with 441D8SS stainless steel</b>				<b>Equipment</b>		<b>96</b>		<b>36</b>		<b>34</b>			
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>36</b>	<b>Front</b>	<b>36</b>	<b>Above</b>	<b>36</b>	
									<b>Right</b>	<b>36</b>	<b>Back</b>	<b>36</b>	<b>Below</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>					
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>					
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---					
								Volume (CFM)		---					
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---		---		---	
								Voltage		---		---		---	
								Phase		---		---		---	
								Horsepower (HP)		---		---		---	
								Amps		---		---		---	
						<b>Connection Type</b>		---							
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---					
								Flow Rate (GPM)		---					
								Capacity (PSI)		---					
						<b>Natural Gas</b>		Connection (inches)		---					
								Capacity (BTU)		---					
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>					
						<b>Compressed Air</b>		Connection (inches)		---					
								Volume (CFM)		---					
								Capacity (PSI)		---					
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Table, layout, stainless steel top, eight foot</b>										<b>1753</b>					

# 1753 Equipment Cutsheet

<b>Equipment Description:</b> <b>Table, layout, stainless steel top, eight foot</b>	<b>EQ ID Number:</b> <b>1753</b>
<b>Manufacturer:</b> Equipto	<b>Model No.:</b> 2333D8 with 441D8SS stainless steel



## 1793 Equipment Datasheet

<b>Manufacturer:</b>		<b>Weldsale</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)	
<b>Model No.:</b>		<b>WSC - 58B - BUNDLE</b>				<b>Equipment</b>		<b>96</b>		<b>60</b>		<b>32</b>	
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	N	<b>Operational Clearance</b>	<b>Left</b>	<b>36</b>	<b>Front</b>	<b>36</b>	<b>Above</b>	<b>---</b>
							<b>Right</b>	<b>36</b>	<b>Back</b>	<b>36</b>	<b>Below</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>													
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Structural</b>		Weight: 3,775 pounds				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		<b>---</b>			
								Volume (CFM)		<b>---</b>			
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>---</b>		<b>---</b>	
								Voltage		<b>---</b>		<b>---</b>	
								Phase		<b>---</b>		<b>---</b>	
								Horsepower (HP)		<b>---</b>		<b>---</b>	
								Amps		<b>---</b>		<b>---</b>	
						<b>Connection Type</b>		<b>---</b>					
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		<b>---</b>			
								Flow Rate (GPM)		<b>---</b>			
								Capacity (PSI)		<b>---</b>			
						<b>Natural Gas</b>		Connection (inches)		<b>---</b>			
								Capacity (BTU)		<b>---</b>			
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>			
						<b>Compressed Air</b>		Connection (inches)		<b>---</b>			
								Volume (CFM)		<b>---</b>			
								Capacity (PSI)		<b>---</b>			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>			
<b>Table, welding, large</b>										<b>1793</b>			

# 1793 Equipment Cutsheet

Equipment Description:

**Table, welding, large**

EQ ID Number:

**1793**

Manufacturer:

Weldsale

Model No.: WSC - 58B - BUNDLE



## 1805 Equipment Datasheet

<b>Manufacturer:</b>		<b>Equipto</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>388-5C with accessories</b>				<b>Equipment</b>		<b>60</b>		<b>30</b>		<b>33-1/2</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>36</b>	<b>Above</b>	---
									<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Power Strip</b>	<b>Instrumental Shelf</b>	---		
								Voltage		<b>120</b>	<b>120</b>	---		
								Phase		<b>1</b>	<b>1</b>	---		
								Horsepower (HP)		---	---	---		
								Amps		<b>15</b>	<b>15</b>	---		
						<b>Connection Type</b>		<b>Provide standard grounded receptacle</b>						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain or Floor Sink (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Workstation, electronics, static dissipative, five foot, with shelf</b>										<b>1805</b>				

## 1805 Equipment Cutsheet

Equipment Description:

**Workstation, electronics, static dissipative, five foot, with shelf**

EQ ID Number:

**1805**

Manufacturer: Equipto

Model No.: 388-5C with accessories



## 1860 Equipment Datasheet

<b>Manufacturer:</b>		<b>Fabricated</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		---				<b>Equipment</b>		<b>72</b>		<b>32</b>		<b>34</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>48</b>	<b>Above</b>	<b>36</b>
									<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Workbench, severe use, six foot</b>										<b>1860</b>				

## 1860 Equipment Cutsheet

Equipment Description:

**Workbench, severe use, six foot**

EQ ID Number:

**1860**

Manufacturer:

Fabricated

Model No.: ---



## 1950 Equipment Datasheet

<b>Manufacturer:</b>		<b>Equipto</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>FSC45S</b>				<b>Equipment</b>		<b>43</b>		<b>18</b>		<b>65</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>48</b>	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Unit to be anchored to the floor.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain or Floor Sink (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Cabinet, flammable materials, large</b>										<b>1950</b>				

# 1950 Equipment Cutsheet

Equipment Description: <b>Cabinet, flammable materials, large</b>	EQ ID Number: <b>1950</b>
--	------------------------------

Manufacturer: Equipto	Model No.: FSC45S
-----------------------	-------------------



## 1966 Equipment Datasheet

<b>Manufacturer:</b>		<b>Justrite Manufacturing</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>28635</b>				<b>Equipment</b>		<b>49</b>		<b>49</b>		<b>10-1/4</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	81	<b>Above</b>	96
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Sink (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Pallet, containment, hazardous materials, four drum</b>										<b>1966</b>				

## 1966 Equipment Cutsheet

Equipment Description:

**Pallet, containment, hazardous materials, four drum**

EQ ID Number:

**1966**

Manufacturer: **Justrite Manufacturing**

Model No.: 28635



## 2102 Equipment Datasheet

<b>Manufacturer:</b>		<b>Nugierfroom Corporation</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>H20-6-3F</b>					<b>Equipment</b>		<b>31</b>		<b>30</b>		<b>74</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>12</b>	<b>Front</b>	<b>36</b>	<b>Above</b>	<b>24</b>	
								<b>Right</b>	<b>24</b>	<b>Back</b>	<b>12</b>	<b>Below</b>	<b>---</b>		
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)			---			
									Volume (CFM)			---			
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements			---	---	---	
									Voltage			---	---	---	
									Phase			---	---	---	
									Horsepower (HP)			---	---	---	
									Amps			---	---	---	
							<b>Connection Type</b>		---						
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)			---			
									Flow Rate (GPM)			---			
									Capacity (PSI)			---			
							<b>Natural Gas</b>		Connection (inches)			---			
									Capacity (BTU)			---			
							<b>Drain</b>		Floor Drain (Y/N)			<b>N</b>			
							<b>Compressed Air</b>		Connection (inches)			---			
									Volume (CFM)			---			
									Capacity (PSI)			---			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Press, hydraulic, 20 ton</b>										<b>2102</b>					

## 2102 Equipment Cutsheet

Equipment Description:

**Press, hydraulic, 20 ton**

EQ ID Number:

**2102**

Manufacturer: Nugierfroom Corporation

Model No.: H20-6-3F



## 2353 Equipment Datasheet

<b>Manufacturer:</b>		<b>Hennessy Industries, Inc.</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)			
<b>Model No.:</b>		<b>HIT-6000</b>				<b>Equipment</b>		<b>78</b>		<b>48</b>		<b>36</b>			
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>36</b>	<b>Front</b>	<b>60</b>	<b>Above</b>	<b>24</b>	
									<b>Right</b>	<b>36</b>	<b>Back</b>	<b>24</b>	<b>Below</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>					
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>					
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---					
								Volume (CFM)		---					
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Unit</b>		---		---	
								Voltage		<b>208</b>		---		---	
								Phase		<b>3</b>		---		---	
								Horsepower (HP)		<b>3</b>		---		---	
								Amps		<b>25</b>		---		---	
						<b>Connection Type</b>		<b>Provide disconnect</b>							
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---					
								Flow Rate (GPM)		---					
								Capacity (PSI)		---					
						<b>Natural Gas</b>		Connection (inches)		---					
								Capacity (BTU)		---					
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>					
						<b>Compressed Air</b>		Connection (inches)		<b>1/4</b>					
								Volume (CFM)		<b>5</b>					
								Capacity (PSI)		<b>110 to 175</b>					
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Changer, heavy duty, 44 inch max tire</b>										<b>2353</b>					

## 2353 Equipment Cutsheet

Equipment Description:

**Changer, heavy duty, 44 inch max tire**

EQ ID Number:

**2353**

Manufacturer:

Hennessy Industries, Inc.

Model No.: HIT-6000



## 2363 Equipment Datasheet

<b>Manufacturer:</b>		<b>Hennessy Industries</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>6450-2D</b>				<b>Equipment</b>		<b>93</b>		<b>62</b>		<b>84</b>		
						<b>Hydraulic Tire Lift</b>		<b>48</b>		<b>34</b>		<b>42</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>24</b>	<b>Front</b>	<b>60</b>	<b>Above</b>	<b>24</b>
									<b>Right</b>	<b>24</b>	<b>Back</b>	<b>12</b>	<b>Below</b>	<b>---</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Unit will be anchored to the slab. Approximate weight: 1,500 pounds; Capacity: 500 pounds				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		Special purpose outlet = L620 plug for single phase or L1520 plug for three phase				<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---	---	---
								Voltage		<b>220</b>	---	---	---	---
								Phase		<b>1</b>	---	---	---	---
								Horsepower (HP)		<b>1-1/2</b>	---	---	---	---
								Amps		<b>20</b>	---	---	---	---
						<b>Connection Type</b>		<b>Provide special purpose outlet</b>						
<b>Plumbing</b>		Compressed air connection only required when optional accessory of hydraulic lift (Hennessy Model No. 575) is used.				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		<b>1/4 NPT</b>				
								Volume (CFM)		<b>3</b>				
								Capacity (PSI)		<b>120 to 150</b>				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Balancer, tire, heavy duty</b>										<b>2363</b>				

## 2363 Equipment Cutsheet

Equipment Description:

**Balancer, tire, heavy duty**

EQ ID Number:

**2363**

Manufacturer: Hennessy Industries

Model No.: 6450-2D



## 2365 Equipment Datasheet

<b>Manufacturer:</b>		<b>Branick Industries, Inc.</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)			
<b>Model No.:</b>		<b>2250</b>					<b>Equipment</b>		<b>28</b>		<b>36</b>		<b>60</b>			
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>36</b>	<b>Front</b>	<b>60</b>	<b>Above</b>	<b>36</b>		
									<b>Right</b>	<b>36</b>	<b>Back</b>	<b>12</b>	<b>Below</b>	<b>0</b>		
<b>DISCIPLINE COORDINATION:</b>																
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>				
<b>Structural</b>		Unit weight 200 pounds					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>				
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)			---				
									Volume (CFM)			---				
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		Automatic Inflation Kit		---		---	
									Voltage		<b>120</b>		---		---	
									Phase		<b>1</b>		---		---	
									Horsepower (HP)		---		---		---	
									Amps		<b>20</b>		---		---	
							<b>Connection Type</b>		<b>Provide standard grounded receptacle</b>							
<b>Plumbing</b>		Provide 3/4 inch combination filter-regulator.					<b>Domestic Water</b>		Connection (inches)			---				
									Flow Rate (GPM)			---				
									Capacity (PSI)			---				
							<b>Natural Gas</b>		Connection (inches)			---				
									Capacity (BTU)			---				
							<b>Drain</b>		Floor Drain (Y/N)			<b>N</b>				
							<b>Compressed Air</b>		Connection (inches)			<b>1/4</b>				
									Volume (CFM)			<b>6</b>				
									Capacity (PSI)			<b>120</b>				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>						
<b>Cage, inflation, tire</b>										<b>2365</b>						

## 2365 Equipment Cutsheet

Equipment Description:

**Cage, inflation, tire**

EQ ID Number:

**2365**

Manufacturer: **Branick Industries, Inc.**

Model No.: 2250



## 2368 Equipment Datasheet

<b>Manufacturer:</b>		<b>Branick Industries</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)									
<b>Model No.:</b>		<b>S-FLL</b>				<b>Equipment</b>		<b>25</b>		<b>35</b>		<b>17</b>									
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>12</b>	<b>12</b>	<b>Front</b>	<b>Back</b>	<b>60</b>	<b>12</b>	<b>Above</b>	<b>Below</b>	<b>60</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>																					
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>									
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>									
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)				---									
								Volume (CFM)				---									
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements				---		---		---					
								Voltage				---		---		---					
								Phase				---		---		---					
								Horsepower (HP)				---		---		---					
								Amps				---		---		---					
						<b>Connection Type</b>		---													
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)				---									
								Flow Rate (GPM)				---									
								Capacity (PSI)				---									
						<b>Natural Gas</b>		Connection (inches)				---									
								Capacity (BTU)				---									
						<b>Drain</b>		Floor Drain (Y/N)				<b>N</b>									
						<b>Compressed Air</b>		Connection (inches)				<b>3/8</b>									
								Volume (CFM)				---									
								Capacity (PSI)				<b>80-120</b>									
<b>Equipment Description:</b>															<b>EQ ID Number:</b>						
<b>Spreader, tire</b>															<b>2368</b>						

## 2368 Equipment Cutsheet

Equipment Description:

**Spreader, tire**

EQ ID Number:

**2368**

Manufacturer:

Branick Industries

Model No.: S-FLL



## 2440 Equipment Datasheet

<b>Manufacturer:</b>		<b>Tennant</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)							
<b>Model No.:</b>		<b>5700-700D with Fast</b>				<b>Unit</b>		<b>37-1/2</b>		<b>64</b>		<b>43</b>							
						<b>Wall Mounted Charger</b>		<b>12</b>		<b>12</b>		<b>5</b>							
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>---</b>	<b>Front</b>	<b>Back</b>	<b>---</b>	<b>Above</b>	<b>Below</b>	<b>---</b>		
<b>DISCIPLINE COORDINATION:</b>																			
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>							
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>							
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		<b>---</b>		Volume (CFM)		<b>---</b>					
<b>Electrical</b>		Wall mounted battery charger				<b>Connection Size</b>		Requirements		<b>Unit</b>		<b>---</b>		<b>---</b>					
								Voltage		<b>120</b>		<b>---</b>		<b>---</b>					
								Phase		<b>1</b>		<b>---</b>		<b>---</b>					
								Horsepower (HP)		<b>0.6</b>		<b>---</b>		<b>---</b>					
								Amps		<b>16</b>		<b>---</b>		<b>---</b>					
						<b>Connection Type</b>		<b>Provide dedicated outlet</b>											
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		<b>---</b>		Flow Rate (GPM)		<b>---</b>		Capacity (PSI)		<b>---</b>	
						<b>Natural Gas</b>		Connection (inches)		<b>---</b>		Capacity (BTU)		<b>---</b>					
						<b>Drain</b>		Floor Drain or Floor Sink (Y/N)		<b>N</b>									
						<b>Compressed Air</b>		Connection (inches)		<b>---</b>		Volume (CFM)		<b>---</b>		Capacity (PSI)		<b>---</b>	
<b>Equipment Description:</b>												<b>EQ ID Number:</b>							
<b>Scrubber, floor, walk behind, 28 inch path, battery operated</b>												<b>2440</b>							

## 2440 Equipment Cutsheet

Equipment Description:

**Scrubber, floor, walk behind, 28 inch path, battery operated**

EQ ID Number:

**2440**

Manufacturer: Tennant

Model No.: 5700-700D with Fast



## 2610 Equipment Datasheet

<b>Manufacturer:</b>		<b>Clausing Industrial</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)									
<b>Model No.:</b>		<b>2277 with accessories</b>				<b>Equipment</b>		<b>22</b>		<b>36</b>		<b>69</b>									
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>24</b>	<b>24</b>	<b>Front</b>	<b>Back</b>	<b>48</b>	<b>6</b>	<b>Above</b>	<b>24</b>	<b>Below</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>																					
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>									
<b>Structural</b>		Weight: 650 pounds				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>									
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)				<b>---</b>									
<b>Mechanical</b>		---				<b>Venting</b>		Volume (CFM)				<b>---</b>									
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Unit</b>		<b>---</b>		<b>---</b>							
<b>Electrical</b>		---				<b>Connection Size</b>		Voltage		<b>460</b>		<b>---</b>		<b>---</b>							
<b>Electrical</b>		---				<b>Connection Size</b>		Phase		<b>3</b>		<b>---</b>		<b>---</b>							
<b>Electrical</b>		---				<b>Connection Size</b>		Horsepower (HP)		<b>1.5</b>		<b>---</b>		<b>---</b>							
<b>Electrical</b>		---				<b>Connection Size</b>		Amps		<b>3</b>		<b>---</b>		<b>---</b>							
<b>Electrical</b>		---				<b>Connection Type</b>		<b>Provide disconnect</b>													
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		<b>---</b>											
<b>Plumbing</b>		---				<b>Domestic Water</b>		Flow Rate (GPM)		<b>---</b>											
<b>Plumbing</b>		---				<b>Domestic Water</b>		Capacity (PSI)		<b>---</b>											
<b>Plumbing</b>		---				<b>Natural Gas</b>		Connection (inches)		<b>---</b>											
<b>Plumbing</b>		---				<b>Natural Gas</b>		Capacity (BTU)		<b>---</b>											
<b>Plumbing</b>		---				<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>											
<b>Plumbing</b>		---				<b>Compressed Air</b>		Connection (inches)		<b>---</b>											
<b>Plumbing</b>		---				<b>Compressed Air</b>		Volume (CFM)		<b>---</b>											
<b>Plumbing</b>		---				<b>Compressed Air</b>		Capacity (PSI)		<b>---</b>											
<b>Equipment Description:</b>														<b>EQ ID Number:</b>							
<b>Drill press, variable speed, 20 inch</b>														<b>2610</b>							

## 2610 Equipment Cutsheet

Equipment Description:

**Drill press, variable speed, 20 inch**

EQ ID Number:

**2610**

Manufacturer: Clausing Industrial

Model No.: 2277 with accessories



## 2689 Equipment Datasheet

<b>Manufacturer:</b>		<b>Kalamazoo Machine Tool</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)									
<b>Model No.:</b>		<b>H350M with accessories</b>				<b>Equipment</b>		<b>72</b>		<b>60</b>		<b>37</b>									
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>48</b>	<b>36</b>	<b>Front</b>	<b>Back</b>	<b>48</b>	<b>120</b>	<b>Above</b>	<b>Below</b>	<b>12</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>																					
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>									
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>									
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)				---									
								Volume (CFM)				---									
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Unit</b>		---		---							
								Voltage		<b>460</b>		---		---							
								Phase		<b>3</b>		---		---							
								Horsepower (HP)		<b>3</b>		---		---							
								Amps		---		---		---							
						<b>Connection Type</b>		<b>Provide disconnect</b>													
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---		Flow Rate (GPM)		---		Capacity (PSI)		---			
						<b>Natural Gas</b>		Connection (inches)		---		Capacity (BTU)		---							
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>											
						<b>Compressed Air</b>		Connection (inches)		---		Volume (CFM)		---		Capacity (PSI)		---			
<b>Equipment Description:</b>															<b>EQ ID Number:</b>						
<b>Saw, band, horizontal, large</b>															<b>2689</b>						

## 2689 Equipment Cutsheet

Equipment Description:

**Saw, band, horizontal, large**

EQ ID Number:

**2689**

Manufacturer:

Kalamazoo Machine Tool

Model No.: H350M with accessories



## 2690 Equipment Datasheet

<b>Manufacturer:</b>		<b>Wellsaw</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)	
<b>Model No.:</b>		<b>1016 with accessories</b>				<b>Equipment</b>		<b>40</b>		<b>84</b>		<b>49</b>	
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>	<b>Left</b>	<b>48</b>	<b>Front</b>	<b>36</b>	<b>Above</b>	<b>36</b>
								<b>Right</b>	<b>48</b>	<b>Back</b>	<b>12</b>	<b>Below</b>	<b>---</b>
<b>DISCIPLINE COORDINATION:</b>													
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Structural</b>		Weight: 900 pounds				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---			
								Volume (CFM)		---			
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Unit</b>		---	
								Voltage		<b>460</b>		---	
								Phase		<b>3</b>		---	
								Horsepower (HP)		<b>2</b>		---	
								Amps		<b>3.2</b>		---	
						<b>Connection Type</b>		<b>Provide disconnect</b>					
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---			
								Flow Rate (GPM)		---			
								Capacity (PSI)		---			
						<b>Natural Gas</b>		Connection (inches)		---			
								Capacity (BTU)		---			
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>			
						<b>Compressed Air</b>		Connection (inches)		---			
								Volume (CFM)		---			
								Capacity (PSI)		---			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>			
<b>Saw, band, horizontal, small</b>										<b>2690</b>			

## 2690 Equipment Cutsheet

Equipment Description:

**Saw, band, horizontal, small**

EQ ID Number:

**2690**

Manufacturer:

Wellsaw

Model No.: 1016 with accessories



## 2698 Equipment Datasheet

<b>Manufacturer:</b>		<b>Makita</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>LW1401</b>				<b>Equipment</b>		<b>11</b>		<b>19-3/4</b>		<b>23-5/8</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>36</b>	<b>Front</b>	<b>36</b>	<b>Above</b>	<b>24</b>
									<b>Right</b>	<b>36</b>	<b>Back</b>	<b>12</b>	<b>Below</b>	<b>---</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---		
								Voltage		<b>120</b>	---	---		
								Phase		<b>1</b>	---	---		
								Horsepower (HP)		---	---	---		
								Amps		<b>15</b>	---	---		
						<b>Connection Type</b>		<b>Provide standard grounded receptacle</b>						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Saw, cutoff, abrasive, 14 inch</b>										<b>2698</b>				

## 2698 Equipment Cutsheet

Equipment Description:

**Saw, cutoff, abrasive, 14 inch**

EQ ID Number:

**2698**

Manufacturer: Makita

Model No.: LW1401



## 2740 Equipment Datasheet

<b>Manufacturer:</b>		<b>Miller Electric</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>Millermatic 141 Package (951601)</b>					<b>Equipment</b>		<b>18</b>		<b>36</b>		<b>35</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---	
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---		
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)		---				
									Volume (CFM)		---				
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		<b>Unit</b>		---		
									Voltage		<b>120</b>		---		
									Phase		<b>1</b>		---		
									Horsepower (HP)		---		---		
									Amps		<b>20</b>		---		
							<b>Connection Type</b>		<b>Provide standard grounded receptacle</b>						
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)		---				
									Flow Rate (GPM)		---				
									Capacity (PSI)		---				
							<b>Natural Gas</b>		Connection (inches)		---				
									Capacity (BTU)		---				
							<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
							<b>Compressed Air</b>		Connection (inches)		---				
									Volume (CFM)		---				
									Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Welder, MIG, with cart</b>										<b>2740</b>					

## 2740 Equipment Cutsheet

Equipment Description:

**Welder, MIG, with cart**

EQ ID Number:

**2740**

Manufacturer: Miller Electric

Model No.: Millermatic 141 Package (951601)



## 2742 Equipment Datasheet

<b>Manufacturer:</b>		<b>Miller Electric Manufacturing Company</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>Millermatic 252 with accessories no.:907321</b>				<b>Equipment</b>		<b>19</b>		<b>40</b>		<b>30</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---
							<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---		---
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Weight: 207 pounds				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		NEMA configuration: Receptacle: 6-50R Plug: 6-50P				<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---		
								Voltage		<b>460</b>	---	---		
								Phase		<b>1</b>	---	---		
								Horsepower (HP)		---	---	---		
								Amps		<b>23</b>	---	---		
						<b>Connection Type</b>		<b>Special purpose outlet</b>						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Welder, MIG, portable</b>										<b>2742</b>				

## 2742 Equipment Cutsheet

Equipment Description:

**Welder, MIG, portable**

EQ ID Number:

**2742**

Manufacturer:

Miller Electric Manufacturing Company

Model No.:

Millermatic 252 with accessories  
no.:907321



## 2750 Equipment Datasheet

<b>Manufacturer:</b>		<b>Miller Electric Manufacturing Company</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>Dimension 452 (Part No.: 903254)</b>				<b>Equipment</b>		<b>38</b>		<b>23</b>		<b>30</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---		
								Voltage		<b>208</b>	---	---		
								Phase		<b>3</b>	---	---		
								Horsepower (HP)		---	---	---		
								Amps		<b>60</b>	---	---		
						<b>Connection Type</b>		Provide pecial purpose outlet						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Welder, multiprocess</b>										<b>2750</b>				

## 2750 Equipment Cutsheet

Equipment Description:

**Welder, multiprocess**

EQ ID Number:

**2750**

Manufacturer: Miller Electric Manufacturing Company

Model No.: Dimension 452 (Part No.: 903254)



## 2760 Equipment Datasheet

<b>Manufacturer:</b>		<b>Miller Electric Manufacturing Co.</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>Syncrowave 210 Runner No. 951684</b>				<b>Equipment</b>		<b>18-1/2</b>		<b>43</b>		<b>31-1/2</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---	---	---
								Voltage		<b>120</b>	---	---	---	---
								Phase		<b>1</b>	---	---	---	---
								Horsepower (HP)		---	---	---	---	---
								Amps		<b>20.5</b>	---	---	---	---
						<b>Connection Type</b>		<b>Provide special purpose outlet</b>						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Welder, TIG</b>										<b>2760</b>				

## 2760 Equipment Cutsheet

Equipment Description:

**Welder, TIG**

EQ ID Number:

**2760**

Manufacturer: Miller Electric Manufacturing Co.

Model No.: Syncrowave 210 Runner No. 951684



## 2765 Equipment Datasheet

<b>Manufacturer:</b>		<b>Harris Product Group</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>4403235</b>				<b>Equipment</b>		<b>28</b>		<b>16-1/2</b>		<b>43-1/2</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Torch, oxyacetylene, with cart</b>										<b>2765</b>				

## 2765 Equipment Cutsheet

Equipment Description:

**Torch, oxyacetylene, with cart**

EQ ID Number:

**2765**

Manufacturer: Harris Product Group

Model No.: 4403235



## 2770 Equipment Datasheet

<b>Manufacturer:</b>		<b>Singer Safety Company</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)	
<b>Model No.:</b>		<b>13-011066</b>					<b>Equipment</b>		<b>144</b>		<b>18</b>		<b>77-1/2</b>	
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)		---			
									Volume (CFM)		---			
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		---	---	---	
									Voltage		---	---	---	
									Phase		---	---	---	
									Horsepower (HP)		---	---	---	
									Amps		---	---	---	
							<b>Connection Type</b>		---					
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)		---			
									Flow Rate (GPM)		---			
									Capacity (PSI)		---			
							<b>Natural Gas</b>		Connection (inches)		---			
									Capacity (BTU)		---			
							<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>			
							<b>Compressed Air</b>		Connection (inches)		---			
									Volume (CFM)		---			
									Capacity (PSI)		---			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Screen, welding</b>										<b>2770</b>				

## 2770 Equipment Cutsheet

Equipment Description:

**Screen, welding**

EQ ID Number:

**2770**

Manufacturer:

Singer Safety Company

Model No.: 13-011066



## 2780 Equipment Datasheet

<b>Manufacturer:</b>		<b>Miller Electric Company</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)	
<b>Model No.:</b>		<b>907579</b>					<b>Equipment</b>		<b>18</b>		<b>36</b>		<b>35</b>	
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Structural</b>		Unit weight: 56 pounds					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)		---			
									Volume (CFM)		---			
<b>Electrical</b>		Match plug; NEMA: L6-30R twist lock					<b>Connection Size</b>		Requirements		<b>Motor</b>		---	
									Voltage		<b>240</b>		---	
									Phase		<b>1</b>		---	
									Horsepower (HP)		---		---	
									Amps		<b>27.7</b>		---	
							<b>Connection Type</b>		<b>Provide special purpose outlet</b>					
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)		---			
									Flow Rate (GPM)		---			
									Capacity (PSI)		---			
							<b>Natural Gas</b>		Connection (inches)		---			
									Capacity (BTU)		---			
							<b>Drain</b>		Floor Sink (Y/N)		<b>N</b>			
							<b>Compressed Air</b>		Connection (inches)		<b>3/8</b>			
									Volume (CFM)		<b>6</b>			
									Capacity (PSI)		<b>90-120</b>			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Cutter, plasma</b>										<b>2780</b>				

## 2780 Equipment Cutsheet

Equipment Description:

**Cutter, plasma**

EQ ID Number:

**2780**

Manufacturer:

Miller Electric Company

Model No.: 907579



## 2835 Equipment Datasheet

<b>Manufacturer:</b>		<b>WMH Tool Group/Wilton</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>1755</b>					<b>Equipment</b>		<b>9</b>		<b>18</b>		<b>10</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>36</b>	<b>Front</b>	<b>36</b>	<b>Above</b>	<b>24</b>	
									<b>Right</b>	<b>36</b>	<b>Back</b>	<b>12</b>	<b>Below</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)			---			
									Volume (CFM)			---			
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements			---	---	---	
									Voltage			---	---	---	
									Phase			---	---	---	
									Horsepower (HP)			---	---	---	
									Amps			---	---	---	
							<b>Connection Type</b>		---						
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)			---			
									Flow Rate (GPM)			---			
									Capacity (PSI)			---			
							<b>Natural Gas</b>		Connection (inches)			---			
									Capacity (BTU)			---			
							<b>Drain</b>		Floor Drain (Y/N)			<b>N</b>			
							<b>Compressed Air</b>		Connection (inches)			---			
									Volume (CFM)			---			
									Capacity (PSI)			---			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Vise, five inch</b>										<b>2835</b>					

## 2835 Equipment Cutsheet

Equipment Description:

**Vise, five inch**

EQ ID Number:

**2835**

Manufacturer:

WMH Tool Group/Wilton

Model No.: 1755



## 2880 Equipment Datasheet

<b>Manufacturer:</b>		<b>Baldor Electronics</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>8123 WD</b>				<b>Equipment</b>		<b>24-3/4</b>		<b>41</b>		<b>41-3/4</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>24</b>	<b>36</b>	<b>Above</b>	<b>36</b>
									<b>24</b>			<b>12</b>	<b>Below</b>	<b>---</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>		
<b>Structural</b>		Weight grinder: 112 pounds; Dust collector: 325 pounds				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>		
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)				<b>---</b>		
								Volume (CFM)				<b>---</b>		
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		Grinder/ Fan		Dust Control		<b>---</b>
								Voltage		<b>460</b>		<b>120</b>		<b>---</b>
								Phase		<b>3</b>		<b>1</b>		<b>---</b>
								Horsepower (HP)		<b>3/4</b>		<b>1</b>		<b>---</b>
								Amps		<b>1.5</b>		<b>12</b>		<b>---</b>
						<b>Connection Type</b>		<b>Provide disconnect</b>						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)				<b>---</b>		
								Flow Rate (GPM)				<b>---</b>		
								Capacity (PSI)				<b>---</b>		
						<b>Natural Gas</b>		Connection (inches)				<b>---</b>		
								Capacity (BTU)				<b>---</b>		
						<b>Drain</b>		Floor Drain (Y/N)				<b>N</b>		
						<b>Compressed Air</b>		Connection (inches)				<b>---</b>		
								Volume (CFM)				<b>---</b>		
								Capacity (PSI)				<b>---</b>		
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Buffer/grinder, eight inch, with dust collector</b>										<b>2880</b>				

## 2880 Equipment Cutsheet

Equipment Description:

**Buffer/grinder, eight inch, with dust collector**

EQ ID Number:

**2880**

Manufacturer: Baldor Electronics

Model No.: 8123 WD



### 3085 Equipment Datasheet

<b>Manufacturer:</b>		<b>Trinity Tool Company (TRINCO)</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>Master 36/BP</b>					<b>Equipment</b>		<b>38</b>		<b>25</b>		<b>64</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>24</b>	<b>Front</b>	<b>48</b>	<b>Above</b>	<b>---</b>	
								<b>Right</b>	<b>48</b>	<b>Back</b>	<b>---</b>	<b>Below</b>	<b>---</b>		
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)			<b>---</b>			
									Volume (CFM)			<b>---</b>			
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		<b>Unit</b>		<b>---</b>		<b>---</b>
									Voltage		<b>120</b>		<b>---</b>		<b>---</b>
									Phase		<b>1</b>		<b>---</b>		<b>---</b>
									Horsepower (HP)		<b>1-1/3</b>		<b>---</b>		<b>---</b>
									Amps		<b>9</b>		<b>---</b>		<b>---</b>
							<b>Connection Type</b>		<b>Provide standard grounded receptacle</b>						
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)			<b>---</b>			
									Flow Rate (GPM)			<b>---</b>			
									Capacity (PSI)			<b>---</b>			
							<b>Natural Gas</b>		Connection (inches)			<b>---</b>			
									Capacity (BTU)			<b>---</b>			
							<b>Drain</b>		Floor Drain (Y/N)			<b>N</b>			
							<b>Compressed Air</b>		Connection (inches)			<b>3/8</b>			
									Volume (CFM)			<b>25</b>			
									Capacity (PSI)			<b>60-80</b>			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Cabinet, abrasive blast, with dust collector</b>										<b>3085</b>					

## 3085 Equipment Cutsheet

Equipment Description:

**Cabinet, abrasive blast, with dust collector**

EQ ID Number:

**3085**

Manufacturer: Trinity Tool Company (TRINCO)

Model No.: Master 36/BP



### 3275 Equipment Datasheet

<b>Manufacturer:</b>		<b>Airflow Systems, Inc.</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>PCH-2</b>				<b>Equipment</b>		<b>24</b>		<b>49-1/4</b>		<b>31-1/4</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>Front</b>	<b>Back</b>	<b>Above</b>	<b>Below</b>
									---	---	2	2	72	---
									42					
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---	---	---
								Voltage		<b>460</b>	---	---	---	---
								Phase		<b>3</b>	---	---	---	---
								Horsepower (HP)		<b>3</b>	---	---	---	---
								Amps		<b>8.4</b>	---	---	---	---
						<b>Connection Type</b>		<b>Provide standard grounded receptacle</b>						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		<b>3/8</b>				
								Volume (CFM)		---				
								Capacity (PSI)		<b>100</b>				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Extractor, fume, welding, portable, 1,200 CFM</b>										<b>3275</b>				

## 3275 Equipment Cutsheet

Equipment Description:

**Extractor, fume, welding, portable, 1,200 CFM**

EQ ID Number:

**3275**

Manufacturer: Airflow Systems, Inc.

Model No.: PCH-2



### 3290 Equipment Datasheet

<b>Manufacturer:</b>		<b>Airflow systems Inc.</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>EZ Arm 7E14</b>					<b>Equipment</b>		---		---		---		
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	Y	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	<b>12</b>	
									<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	<b>126</b>	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		Coordinate roof/wall penetration for exhaust vent piping and wall mounting of unit.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Structural</b>		Provide roof/wall penetration of exhaust vent with mechanical; Arm shall be mounted at 10 feet, 6 inches AFF; Approximate weight 45 pounds; Coordinate size and location with mechanical; Reference Manufacturer's Design Details.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Mechanical</b>		Provide 8 inch exhaust vent piping from exhaust fan to exterior; Coordinate with design details.					<b>Venting</b>		Connection (inches)			<b>8</b>			
									Volume (CFM)			<b>600 to 1,500</b>			
<b>Electrical</b>		One connection from starter to blower.					<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---		
									Voltage		<b>460</b>	---	---		
									Phase		<b>3</b>	---	---		
									Horsepower (HP)		<b>3</b>	---	---		
									Amps		<b>3.8</b>	---	---		
							<b>Connection Type</b>		<b>Provide disconnect</b>						
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)		---				
									Flow Rate (GPM)		---				
									Capacity (PSI)		---				
							<b>Natural Gas</b>		Connection (inches)		---				
									Capacity (BTU)		---				
							<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
							<b>Compressed Air</b>		Connection (inches)		---				
									Volume (CFM)		---				
									Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Fume extraction arm, welding</b>										<b>3290</b>					

## 3290 Equipment Cutsheet

Equipment Description:

**Fume extraction arm, welding**

EQ ID Number:

**3290**

Manufacturer: Airflow systems Inc.

Model No.: EZ Arm 7E14



### E-Z Arm

#### Features & Benefits

- **Patented friction release pawl-and-sprocket design:** Engages positively when positioned, yet offers no resistance when removed.
- **7-, 10-, or 14-foot lengths:** Provides for high-volume collection with maximum reach.
- **Strong HDPE flat base joint:** Easy to install; HDPE bearing material works to seal base without collars or fittings.
- **Large 13-in. dia. inlet hood with 360° flange handle:** Easier hood positioning than single-handle designs.
- **Durable rounded duct constructed of 21-ga. aluminum:** Withstands industrial use, yet lightweight for easy operation. Powder coated inside and outside.
- **Hi-Flow spiral wire-reinforced hose.** Provides superior strength and resistance to sparks and embers.

#### Options

- **65 Watt Halogen Light Kit:** Improves worker visibility and productivity.
- **Damper:** Shut off air flow when not in use.
- **Blowers:** Several sizes available.
- **Silencer:** Reduces air flow noise for quieter operation.
- **Wall Brackets:** Maximizes installation versatility.
- **Adjustable Height Floor Stand:** Maximum height of 120 inches adds installation versatility.
- **Filtration Units:** HEPA, cartridge, and odor-control filter systems available based on application.
- **Boom Extensions:** System includes steel boom arm, boom arm wall bracket, tube kit, flex hose, and one transition to 8-in. dia.

#### Specifications

- **Construction:** 21 ga. aluminum tube with spiral wire-reinforced Hi-Flow hose
- **Arm Lengths:** 7 ft. (E-Z Arm® 7E07) , 10 ft. (E-Z Arm® 7E10), 14 ft. (E-Z Arm® 7E14)
- **Blower Pkgs (HP):** .75, 1.5, 3.0, 5.0, 7.5
- **Nominal Air Flow (CFM):** 600 to 1500
- **Weight (lbs.):** E-Z Arm® 7E07 - 36 lbs., E-Z Arm® 7E10 - 40 lbs., E-Z Arm® 7E14 - 45 lbs.

### 3300 Equipment Datasheet

<b>Manufacturer:</b>		<b>Fabricated/Makai Solutions</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>Stainless steel mop tank with accessories</b>					<b>Equipment</b>		<b>40</b>		<b>25</b>		<b>42</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	Y	<b>Operational Clearance</b>		<b>Left</b>	<b>36</b>	<b>Front</b>	<b>36</b>	<b>Above</b>	<b>36</b>	
									<b>Right</b>	<b>36</b>	<b>Back</b>	<b>36</b>	<b>Below</b>	<b>0</b>	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		Coordinate floor sink locations per Design Details.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>				
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>				
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)		---				
									Volume (CFM)		---				
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		---		---		
									Voltage		---		---		
									Phase		---		---		
									Horsepower (HP)		---		---		
									Amps		---		---		
							<b>Connection Type</b>		---						
<b>Plumbing</b>		Provide faucet: Hot and cold water supply; Drain: 1-1/2 inches; Provide fabricated support for plumbing fixtures and hot and cold water supply; Reference Design Details.					<b>Domestic Water</b>		Connection (inches)		<b>3/4</b>				
									Flow Rate (GPM)		<b>3.5</b>				
									Capacity (PSI)		---				
							<b>Natural Gas</b>		Connection (inches)		---				
									Capacity (BTU)		---				
							<b>Drain</b>		Floor Sink (Y/N)		<b>Y</b>				
							<b>Compressed Air</b>		Connection (inches)		---				
									Volume (CFM)		---				
									Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Tank, mop, with wringer</b>										<b>3300</b>					

## 3300 Equipment Cutsheet

Equipment Description:

**Tank, mop, with wringer**

EQ ID Number:

**3300**

Manufacturer: Fabricated/Makai Solutions

Model No.: Stainless steel mop tank with accessories



### 3540 Equipment Datasheet

<b>Manufacturer:</b>		<b>Graymills</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)									
<b>Model No.:</b>		<b>PL36-A with accessories</b>				<b>Equipment</b>		<b>36</b>		<b>22</b>		<b>38-1/2</b>									
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>6</b>	<b>6</b>	<b>Front</b>	<b>Back</b>	<b>36</b>	<b>6</b>	<b>Above</b>	<b>24</b>	<b>Below</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>																					
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>									
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>									
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)				---									
<b>Mechanical</b>		---				<b>Venting</b>		Volume (CFM)				---									
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Unit</b>		---		---							
<b>Electrical</b>		---				<b>Connection Size</b>		Voltage		<b>120</b>		---		---							
<b>Electrical</b>		---				<b>Connection Size</b>		Phase		<b>1</b>		---		---							
<b>Electrical</b>		---				<b>Connection Size</b>		Horsepower (HP)		<b>1/5</b>		---		---							
<b>Electrical</b>		---				<b>Connection Size</b>		Amps		<b>1.04</b>		---		---							
<b>Electrical</b>		---				<b>Connection Type</b>		<b>Provide standard grounded receptacle</b>													
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---											
<b>Plumbing</b>		---				<b>Domestic Water</b>		Flow Rate (GPM)		---											
<b>Plumbing</b>		---				<b>Domestic Water</b>		Capacity (PSI)		---											
<b>Plumbing</b>		---				<b>Natural Gas</b>		Connection (inches)		---											
<b>Plumbing</b>		---				<b>Natural Gas</b>		Capacity (BTU)		---											
<b>Plumbing</b>		---				<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>											
<b>Plumbing</b>		---				<b>Compressed Air</b>		Connection (inches)		---											
<b>Plumbing</b>		---				<b>Compressed Air</b>		Volume (CFM)		---											
<b>Plumbing</b>		---				<b>Compressed Air</b>		Capacity (PSI)		---											
<b>Equipment Description:</b>														<b>EQ ID Number:</b>							
<b>Tank, parts cleaning, 15 gallon</b>														<b>3540</b>							

## 3540 Equipment Cutsheet

Equipment Description:

**Tank, parts cleaning, 15 gallon**

EQ ID Number:

**3540**

Manufacturer: Graymills

Model No.: PL36-A with accessories



### 3555 Equipment Datasheet

<b>Manufacturer:</b>		<b>Better Engineering</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>F-3000-P with accessories</b>				<b>Equipment</b>		<b>50</b>		<b>62</b>		<b>69</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>36</b>	<b>Front</b>	<b>48</b>	<b>Above</b>	<b>24</b>
									<b>Right</b>	<b>36</b>	<b>Back</b>	<b>12</b>	<b>Below</b>	<b>---</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Coordinate exterior penetration size and location of steam vent with mechanical.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Coordinate exterior penetration size and location of steam vent with mechanical.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		Steam exhaust: Vent PVC steam exhaust to exterior				<b>Venting</b>		Connection (inches)		<b>4</b>				
								Volume (CFM)		<b>---</b>				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>Unit</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>
								Voltage		<b>460</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>
								Phase		<b>3</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>
								Horsepower (HP)		<b>5</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>
								Amps		<b>43</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>
						<b>Connection Type</b>		<b>Provide disconnect</b>						
<b>Plumbing</b>		Provide back flow device.				<b>Domestic Water</b>		Connection (inches)		<b>1/2</b>				
								Flow Rate (GPM)		<b>10 to 12</b>				
								Capacity (PSI)		<b>50 to 150</b>				
						<b>Natural Gas</b>		Connection (inches)		<b>---</b>				
								Capacity (BTU)		<b>---</b>				
						<b>Drain</b>		Floor Drain or Floor Sink (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		<b>---</b>				
								Volume (CFM)		<b>---</b>				
								Capacity (PSI)		<b>---</b>				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Washer, parts, automatic, front load</b>										<b>3555</b>				

## 3555 Equipment Cutsheet

Equipment Description:

**Washer, parts, automatic, front load**

EQ ID Number:

**3555**

Manufacturer: **Better Engineering**

Model No.: **F-3000-P with accessories**



### 3610 Equipment Datasheet

<b>Manufacturer:</b>		<b>J.E. Adams Industries</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)									
<b>Model No.:</b>		<b>9235-3 with accessories</b>				<b>Equipment</b>		<b>20-1/8</b>		<b>26</b>		<b>52</b>									
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>24</b>	<b>24</b>	<b>Front</b>	<b>Back</b>	<b>24</b>	<b>6</b>	<b>Above</b>	<b>---</b>	<b>Below</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>																					
<b>Architectural</b>		Column mounted or on steel reinforced housekeeping pad at desired height of owner; Must be at least 20 feet from outside face of any fuel dispenser. [Project specific]				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>Y</b>									
<b>Structural</b>		Column mounted or on steel reinforced housekeeping pad a minimum of 18 inches. [Project specific]				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>Y</b>									
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)				<b>---</b>									
								Volume (CFM)				<b>---</b>									
<b>Electrical</b>		Requires a dedicated circuit and hardwire connection.				<b>Connection Size</b>		Requirements		<b>Motor</b>		<b>---</b>		<b>---</b>							
								Voltage		<b>120</b>		<b>---</b>		<b>---</b>							
								Phase		<b>1</b>		<b>---</b>		<b>---</b>							
								Horsepower (HP)		<b>4.8</b>		<b>---</b>		<b>---</b>							
								Amps		<b>30</b>		<b>---</b>		<b>---</b>							
						<b>Connection Type</b>		<b>Provide j-box</b>													
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)				<b>---</b>									
								Flow Rate (GPM)				<b>---</b>									
								Capacity (PSI)				<b>---</b>									
						<b>Natural Gas</b>		Connection (inches)				<b>---</b>									
								Capacity (BTU)				<b>---</b>									
						<b>Drain</b>		Floor Drain (Y/N)				<b>N</b>									
						<b>Compressed Air</b>		Connection (inches)				<b>---</b>									
								Volume (CFM)				<b>---</b>									
								Capacity (PSI)				<b>---</b>									
<b>Equipment Description:</b>														<b>EQ ID Number:</b>							
<b>Vacuum, canister, stainless steel</b>														<b>3610</b>							

## 3610 Equipment Cutsheet

Equipment Description:

**Vacuum, canister, stainless steel**

EQ ID Number:

**3610**

Manufacturer: J.E. Adams Industries

Model No.: 9235-3 with accessories



### 3718 Equipment Datasheet

<b>Manufacturer:</b>		<b>Hotsy Corporation</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>945N with accessories</b>				<b>Equipment</b>		<b>47-1/2</b>		<b>21</b>		<b>51</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>36</b>	<b>Front</b>	<b>36</b>	<b>Above</b>	<b>48</b>
									<b>Right</b>	<b>36</b>	<b>Back</b>	<b>36</b>	<b>Below</b>	<b>0</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Coordinate roof penetration with equipment, mechanical, and structural.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>				
<b>Structural</b>		Coordinate roof penetration size and location of exhaust vent with mechanical and architectural; Weight of unit: 545 pounds; Reference Design Details.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>				
<b>Mechanical</b>		If enclosed, provide louvered opening sized according to combustion air requirements and NFPA54; Provide exhaust stack through the roof; Draft diverter supplied by manufacturer; Reference Design Details.				<b>Venting</b>		Connection (inches)		<b>8</b>				
								Volume (CFM)		---				
<b>Electrical</b>		Reference Design Details.				<b>Connection Size</b>		Requirements	<b>Unit</b>	---	---			
								Voltage	<b>460</b>	---	---			
								Phase	<b>3</b>	---	---			
								Horsepower (HP)	<b>5</b>	---	---			
								Amps	<b>8</b>	---	---			
						<b>Connection Type</b>		<b>Provide disconnect</b>						
<b>Plumbing</b>		Water supply terminates at standard hose bibb; Provide gas regulator; Reference Design Details.				<b>Domestic Water</b>		Connection (I.D. inches)		<b>5/8</b>				
								Flow Rate (GPM)		<b>4</b>				
								Capacity (PSI)		<b>30</b>				
						<b>Natural Gas</b>		Connection (inches)		<b>3/4</b>				
								Capacity (BTU/Hr)		<b>365,000</b>				
								Gas Pressure (W.C.I)		<b>9 to 14</b>				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Washer, high pressure, hot water, NG, 4 GPM</b>										<b>3718</b>				

## 3718 Equipment Cutsheet

Equipment Description:

**Washer, high pressure, hot water, NG, 4 GPM**

EQ ID Number:

**3718**

Manufacturer: Hotsy Corporation

Model No.: 945N with accessories



### 3834 Equipment Datasheet

<b>Manufacturer:</b>		<b>Interclean Equipment</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		Four brush and touchless hybrid #LY16-042 with accessories				<b>Equipment</b>		<b>1020</b>		<b>192</b>		<b>170</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	Y	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---
									<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Settling pit in wash bay; Floor slopes at 1/4 inch per foot; Coordinate with overhead door clearances; Vehicle wash pumps to be mounted on housekeeping pad.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>				
<b>Structural</b>		Provide cast in place settling pit per manufacturer's design details in wash bay with water stops to prevent water leaking out of sump; Vehicle wash pumps to be mounted on housekeeping pad.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>				
<b>Mechanical</b>		Coordinate 6 inch exhaust flue through roof from the water heater.				<b>Venting</b>		Connection (inches)		<b>6</b>				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---	---	
								Voltage		---	---	---	---	
								Phase		---	---	---	---	
								Horsepower (HP)		---	---	---	---	
								Amps		---	---	---	---	
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		<b>2</b>				
								Flow Rate (GPM)		---				
								Capacity (PSI)		<b>30 to 80</b>				
						<b>Natural Gas</b>		Connection (inches)		<b>3/4</b>				
								Capacity (BTU)		<b>199000</b>				
						<b>Drain</b>		Floor Drain (Y/N)		<b>Y</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Washer, bus, drive through, four brush</b>										<b>3834</b>				

## 3834 Equipment Cutsheet

Equipment Description:

**Washer, bus, drive through, four brush**

EQ ID Number:

**3834**

Manufacturer: Interclean Equipment

Model No.: Four brush and touchless hybrid  
#LY16-042 with accessories



## 5010 Equipment Datasheet

<b>Manufacturer:</b>		<b>Kone Cranes, Inc</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>Model #</b>					<b>Equipment</b>		<b>0</b>		<b>0</b>		<b>0</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	Y	<b>Operational Clearance</b>		<b>Left</b>	<b>6</b>	<b>Front</b>	<b>6</b>	<b>Above</b>	<b>6</b>	
									<b>Right</b>	<b>6</b>	<b>Back</b>	<b>6</b>	<b>Below</b>	<b>6</b>	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		Coordinate OSHA clearances, overhead door clearances ducting clearances, process piping, routing with mechanical and design with structural.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Coordinate beam size clearances, and mounting details for crane rails per manufacturer's drawings.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		Coordinate ducting and HVAC equipment with architectural to avoid conflicts with the operation of the bridge crane.					<b>Venting</b>		Connection (inches)		---				
									Volume (CFM)		---				
<b>Electrical</b>		Provide power through disconnect to the support beam.					<b>Connection Size</b>		Requirements		Unit		---		
									Voltage		<b>460</b>		---		
									Phase		<b>3</b>		---		
									Horsepower (HP)		---		---		
									Amps		<b>35</b>		---		
							<b>Connection Type</b>		<b>Provide disconnect</b>						
<b>Plumbing</b>		Coordinate piping with architect to avoid conflicts with the operation of the bridge crane.					<b>Domestic Water</b>		Connection (inches)		---				
									Flow Rate (GPM)		---				
									Capacity (PSI)		---				
							<b>Natural Gas</b>		Connection (inches)		---				
									Capacity (BTU)		---				
							<b>Drain</b>		Floor Sink (Y/N)		<b>N</b>				
							<b>Compressed Air</b>		Connection (inches)		---				
									Volume (CFM)		---				
									Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Crane, bridge, top running, 5 ton</b>										<b>5010</b>					

## 5010 Equipment Cutsheet

Equipment Description:

**Crane, bridge, top running, 5 ton**

EQ ID Number:

**5010**

Manufacturer:

Kone Cranes, Inc

Model No.: Model #



## 5404 Equipment Datasheet

<b>Manufacturer:</b>		<b>Clark Material Handling Company</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>NPX 20 with accessories</b>				<b>Equipment</b>		<b>93</b>		<b>40-1/4</b>		<b>95</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>0</b>	<b>Front</b>	<b>0</b>	<b>Above</b>	<b>0</b>
									<b>Right</b>	<b>0</b>	<b>Back</b>	<b>0</b>	<b>Below</b>	<b>0</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Weight of battery charger: 159 pounds.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		Provide dedicated circuit.				<b>Connection Size</b>		Requirements		<b>Battery</b>		---		
								Voltage		<b>460</b>		---		
								Phase		<b>3</b>		---		
								Horsepower (HP)		---		---		
								Amps		<b>13.5</b>		---		
						<b>Connection Type</b>		<b>Provide disconnect</b>						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Forklift, electric, 4,000 pound, stand up</b>										<b>5404</b>				

## 5404 Equipment Cutsheet

Equipment Description: <b>Forklift, electric, 4,000 pound, stand up</b>	EQ ID Number: <b>5404</b>
Manufacturer: <b>Clark Material Handling Company</b>	Model No.: <b>NPX 20 with accessories</b>



## 5410 Equipment Datasheet

<b>Manufacturer:</b>		<b>Clark Material Handling Company</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>GEX 50</b>				<b>Equipment</b>		<b>127-3/4</b>		<b>58-3/4</b>		<b>91</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Weight of battery charger is 380 pounds.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		Charger	---	---	---	---
								Voltage		<b>480</b>	---	---	---	---
								Phase		<b>3</b>	---	---	---	---
								Horsepower (HP)		---	---	---	---	---
								Amps		<b>13-1/2</b>	---	---	---	---
						<b>Connection Type</b>		<b>Provide Disconnect</b>						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Forklift, electric, 10,000 pound</b>										<b>5410</b>				

## 5410 Equipment Cutsheet

Equipment Description:

**Forklift, electric, 10,000 pound**

EQ ID Number:

**5410**

Manufacturer: Clark Material Handling Company

Model No.: GEX 50



## 5420 Equipment Datasheet

<b>Manufacturer:</b>		<b>Clark Material Handling Co.</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>C50S</b>				<b>Equipment</b>		<b>175</b>		<b>69</b>		<b>90-1/2</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>36</b>	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	<b>36</b>	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Forklift, 10,000 pound, LPG</b>										<b>5420</b>				

## 5420 Equipment Cutsheet

Equipment Description:

**Forklift, 10,000 pound, LPG**

EQ ID Number:

**5420**

Manufacturer:

Clark Material Handling Co.

Model No.: C50S

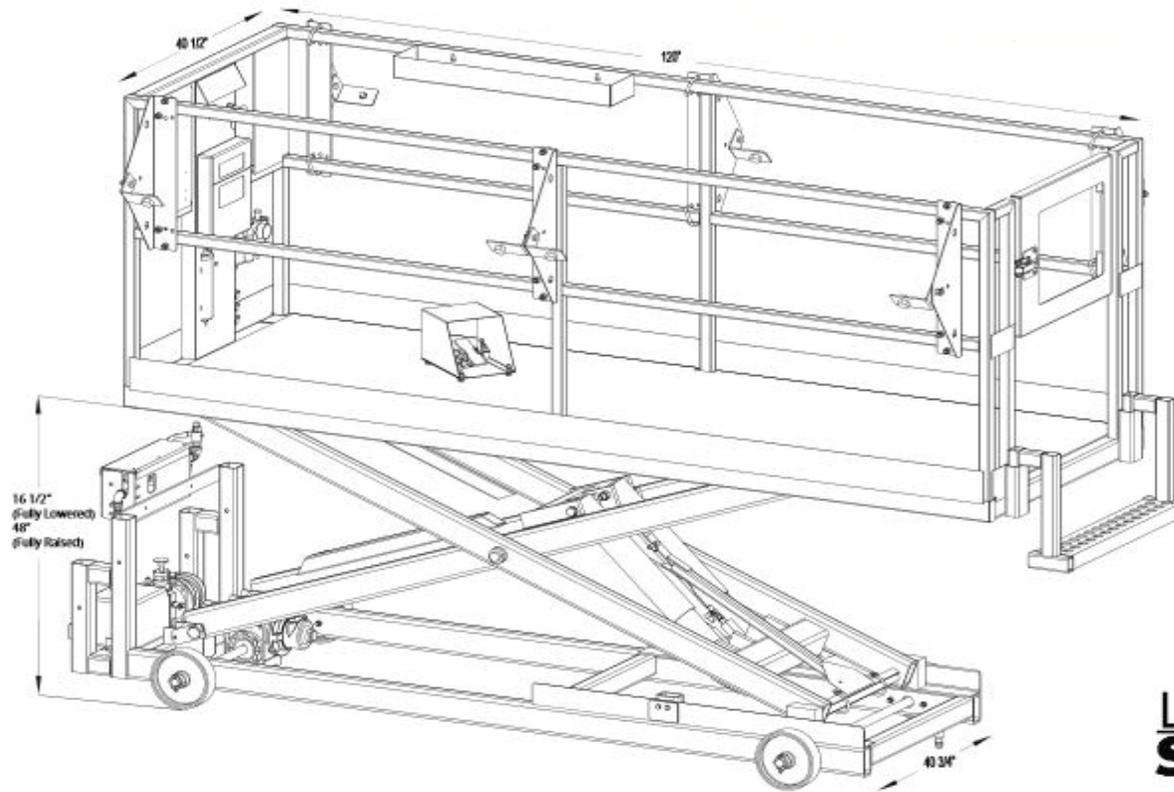




# 5558 Equipment Cutsheet

Equipment Description: <b>Lift, man, mobile, LLWA</b>	EQ ID Number: <b>5558</b>
--	------------------------------

Manufacturer: LPI Lift Systems	Model No.: TK 48-S with accessories
--------------------------------	-------------------------------------



## 5630 Equipment Datasheet

<b>Manufacturer:</b>		<b>Rotary Lifts</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>MOD335 with accessories</b>				<b>Equipment</b>		<b>25-3/8</b>		<b>14-1/4</b>		<b>32-7/8</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	Y	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---
									<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Coordinate foundation design with structural; Reference Design Details.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Provide note to reference approved manufacturer shop drawings prior to construction; Provide foundation details for lift per Design Details.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		Provide 2 inch conduits from control cabinet to lift; Reference approved manufacturer shop drawings; Provide two 2 inch conduits from disconnect to control panel.				<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---	---	---
								Voltage		<b>460</b>	---	---	---	---
								Phase		<b>3</b>	---	---	---	---
								Horsepower (HP)		<b>5</b>	---	---	---	---
								Amps		<b>28</b>	---	---	---	---
						<b>Connection Type</b>		<b>Provide disconnect</b>						
<b>Plumbing</b>		Provide drain for liquid evacuation system; Provide filter/regulator/lubricator to lift control panel; Reference Design Details.				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		<b>1/2</b>				
								Volume (CFM)		<b>5</b>				
								Capacity (PSI)		<b>90 to 110</b>				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Lift, axle, three post, 105,000 pound, shallow design</b>										<b>5630</b>				

# 5630 Equipment Cutsheet

Equipment Description:  
**Lift, axle, three post, 105,000 pound, shallow design**

EQ ID Number:  
**5630**

Manufacturer: **Rotary Lifts** Model No.: **MOD335 with accessories**

**WHEELBASE CHART**  
 FOR MODULAR SHUTTER PLATE TRENCH MODELS: MOD35 SERIES

" U " (INCHES)	MIN. W/B (INCHES)	FRAME LENGTH (FT.)		
		15	21	24
48	108	222	236	254
54	114	228	244	260
60	120	234	250	266
66	126	240	256	272
72	132	246	262	278
78	138	252	268	284
84	144	258	274	290
90	150	264	280	296
96	156	270	286	302
102	162	276	292	308
108	168	282	298	314
114	174	288	304	320
120	180	294	310	326
126	186	300	316	332
132	192	306	322	338
138	198	312	328	344
144	204	318	334	350
150	210	324	340	356

**General Notes**  
 NOTES: TYPICAL EQUIPMENT FOUNDATION REQUIREMENTS (EFR) CONSULT ROTARY LIFT PRIOR TO INSTALLATION TO CONFIRM LATEST REVISION.  
 READ NOTES PAGE THOROUGHLY BEFORE STARTING PROJECT. THE DESIGN AND DETAIL ILLUSTRATED IN THIS DRAWING IS THE PROPERTY OF ROTARY LIFT. IT IS BEING LOANED WITH THE EXPRESSED CONDITION THAT IT WILL NOT BE REPRODUCED OR USED IN ANY MANNER WITHOUT PERMISSION AND IS SUBJECT TO RETURN UPON REQUEST.

REV: 888148 1.9.15 THP/LJK  
 CO. NUM. DATE BY

**Rotary Lifts**  
 ROTARY LIFT WORLD HEADQUARTERS  
 2700 LANIER DRIVE  
 MADISON, IN 47205  
 WWW.ROTARYLIFT.COM  
 800.445.5436

PROJECT NAME:  
 \_\_\_\_\_

3-POST WHEELBASE LAYOUT MOD35 SERIES

SP1C0254-1  
 1.9.15 1 OF 9  
 NONE

## 5645 Equipment Datasheet

<b>Manufacturer:</b>		<b>Rotary Lift</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>75/48-F with accessories</b>				<b>Equipment</b>		<b>576</b>		<b>112</b>		<b>63</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---
									<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Coordinate with overhead door clearances; Control panel mounted on housekeeping pad; Coordinate conduit in slab from controls to lift.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>				
<b>Structural</b>		Pits and other concrete work shall be provided per design details; Housekeeping pad shall be sized for equipment console.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		Provide disconnect near controls; provide two inch conduit in slab from controls to the lift; Coordinate with design details.				<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---	---	---
								Voltage		<b>460</b>	---	---	---	---
								Phase		<b>3</b>	---	---	---	---
								Horsepower (HP)		<b>20</b>	---	---	---	---
								Amps		---	---	---	---	---
						<b>Connection Type</b>		<b>Provide disconnect</b>						
<b>Plumbing</b>		Provide floor drain in each lift recess; Coordinate with design details.				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		<b>1/2</b>				
								Volume (CFM)		<b>5</b>				
								Capacity (PSI)		<b>120</b>				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Lift, parallelogram, 75,000 pounds, 48 feet</b>										<b>5645</b>				

## 5645 Equipment Cutsheet

<b>Equipment Description:</b> <b>Lift, parallelogram, 75,000 pounds, 48 feet</b>	<b>EQ ID Number:</b> <span style="font-size: 1.5em;"><b>5645</b></span>
---	--

<b>Manufacturer:</b> Rotary Lift	<b>Model No.:</b> 75/48-F with accessories
----------------------------------	--



Surface in recessed mount



<b>Model:</b>	75/48-S 75/48-F
<b>Rise*</b>	63" (1600mm)
<b>Lifting Capacity</b>	75,000 lbs. (34000kg)
<b>Length Platform</b>	48' (14630mm)
<b>Length Overall</b>	56' 3 3/16" (17150mm) 48' (14630mm)
<b>Width Platform</b>	32" (813mm)
<b>Width Overall</b>	109" (2769mm)
<b>Height Retracted</b>	12 7/8" (327mm) Flush
<b>Motor</b>	20hp
<b>Number of Legs</b>	8
<b>Min. Floor Thickness</b>	6 3/4" (152mm) 9" (229mm)

\* Rise is calculated from 1

## 5692 Equipment Datasheet

<b>Manufacturer:</b>		<b>Stertil-Koni</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>ECO90 with accessories</b>				<b>Equipment</b>		---		<b>66</b>		---		
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	Y	<b>Operational Clearance</b>		<b>Left</b>	<b>160</b>	<b>Front</b>	<b>120</b>	<b>Above</b>	<b>228</b>
									<b>Right</b>	<b>160</b>	<b>Back</b>	<b>120</b>	<b>Below</b>	<b>---</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Coordinate foundation requirements with structural. Mount control console on housekeeping pad. Refer to Design Details for size and location of concrete block out service opening.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>				
<b>Structural</b>		Concrete work shall be per manufacturer's shop drawings for a complete flush with floor installation; Control console on housekeeping pad.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		Provide fused disconnect on wall or column near control console; Provide conduit under slab between disconnect and control console and between console and lift; Reference Design Details.				<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---	---	---
								Voltage		<b>460</b>	---	---	---	---
								Phase		<b>3</b>	---	---	---	---
								Horsepower (HP)		<b>15</b>	---	---	---	---
								Amps		<b>13</b>	---	---	---	---
						<b>Connection Type</b>		<b>Provide disconnect</b>						
<b>Plumbing</b>		Provide 2 inch conduit in slab from adjacent wall to control console for compressed air; Provide floor drain in each pit; Reference Design Details.				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Drain (Y/N)		<b>Y</b>				
						<b>Compressed Air</b>		Connection (inches)		<b>1/4</b>				
								Volume (CFM)		<b>5</b>				
								Capacity (PSI)		<b>60</b>				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Lift, axle, scissor, adjustable, 90,000 pound</b>										<b>5692</b>				

## 5692 Equipment Cutsheet

Equipment Description:

**Lift, axle, scissor, adjustable, 90,000 pound**

EQ ID Number:

**5692**

Manufacturer: Stertil-Koni

Model No.: ECO90 with accessories



## 7520 Equipment Datasheet

<b>Manufacturer:</b>		<b>Graco, Inc.</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)	
<b>Model No.:</b>		<b>425 Fire-Ball</b>					<b>Equipment</b>		<b>8 dia.</b>		<b>---</b>		<b>28-1/2</b>	
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>12</b>	<b>Front</b>	<b>12</b>	<b>Above</b>	<b>18</b>
									<b>Right</b>	<b>12</b>	<b>Back</b>	<b>12</b>	<b>Below</b>	<b>---</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>	
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>	
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)				<b>---</b>	
									Volume (CFM)				<b>---</b>	
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		<b>---</b>		<b>---</b>	
									Voltage		<b>---</b>		<b>---</b>	
									Phase		<b>---</b>		<b>---</b>	
									Horsepower (HP)		<b>---</b>		<b>---</b>	
									Amps		<b>---</b>		<b>---</b>	
							<b>Connection Type</b>						<b>---</b>	
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)				<b>---</b>	
									Flow Rate (GPM)				<b>---</b>	
									Capacity (PSI)				<b>---</b>	
							<b>Natural Gas</b>		Connection (inches)				<b>---</b>	
									Capacity (BTU)				<b>---</b>	
							<b>Drain</b>		Floor Drain (Y/N)				<b>N</b>	
							<b>Compressed Air</b>		Connection (inches)				<b>1/2 NPT(F)</b>	
									Volume (CFM)				<b>24</b>	
									Capacity (PSI)				<b>100</b>	
<b>Equipment Description:</b>														
<b>Pump, air piston, 10:1 ratio (commodity)</b>										<b>EQ ID Number:</b>				
										<b>7520</b>				

# 7520 Equipment Cutsheet

Equipment Description: <b>Pump, air piston, 10:1 ratio (commodity)</b>	EQ ID Number: <b>7520</b>
---	------------------------------

Manufacturer: Graco, Inc.	Model No.: 425 Fire-Ball
---------------------------	--------------------------



## 7531 Equipment Datasheet

<b>Manufacturer:</b>		<b>Graco, Inc.</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)							
<b>Model No.:</b>		<b>647016 for water/antifreeze, 647731 for OH</b>					<b>Equipment</b>		<b>14-3/4</b>		<b>10-1/4</b>		<b>16</b>							
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>12</b>	<b>12</b>	<b>Front</b>	<b>Back</b>	<b>12</b>	<b>Above</b>	<b>Below</b>	<b>18</b>	<b>12</b>	
<b>DISCIPLINE COORDINATION:</b>																				
<b>Architectural</b>		Coordinate wall mounting of pump above tank.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>							
<b>Structural</b>		Coordinate wall mounting of pump above tank. Weight: 23 pounds.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>							
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)				---							
<b>Mechanical</b>		---					<b>Venting</b>		Volume (CFM)				---							
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		---		---		---					
<b>Electrical</b>		---					<b>Connection Size</b>		Voltage		---		---		---					
<b>Electrical</b>		---					<b>Connection Size</b>		Phase		---		---		---					
<b>Electrical</b>		---					<b>Connection Size</b>		Horsepower (HP)		---		---		---					
<b>Electrical</b>		---					<b>Connection Size</b>		Amps		---		---		---					
<b>Electrical</b>		---					<b>Connection Type</b>		---											
<b>Plumbing</b>		Plumb to reel banks; Provide compressed air from main compressed air loop.					<b>Domestic Water</b>		Connection (inches)		---									
<b>Plumbing</b>		Plumb to reel banks; Provide compressed air from main compressed air loop.					<b>Domestic Water</b>		Flow Rate (GPM)		---									
<b>Plumbing</b>		Plumb to reel banks; Provide compressed air from main compressed air loop.					<b>Domestic Water</b>		Capacity (PSI)		---									
<b>Plumbing</b>		Plumb to reel banks; Provide compressed air from main compressed air loop.					<b>Natural Gas</b>		Connection (inches)		---									
<b>Plumbing</b>		Plumb to reel banks; Provide compressed air from main compressed air loop.					<b>Natural Gas</b>		Capacity (BTU)		---									
<b>Plumbing</b>		Plumb to reel banks; Provide compressed air from main compressed air loop.					<b>Drain</b>		Floor Drain or Floor Sink (Y/N)		<b>N</b>									
<b>Plumbing</b>		Plumb to reel banks; Provide compressed air from main compressed air loop.					<b>Compressed Air</b>		Connection (inches)		<b>1/2</b>									
<b>Plumbing</b>		Plumb to reel banks; Provide compressed air from main compressed air loop.					<b>Compressed Air</b>		Volume (CFM)		<b>67</b>									
<b>Plumbing</b>		Plumb to reel banks; Provide compressed air from main compressed air loop.					<b>Compressed Air</b>		Capacity (PSI)		<b>100</b>									
<b>Equipment Description:</b>												<b>EQ ID Number:</b>								
<b>Pump, diaphragm, non-mixing (EC)</b>												<b>7531</b>								

## 7531 Equipment Cutsheet

Equipment Description:		EQ ID Number:
<b>Pump, diaphragm, non-mixing (EC)</b>		<b>7531</b>
Manufacturer:	Graco, Inc.	Model No.: 647016 for water/antifreeze, 647731 for OH



## 7541 Equipment Datasheet

<b>Manufacturer:</b>		<b>Graco, Inc.</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)							
<b>Model No.:</b>		<b>24E166 with accessories</b>					<b>Equipment</b>		<b>14-3/4</b>		<b>10-3/4</b>		<b>16</b>							
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>12</b>	<b>12</b>	<b>Front</b>	<b>Back</b>	<b>12</b>	<b>---</b>	<b>Above</b>	<b>18</b>	<b>Below</b>	<b>12</b>
<b>DISCIPLINE COORDINATION:</b>																				
<b>Architectural</b>		Coordinate mounting of pump.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>							
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>							
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)				---							
<b>Mechanical</b>		---					<b>Venting</b>		Volume (CFM)				---							
<b>Electrical</b>		Route control wiring in conduit between fluid monitoring system and solenoid valve and strobe at corresponding extraction pump; Provide dedicated outlet adjacent to unit.					<b>Connection Size</b>		Requirements		<b>Unit</b>		---		---					
<b>Electrical</b>							<b>Connection Size</b>		Voltage		<b>120</b>		---		---					
<b>Electrical</b>							<b>Connection Size</b>		Phase		<b>1</b>		---		---					
<b>Electrical</b>							<b>Connection Size</b>		Horsepower (HP)		---		---		---					
<b>Electrical</b>							<b>Connection Size</b>		Amps		<b>2</b>		---		---					
<b>Electrical</b>							<b>Connection Type</b>		<b>Provide standard grounded receptacle</b>											
<b>Plumbing</b>		Plumb to used fluid tank; Provide compressed air from main compressed air loop.					<b>Domestic Water</b>		Connection (inches)		---		Flow Rate (GPM)		---		Capacity (PSI)		---	
<b>Plumbing</b>							<b>Natural Gas</b>		Connection (inches)		---		Capacity (BTU)		---		Floor Drain (Y/N)		<b>N</b>	
<b>Plumbing</b>							<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>		Connection (inches)		<b>1/2</b>		Volume (CFM)		<b>67</b>	
<b>Plumbing</b>							<b>Compressed Air</b>		Volume (CFM)		<b>67</b>		Capacity (PSI)		<b>100</b>		EQ ID Number:		<b>7541</b>	
<b>Equipment Description:</b>		<b>Pump, diaphragm, used fluid evacuation (UC)</b>												<b>7541</b>						

## 7541 Equipment Cutsheet

Equipment Description:

**Pump, diaphragm, used fluid evacuation (UC)**

EQ ID Number:

**7541**

Manufacturer: Graco, Inc.

Model No.: 24E166 with accessories



## 7575 Equipment Datasheet

<b>Manufacturer:</b>		<b>Graco Incorporated</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)			
<b>Model No.:</b>		<b>220592 and 247713 with accessories</b>				<b>Equipment</b>		<b>2</b>		<b>2</b>		<b>10</b>			
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>12</b>	<b>Front</b>	<b>12</b>	<b>Above</b>	<b>12</b>	
									<b>Right</b>	<b>12</b>	<b>Back</b>	<b>12</b>	<b>Below</b>	<b>12</b>	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>					
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>					
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---					
								Volume (CFM)		---					
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---		---		---	
								Voltage		---		---		---	
								Phase		---		---		---	
								Horsepower (HP)		---		---		---	
								Amps		---		---		---	
						<b>Connection Type</b>		---							
<b>Plumbing</b>		Plumbed to tank in Lube Room.				<b>Domestic Water</b>		Connection (inches)		---					
								Flow Rate (GPM)		---					
								Capacity (PSI)		---					
						<b>Natural Gas</b>		Connection (inches)		---					
								Capacity (BTU)		---					
						<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>					
						<b>Compressed Air</b>		Connection (inches)		---					
								Volume (CFM)		---					
								Capacity (PSI)		---					
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Hose and dispenser (GO)</b>										<b>7575</b>					

## 7575 Equipment Cutsheet

Equipment Description:

**Hose and dispenser (GO)**

EQ ID Number:

**7575**

Manufacturer: Graco Incorporated

Model No.: 220592 and 247713 with accessories



## 7710 Equipment Datasheet

<b>Manufacturer:</b>		<b>Graco, Inc.</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)	
<b>Model No.:</b>		<b>XD Series</b>					<b>Equipment</b>		---		---		---	
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	Y	<b>Operational Clearance</b>	<b>Left</b>	<b>3-1/2</b>	<b>Front</b>	<b>48</b>	<b>Above</b>	---	
								<b>Right</b>	<b>3-1/2</b>	<b>Back</b>	<b>48</b>	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Coordinate mounting of reel banks with structural.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Structural</b>		Reel bank shall be hung from a structural frame with mounting plate at 16 feet AFF; Weight approximately 100 pounds; Reference Equipment Drawing Details.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>			
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)		---			
									Volume (CFM)		---			
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		---		---	
									Voltage		---		---	
									Phase		---		---	
									Horsepower (HP)		---		---	
									Amps		---		---	
							<b>Connection Type</b>		---					
<b>Plumbing</b>		Plumb to lube/compressor room.					<b>Domestic Water</b>		Connection (inches)		---			
									Flow Rate (GPM)		---			
									Capacity (PSI)		---			
							<b>Natural Gas</b>		Connection (inches)		---			
									Capacity (BTU)		---			
							<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>			
							<b>Compressed Air</b>		Connection (inches)		---			
									Volume (CFM)		---			
									Capacity (PSI)		---			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Reel bank (CA)</b>										<b>7710</b>				

# 7710 Equipment Cutsheet

Equipment Description: <b>Reel bank (CA)</b>	EQ ID Number: <b>7710</b>
---	------------------------------

Manufacturer: Graco, Inc.	Model No.: XD Series
---------------------------	----------------------



## 7780 Equipment Datasheet

<b>Manufacturer:</b>		<b>Graco, Inc.</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)	
<b>Model No.:</b>		<b>XD Series</b>					<b>Equipment</b>		---		---		---	
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	Y	<b>Operational Clearance</b>		<b>Left</b>	<b>3-1/2</b>	<b>Front</b>	<b>48</b>	<b>Above</b>	---
									<b>Right</b>	<b>3-1/2</b>	<b>Back</b>	<b>48</b>	<b>Below</b>	<b>168</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Coordinate mounting of reel banks with structural.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>	
<b>Structural</b>		Reel bank shall be hung from a structural frame with mounting plate at 16 feet AFF; Weight approximately 800 pounds; Reference Design Details.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>	
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)				---	
									Volume (CFM)				---	
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		---		---	
									Voltage		---		---	
									Phase		---		---	
									Horsepower (HP)		---		---	
									Amps		---		---	
							<b>Connection Type</b>		---					
<b>Plumbing</b>		Plumb to lube/compressor room.					<b>Domestic Water</b>		Connection (inches)				---	
									Flow Rate (GPM)				---	
									Capacity (PSI)				---	
							<b>Natural Gas</b>		Connection (inches)				---	
									Capacity (BTU)				---	
							<b>Drain</b>		Floor Drain (Y/N)				<b>N</b>	
							<b>Compressed Air</b>		Connection (inches)				---	
									Volume (CFM)				---	
									Capacity (PSI)				---	
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Reel bank (CA, diff. GO1, GO2, H2O, CO, Power Steering PS. future)</b>										<b>7780</b>				

## 7780 Equipment Cutsheet

Equipment Description:

**Reel bank (CA, diff. GO1, GO2, H2O, CO, Power Steering PS. future)**

EQ ID Number:

**7780**

Manufacturer:

Graco, Inc.

Model No.: XD Series



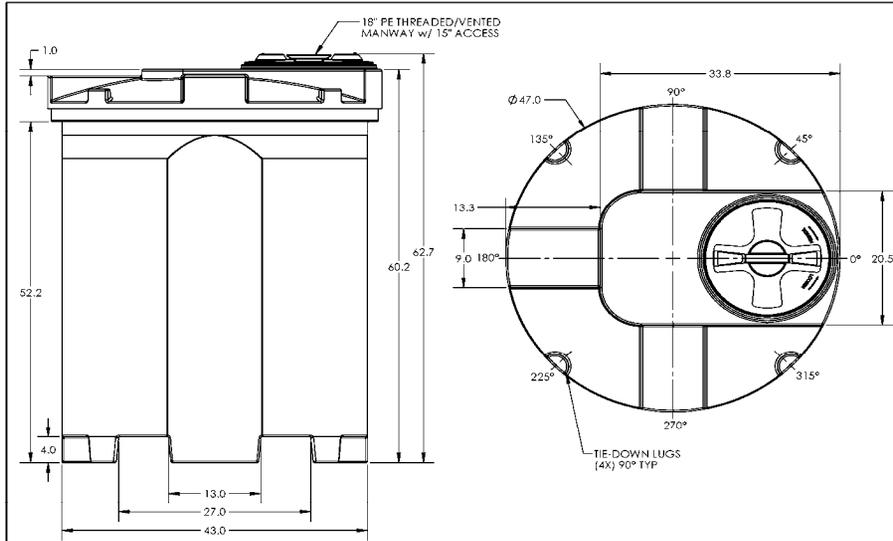
## 7907 Equipment Datasheet

<b>Manufacturer:</b>		<b>Snyder Industries</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>5740100N</b>				Equipment		<b>47 dia.</b>		---		<b>58-1/2</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	<b>48</b>	<b>Above</b>	---
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Approx. wet weight (water): 2,296 pounds. Approx. dry weight: 96 pounds.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		---				
								Volume (CFM)		---				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		---	---	---		
								Voltage		---	---	---		
								Phase		---	---	---		
								Horsepower (HP)		---	---	---		
								Amps		---	---	---		
						<b>Connection Type</b>		---						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Sink (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		---				
								Volume (CFM)		---				
								Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Tank, double wall, polyethylene, 275 gallon (commodity)</b>										<b>7907</b>				

# 7907 Equipment Cutsheet

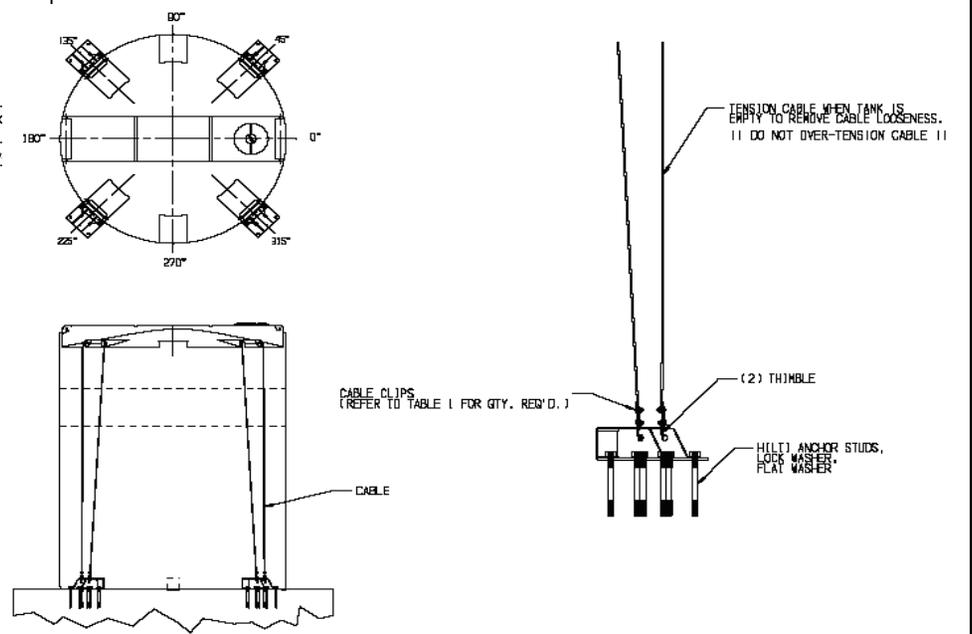
<b>Equipment Description:</b>	<b>EQ ID Number:</b>
<b>Tank, double wall, polyethylene, 275 gallon (commodity)</b>	<b>7907</b>

<b>Manufacturer:</b> Snyder Industries	<b>Model No.:</b> 5740100N
--	----------------------------



\*ALL EXTERNAL PIPING MUST BE INDEPENDENTLY SUPPORTED.  
 \*ONLY BASE FITTINGS TO BE LEFT INSTALLED AT TIME OF SHIPMENT PER SH PROCEDURE.  
 \*Consult Snyder's Guidelines for Use and Installation prior to delivery.  
 Available on-line at <http://www.snyderind.com/techsupport>  
 ALL DIMENSIONS ARE IN INCHES, NOMINAL, & SUBJECT TO CHANGE WITHOUT NOTICE.  
 ALL DIMENSIONS ON ROTATIONAL MOLDED PARTS ARE SUBJECT TO A ± 3% TOLERANCE.

DOC NO/ISSUE	REVISED	DATE	BY	APPROVED	DESCRIPTION
Released					ASM TK 275VNT X 42 DC
SYNDR INDUSTRIES, INC.			5740102N		
			D00		



## 7970 Equipment Datasheet

<b>Manufacturer:</b>		<b>Containment Solutions, Incorporated</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>LC500DW with accessories</b>				<b>Equipment</b>		<b>61</b>		<b>46</b>		<b>61</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>6</b>	<b>Front</b>	<b>72</b>	<b>Above</b>	<b>48</b>
									<b>Right</b>	<b>6</b>	<b>Back</b>	<b>6</b>	<b>Below</b>	<b>0</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Dry Weight: 1,350 pounds; Filled Weight: 11,273 pounds; Anchored at tabs; anchor size by Structural Engineer				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		Provide venting to exterior [for used fluid tanks only].				<b>Venting</b>		Connection (inches)		<b>2</b>				
								Volume (CFM)		---				
<b>Electrical</b>		[For UO/UC tanks only with Fluid Management System] Control wiring between Fluid Monitoring System and solenoid valve at corresponding extraction pump; Route all wiring in conduit; Provide outlet(s) on wall above tank for alarm or Fluid Management System (FMS), pump air control (PAC); Control wiring between FMS and tank; Route in conduit.				<b>Connection Size</b>		Requirements	<b>PAC</b>	<b>Alarm</b>	<b>FMS</b>			
								Voltage	<b>120</b>	<b>120</b>	<b>120</b>			
								Phase	<b>1</b>	<b>1</b>	<b>1</b>			
								Horsepower (HP)	---	---	---			
								Amps	<b>2</b>	---	<b>1</b>			
						<b>Connection Type</b>		<b>Receptacle, Standard Grounded</b>						
<b>Plumbing</b>		Plumb to corresponding overhead reels/used fluid pumps.				<b>Domestic Water</b>		Connection (inches)		---				
								Flow Rate (GPM)		---				
								Capacity (PSI)		---				
						<b>Natural Gas</b>		Connection (inches)		---				
								Capacity (BTU)		---				
						<b>Drain</b>		Floor Sink (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		<b>1/2</b>				
								Volume (CFM)		<b>60</b>				
								Capacity (PSI)		<b>50</b>				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Tank, double wall, cube, 500 gallon (commodity)</b>										<b>7970</b>				

## 7970 Equipment Cutsheet

Equipment Description:

**Tank, double wall, cube, 500 gallon (commodity)**

EQ ID Number:

**7970**

Manufacturer: Containment Solutions, Incorporated

Model No.: LC500DW with accessories



## 7993 Equipment Datasheet

<b>Manufacturer:</b>		<b>Graco Incorporated</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)								
<b>Model No.:</b>		<b>218 969 with accessories</b>				<b>Equipment</b>		<b>33</b>		<b>24</b>		<b>11</b>								
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>6</b>	<b>6</b>	<b>Front</b>	<b>Back</b>	<b>36</b>	<b>6</b>	<b>Above</b>	<b>2</b>	<b>Below</b>	<b>12</b>
<b>DISCIPLINE COORDINATION:</b>																				
<b>Architectural</b>		Coordinate clearances and design with structural. Drain pan shall travel on rails the complete length of pit and store at end of pit under a steel plate flush with the finished floor.; rails must be 2-1/2 inches wide to support drain pan wheels for travel on.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>							
<b>Structural</b>		Drain pan shall travel on rails the complete length of pit and store at end of pit under a steel plate flush with the finished floor.; rails must be 2-1/2 inches wide to support drain pan wheels for travel on.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>N</b>							
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)				---							
<b>Mechanical</b>		---					<b>Venting</b>		Volume (CFM)				---							
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		---		---		---					
<b>Electrical</b>		---					<b>Connection Size</b>		Voltage		---		---		---					
<b>Electrical</b>		---					<b>Connection Size</b>		Phase		---		---		---					
<b>Electrical</b>		---					<b>Connection Size</b>		Horsepower (HP)		---		---		---					
<b>Electrical</b>		---					<b>Connection Size</b>		Amps		---		---		---					
<b>Electrical</b>		---					<b>Connection Type</b>		---											
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)		---									
<b>Plumbing</b>		---					<b>Domestic Water</b>		Flow Rate (GPM)		---									
<b>Plumbing</b>		---					<b>Domestic Water</b>		Capacity (PSI)		---									
<b>Plumbing</b>		---					<b>Natural Gas</b>		Connection (inches)		---									
<b>Plumbing</b>		---					<b>Natural Gas</b>		Capacity (BTU)		---									
<b>Plumbing</b>		---					<b>Drain</b>		Floor Sink (Y/N)		<b>N</b>									
<b>Plumbing</b>		---					<b>Compressed Air</b>		Connection (inches)		---									
<b>Plumbing</b>		---					<b>Compressed Air</b>		Volume (CFM)		---									
<b>Plumbing</b>		---					<b>Compressed Air</b>		Capacity (PSI)		---									
<b>Equipment Description:</b>														<b>EQ ID Number:</b>						
<b>Drain pan, rolling (UC)</b>														<b>7993</b>						

## 7993 Equipment Cutsheet

Equipment Description:

**Drain pan, rolling (UC)**

EQ ID Number:

**7993**

Manufacturer: Graco Incorporated

Model No.: 218 969 with accessories



## 7995 Equipment Datasheet

<b>Manufacturer:</b>		<b>Graco, Incorporated</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>248632</b>					<b>Equipment</b>		<b>24</b>		<b>24</b>		<b>45</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	<b>30</b>	
									<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>			
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)			---			
									Volume (CFM)			---			
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements			---	---	---	
									Voltage			---	---	---	
									Phase			---	---	---	
									Horsepower (HP)			---	---	---	
									Amps			---	---	---	
							<b>Connection Type</b>		---						
<b>Plumbing</b>		3/4" pump connection					<b>Domestic Water</b>		Connection (inches)			---			
									Flow Rate (GPM)			---			
									Capacity (PSI)			---			
							<b>Natural Gas</b>		Connection (inches)			---			
									Capacity (BTU)			---			
							<b>Drain</b>		Floor Drain (Y/N)			<b>N</b>			
							<b>Compressed Air</b>		Connection (inches)			---			
									Volume (CFM)			---			
									Capacity (PSI)			---			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Receiver, 25 gallon, portable (UC)</b>										<b>7995</b>					

## 7995 Equipment Cutsheet

Equipment Description:

**Receiver, 25 gallon, portable (UC)**

EQ ID Number:

**7995**

Manufacturer: Graco, Incorporated

Model No.: 248632



## 7996 Equipment Datasheet

<b>Manufacturer:</b>		<b>Graco, Incorporated.</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>238866</b>					<b>Equipment</b>		<b>24</b>		<b>24</b>		<b>45</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	<b>30</b>	
									<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)		---				
									Volume (CFM)		---				
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements		---	---	---		
									Voltage		---	---	---		
									Phase		---	---	---		
									Horsepower (HP)		---	---	---		
									Amps		---	---	---		
							<b>Connection Type</b>		---						
<b>Plumbing</b>		3/4" pump connection.					<b>Domestic Water</b>		Connection (inches)		---				
									Flow Rate (GPM)		---				
									Capacity (PSI)		---				
							<b>Natural Gas</b>		Connection (inches)		---				
									Capacity (BTU)		---				
							<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
							<b>Compressed Air</b>		Connection (inches)		---				
									Volume (CFM)		---				
									Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Receiver, 25 gallon, portable (UO)</b>										<b>7996</b>					

## 7996 Equipment Cutsheet

Equipment Description:

**Receiver, 25 gallon, portable (UO)**

EQ ID Number:

**7996**

Manufacturer: Graco, Incorporated.

Model No.: 238866



## 8276 Equipment Datasheet

<b>Manufacturer:</b>		<b>Kaeser Compressor</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)									
<b>Model No.:</b>		<b>ASD40ST</b>				<b>Equipment</b>		<b>69-5/8</b>		<b>35-3/8</b>		<b>60-1/4</b>									
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>Right</b>	<b>15</b>	<b>40</b>	<b>Front</b>	<b>Back</b>	<b>50</b>	<b>40</b>	<b>Above</b>	<b>24</b>	<b>Below</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>																					
<b>Architectural</b>		Coordinate size of housekeeping pad with equipment.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>Y</b>									
<b>Structural</b>		Coordinate size of housekeeping pad with equipment. Weight: 1,747 pounds.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)				<b>Y</b>									
<b>Mechanical</b>		Heat rejection: 119,270 BTU/hour; 8240 CFM. No equipment vibration isolation if mounted slab on grade. Refrigerant: R-134A. 1.76 pounds.				<b>Venting</b>		Connection (inches)				<b>---</b>									
<b>Mechanical</b>						<b>Venting</b>		Volume (CFM)				<b>---</b>									
<b>Electrical</b>		Provide fusible disconnect with 70 A fuse. Provide data port.				<b>Connection Size</b>		Requirements		Unit		---		---							
<b>Electrical</b>						<b>Connection Size</b>		Voltage		<b>460</b>		---		---							
<b>Electrical</b>						<b>Connection Size</b>		Phase		<b>3</b>		---		---							
<b>Electrical</b>						<b>Connection Size</b>		Horsepower (HP)		<b>40</b>		---		---							
<b>Electrical</b>						<b>Connection Size</b>		Amps		<b>47</b>		---		---							
<b>Electrical</b>						<b>Connection Type</b>		<b>Provide disconnect</b>													
<b>Plumbing</b>		Floor sink between compressor and dryer on housekeeping pad to sand-oil interceptor				<b>Domestic Water</b>		Connection (inches)				<b>---</b>									
<b>Plumbing</b>						<b>Domestic Water</b>		Flow Rate (GPM)				<b>---</b>									
<b>Plumbing</b>						<b>Domestic Water</b>		Capacity (PSI)				<b>---</b>									
<b>Plumbing</b>						<b>Natural Gas</b>		Connection (inches)				<b>---</b>									
<b>Plumbing</b>						<b>Natural Gas</b>		Capacity (BTU)				<b>---</b>									
<b>Plumbing</b>						<b>Drain</b>		Sink Drain (Y/N)				<b>Y</b>									
<b>Plumbing</b>						<b>Compressed Air</b>		Connection (inches)				<b>---</b>									
<b>Plumbing</b>						<b>Compressed Air</b>		Volume (CFM)				<b>---</b>									
<b>Plumbing</b>						<b>Compressed Air</b>		Capacity (PSI)				<b>---</b>									
<b>Equipment Description:</b>														<b>EQ ID Number:</b>							
<b>Compressor, air, screw, rotary, 40 HP, with integral dryer</b>														<b>8276</b>							

## 8276 Equipment Cutsheet

<b>Equipment Description:</b> <b>Compressor, air, screw, rotary, 40 HP, with integral dryer</b>	<b>EQ ID Number:</b> <span style="font-size: 1.5em;"><b>8276</b></span>
--	--

<b>Manufacturer:</b> <b>Kaeser Compressor</b>	<b>Model No.:</b> ASD40ST
---	---------------------------

### Technical Specifications

Model	Pressure Range <sup>(1)</sup> (psig)	Capacity (acfm) <sup>(2)</sup>	Rated Motor Power (hp)	Sound Level (dB(A)) <sup>(3)</sup>	Standard Air-cooled <sup>(4)</sup> Units		Air-Cooled Units with Integral Dryer	
					Dimensions L x W x H (in.)	Weight (lb.) <sup>(5)</sup>	Dimensions L x W x H (in.)	Weight (lb.) <sup>(5)</sup>
ASD 25	125	112	25	66		1345		1555
ASD 30	125	132	30	67				1579
	175	110						
ASD 40S	125	162	40	67	57 <sup>1</sup> / <sub>2</sub> x 35 <sup>1</sup> / <sub>2</sub> x 60 <sup>1</sup> / <sub>4</sub>		69 <sup>5</sup> / <sub>8</sub> x 35 <sup>1</sup> / <sub>2</sub> x 60 <sup>1</sup> / <sub>4</sub>	1747
	175	127						
	217	106						
ASD 40	125	191	40	69				1779
	175	159						
	217	123						



### 8637 Equipment Datasheet

<b>Manufacturer:</b>		<b>Manchester Tank</b>				<b>Dimensions</b>		<b>Length (inches)</b>		<b>Width (inches)</b>		<b>Height (inches)</b>			
<b>Model No.:</b>		<b>302433</b>				<b>Equipment</b>		<b>36 dia.</b>		<b>---</b>		<b>101</b>			
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>24</b>	<b>Front</b>	<b>42</b>	<b>Above</b>	<b>24</b>	
									<b>Right</b>	<b>24</b>	<b>Back</b>	<b>24</b>	<b>Below</b>	<b>---</b>	
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		Coordinate size of housekeeping pad with equipment.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>					
<b>Structural</b>		Unit weight: 783 pounds				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>Y</b>					
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		<b>---</b>					
								Volume (CFM)		<b>---</b>					
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>---</b>		<b>---</b>		<b>---</b>	
								Voltage		<b>---</b>		<b>---</b>		<b>---</b>	
								Phase		<b>---</b>		<b>---</b>		<b>---</b>	
								Horsepower (HP)		<b>---</b>		<b>---</b>		<b>---</b>	
								Amps		<b>---</b>		<b>---</b>		<b>---</b>	
						<b>Connection Type</b>		<b>---</b>							
<b>Plumbing</b>		Floor sink adjacent to compressor, dryer, and receiver to oil separator. 1 inch NPT drain connection.				<b>Domestic Water</b>		Connection (inches)		<b>---</b>					
										Flow Rate (GPM)		<b>---</b>			
										Capacity (PSI)		<b>---</b>			
						<b>Natural Gas</b>				Connection (inches)		<b>---</b>			
										Capacity (BTU)		<b>---</b>			
						<b>Drain</b>				Floor Sink (Y/N)		<b>Y</b>			
						<b>Compressed Air</b>				Connection (inches)		<b>---</b>			
										Volume (CFM)		<b>---</b>			
										Capacity (PSI)		<b>---</b>			
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Receiver, vertical mounted, 400 gallon</b>										<b>8637</b>					

# 8637 Equipment Cutsheet

Equipment Description:

EQ ID Number:

**Receiver, vertical mounted, 400 gallon**

**8637**

Manufacturer:

Manchester Tank

Model No.: 302433



### 9315 Equipment Datasheet

<b>Manufacturer:</b>		<b>Unilube Systems</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)	
<b>Model No.:</b>		<b>Pit Guard, Pit Cover</b>					<b>Equipment</b>		<b>38</b>		<b>40-1/2</b>		<b>2</b>	
<b>Provided:</b>	Cutsheet	Y	Functional Model	N	Design Details	Y	<b>Operational Clearance</b>	<b>Left</b>	1/2	<b>Front</b>	0	<b>Above</b>	0	
							<b>Right</b>	1/2	<b>Back</b>	0	<b>Below</b>	0		
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Coordinate clearances and design with structural.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>		
<b>Structural</b>		Pit guard cover will sit on rails the entire length of pit; Provide support for pit guard; Reference Manufacturer's Equipment Design Details.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)			<b>N</b>		
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)			---		
									Volume (CFM)			---		
<b>Electrical</b>		---					<b>Connection Size</b>		Requirements			---	---	---
									Voltage			---	---	---
									Phase			---	---	---
									Horsepower (HP)			---	---	---
									Amps			---	---	---
							<b>Connection Type</b>		---					
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)			---		
									Flow Rate (GPM)			---		
									Capacity (PSI)			---		
							<b>Natural Gas</b>		Connection (inches)			---		
									Capacity (BTU)			---		
							<b>Drain</b>		Floor Drain (Y/N)			<b>N</b>		
							<b>Compressed Air</b>		Connection (inches)			---		
									Volume (CFM)			---		
									Capacity (PSI)			---		
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Cover, safety, metal</b>										<b>9315</b>				

## 9315 Equipment Cutsheet

Equipment Description:

**Cover, safety, metal**

EQ ID Number:

**9315**

Manufacturer:

Unilube Systems

Model No.: Pit Guard, Pit Cover



## 9900 Equipment Datasheet

<b>Manufacturer:</b>		<b>Genfare</b>				<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>Dualport stationary vault</b>				<b>Equipment</b>		<b>32</b>		<b>36</b>		<b>66</b>		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	<b>24</b>	<b>Front</b>	<b>60</b>	<b>Above</b>	<b>---</b>
									<b>Right</b>	<b>24</b>	<b>Back</b>	<b>---</b>	<b>Below</b>	<b>---</b>
<b>DISCIPLINE COORDINATION:</b>														
<b>Architectural</b>		Coordinate with manufacturer's shop drawings for installation of through wall vault receiver; Coordinate probe and retractor location, if applicable.				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		---				<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---				<b>Venting</b>		Connection (inches)		<b>---</b>				
								Volume (CFM)		<b>---</b>				
<b>Electrical</b>		---				<b>Connection Size</b>		Requirements		<b>---</b>		<b>---</b>		<b>---</b>
								Voltage		<b>---</b>		<b>---</b>		<b>---</b>
								Phase		<b>---</b>		<b>---</b>		<b>---</b>
								Horsepower (HP)		<b>---</b>		<b>---</b>		<b>---</b>
								Amps		<b>---</b>		<b>---</b>		<b>---</b>
						<b>Connection Type</b>		<b>---</b>						
<b>Plumbing</b>		---				<b>Domestic Water</b>		Connection (inches)		<b>---</b>				
								Flow Rate (GPM)		<b>---</b>				
								Capacity (PSI)		<b>---</b>				
						<b>Natural Gas</b>		Connection (inches)		<b>---</b>				
								Capacity (BTU)		<b>---</b>				
						<b>Drain</b>		Floor Sink (Y/N)		<b>N</b>				
						<b>Compressed Air</b>		Connection (inches)		<b>---</b>				
								Volume (CFM)		<b>---</b>				
								Capacity (PSI)		<b>---</b>				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>				
<b>Vault, collection, revenue</b>										<b>9900</b>				

## 9900 Equipment Cutsheet

Equipment Description:

**Vault, collection, revenue**

EQ ID Number:

**9900**

Manufacturer: Genfare

Model No.: Dualport stationary vault



## 9910 Equipment Datasheet

<b>Manufacturer:</b>		<b>Genfare</b>					<b>Dimensions</b>		<b>Length</b> (inches)		<b>Width</b> (inches)		<b>Height</b> (inches)		
<b>Model No.:</b>		<b>Garage Data System with accessories</b>					<b>Equipment</b>		---		---		---		
<b>Provided:</b>	Cutsheet	Y	Functional Model	Y	Design Details	N	<b>Operational Clearance</b>		<b>Left</b>	---	<b>Front</b>	---	<b>Above</b>	---	
								<b>Right</b>	---	<b>Back</b>	---	<b>Below</b>	---		
<b>DISCIPLINE COORDINATION:</b>															
<b>Architectural</b>		Coordinate location of data probe installation.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Structural</b>		Coordinate location of data probe installation.					<b>Housekeeping Pad</b>		Mounted 6 inch high, steel reinforced (Y/N)		<b>N</b>				
<b>Mechanical</b>		---					<b>Venting</b>		Connection (inches)		---				
									Volume (CFM)		---				
<b>Electrical</b>		Provide one inch conduit from probe to electrical room; Provide one inch conduit for data/control wire from system computer to j-box (up to 1,000 feet).					<b>Connection Size</b>		Requirements		<b>Unit</b>	---	---		
									Voltage		<b>120</b>	---	---		
									Phase		<b>1</b>	---	---		
									Horsepower (HP)		---	---	---		
									Amps		<b>20</b>	---	---		
							<b>Connection Type</b>		<b>Provide j-box</b>						
<b>Plumbing</b>		---					<b>Domestic Water</b>		Connection (inches)		---				
									Flow Rate (GPM)		---				
									Capacity (PSI)		---				
							<b>Natural Gas</b>		Connection (inches)		---				
									Capacity (BTU)		---				
							<b>Drain</b>		Floor Drain (Y/N)		<b>N</b>				
							<b>Compressed Air</b>		Connection (inches)		---				
									Volume (CFM)		---				
									Capacity (PSI)		---				
<b>Equipment Description:</b>										<b>EQ ID Number:</b>					
<b>Probe, farebox, with software system</b>										<b>9910</b>					

## 9910 Equipment Cutsheet

Equipment Description:

**Probe, farebox, with software system**

EQ ID Number:

**9910**

Manufacturer: Genfare

Model No.: Garage Data System with accessories



## GENERAL NOTES

- OCS is only located in the parking areas and certain maintenance bays, as noted.
- Relevant requirements fall in the 2018 criteria (pp 1-5). The remaining information are reference materials that may inform some design decisions.
- LMD shall design a site specific solution, with deviations from the tension requirements outlined in this appendix permitted upon approval by the SFMTA.
- LMD shall take particular note to design an OCS solution for the trolley fleet that anticipates a smooth transition to future battery electric bus.

# APPENDIX B: SFMTA OCS DESIGN CRITERIA

## I. **GENERAL**

These criteria govern the Overhead Contact System (OCS) design, to provide a safe, reliable and efficient system to deliver electrical power to support and Electric Trolleybuses (ETBs).

### A. **References**

The latest edition of the applicable standards, codes, and guidelines of the following organizations shall be used for all designs unless otherwise required by this section:

- California Public Utilities Commission (CPUC) General Order No. 95, Rules for Overhead Line Construction
- California Public Utilities Commission (CPUC) General Order No. 128, Rules for Construction of Underground Electric Supply and Communications Systems.
- Muni High Performance Trolley Coach Overhead Wire Minimum Standards
- Design standards and criteria developed on previous Muni projects
- American with Disabilities Act (ADA), 49 CFR parts 27, 37 and 38
- American National Standards Institute (ANSI) C2, National Electric Safety Code
- American Public Transit Association (APTA) – Rapid Transit Standards
- California Code of Regulation (CCR), Title 8, Industrial Relation
- California Code of Regulation (CCR), Title 23, Waters
- California Code of Regulation (CCR), Title 24, Building Standards Code
- California Occupational Safety and Health Association (Cal OSHA)
- City of San Francisco Standard Plans and Specifications
- Code of Federal Regulations, Title 29, Part 1910, Occupational Safety and Health Standards
- Code of Federal Regulations, Title 41, Public Contracts and Property Management
- Code of Federal Regulations, Title 49, Part 212, State Safety Participation Regulations

## Capital Programs & Construction

- Illuminating Engineering Society (IES) Model Lighting Ordinance (MLO)
- Insulated Cable Engineers Association (ICEA)
- National Electric Code (NEC)
- National Electrical Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA) Standard 130, Fixed Guideway Transit and Passenger Rail Systems
- Occupational Safety and Health Act of 1970 (OSHA)
- San Francisco County Ordinance Code
- San Francisco Municipal Code
- Telecommunications Industry Association (TIA)
- Underwriters Laboratories (UL)
- Uniform Building Code (UBC)
- Uniform Fire Code (UFC)
- Uniform Plumbing Code (UPC)

Where more than one code, standard, or criterion is applicable, the most restrictive shall govern, except as indicated in this document. The Safety Criteria shall be reviewed in light of new editions and issues of these codes and standards at the beginning of each design phase and shall be amended as appropriate. All materials, equipment, design, manufacturing methods, installation, and testing shall conform to all applicable Federal, State, and local codes and regulations. In addition, Muni standards and established Industry Standards and practices shall govern the design and construction.

## **II. DESIGN CRITERIA**

This section provides the general OCS design criteria. Project specific design criteria addressing the project needs should also be incorporated.

### **A. Electric Trolley Buses (ETBs)**

Overhead hardware used should be products of manufacturers regularly engaged in the production of such material and equipment, and is of the manufacturer's latest design

## Capital Programs & Construction

approved by Muni. This is to ensure compatibility and interchangeability with the current Muni overhead hardware and spare parts. The followings are specific hardware characteristics for the project:

1. Hardware Criteria
  - i. Overhead Contact System Type - OCS shall be a rigid type system similar to Ohio Brass (OB)/Westinghouse Air Brake Company (WASCO)/Impulse NC, Inc Contact System or a flexible system similar to Kummler & Matter System.
  - ii. Contact Wire- Contact wire shall be bronze, grooved, alloy 80 conforming to ASTM B9-90. The following characteristics shall be used:

**Table II.B.1 Trolley System Contact Wire Standards**

Description	Min. Standards
Contact Wire for Trolley Vehicles	#4/0 or #2/0
#4/0 Contact Wire Tension @ 60°F	3000 lb per wire
#2/0 Contact Wire Tension @ 60°F	2000 lb per wire
Contact Wire Height	19ft-6in ± 3in
Contact Wire Spacing	2ft
Axis of Trolley wire pair from curb unless otherwise noted	14ft
Maximum Unsupported Contact Wire Span	100ft

- iii. Overhead Components and Trolley Wire Replacement – Replace overhead components and trolley wires that have a service life of less than 50%.
  - iv. Leading Switch -15° Induction Controlled
2. Trolley Wire Alignment shall be in accordance with guidelines and criteria established by Municipal Railway High Performance Trolley Coach Overhead Minimum Standards.

### C. Overhead Supports and Foundations

#### 1. OCS Poles

Steel poles shall be in accordance with Muni Standard Drawing CL-7971, Rev. 2. Standard pole Types 761N, 765N, 767 and 770 should be used.

New poles should be in line with property line between adjacent properties and avoid fronting doors, windows, and access ways wherever possible. They should be

## Capital Programs & Construction

located within the first flag from the curb (18in to near side face and 24in to center of pole approximately). New poles should be 3ft from low-pressure hydrant and 5ft from high-pressure hydrant from centerline of pole to centerline of hydrant. New poles should be located away from new and existing ADA curb ramps, trees, sub-sidewalk basements, etc.

Where an existing pole is replaced with a new pole, the new pole should be 4ft away (minimum) from the present location. At intersections adjoining side platforms the poles should be as clear of the corner as possible to avoid being hit by right turning trucks. Other overhead utilities might share pole and air space such as PG&E, PAC Bell, TCI and/or Viacom.

Wherever possible, poles should be combined with streetlight and traffic signals to reduce the number of poles. Combination poles should be located within 3ft of perpendicular property line.

Poles with feeder risers inside should not be combined with traffic signals.

### 2. Poles Foundations

Unless otherwise noted, existing foundations should be removed to a depth of 3ft below the finished grade. Where a pole has to be replaced in place due to space constraint, the existing foundation should be removed entirely and new foundation installed in place.

New standard pole foundations shall be in accordance with Muni Standard Drawing CL-7971, Rev. 2. Where special foundations are required, they shall be designed according to the current codes, regulations and field conditions.

### 3. Pole Replacement

Replace City-owned wood, segmented, concrete, and/or steel poles that are bending, leaning, deeply pitted, undersized, with exposed rebars, rusted and/or with holes along the shaft or base.

### 4. Protection Devices

Wood troughs, preformed glass/epoxy shields, or approved apparatus of a custom design if necessary, should be used wherever the overhead support structure shall be protected against possible arcing conditions and in accordance to the GO 95, Rules for Overhead Lines Construction.

Guy wire span supports shall include tree guard or similar item to protect against trolley shoe snags during dewirement from a trolley vehicle.

### 5. Finish Treatment

Unless otherwise required by urban design requirements or streetscape master plan, new steel pole shall have a galvanized finish (Not Painted). Existing steel trolley pole shall be painted to match galvanizing or existing coating color. Anti-graffiti coating shall be applied to the bottom 8 ft of the pole.

### 6. All new OCS poles shall be grounded.

## **Appendices**

- 1.** Transmission of Trolley Coach Overhead Wire Guidelines, dated 4/6/89
- 2.** New Muni Overhead Trough Suspension Instructions, 8/4/94



SAN FRANCISCO MUNICIPAL RAILWAY 949 PRESIDIO AVENUE, SAN FRANCISCO, CALIF. 94115 415-673-6264

**FINAL**

TO: Don Keener  
FROM: W. G. Stead *William Stead*  
DATE: April 6, 1989  
RE: TRANSMISSION OF TROLLEY COACH OVERHEAD WIRE GUIDELINES

Enclosed is a copy of the Municipal Railway High Performance Trolley Coach Overhead Standards. These standards represent MUNI policy on those issues relative to the design of our Trolley Coach Overhead System, and should be followed by UEB designers on MUNI trolley overhead projects. If UEB believes that these standards cannot be applied to a particular circumstance, which will happen, the MUNI project coordinator should be contacted to review the circumstances.

Our staff is prepared to work with your Project Managers and Designers in implementing these guidelines. In particular, we will be providing UEB with explanatory drawings of key concepts contained in the guidelines.

These guidelines should eliminate the need for ad hoc communication between MUNI personnel and UEB designers during the design phase of these projects, and all communication will go through the UEB Project Manager to/from the MUNI Project Coordinator.

cc: J. Ivester  
E. Pearson  
B. Bernhard  
J. Katz  
*✓* M. Cohn, UEB

Enc.

OVRDGLN



SAN FRANCISCO MUNICIPAL RAILWAY 949 PRESIDIO AVENUE, SAN FRANCISCO, CALIF. 94115 415-673-6864

TO: W. G. Stead  
THRU: J. Ivester *J.I.*  
B. Bernhard *BB*  
FROM: John Katz *J.K.*  
DATE: April 6, 1989  
RE: TROLLEY COACH OVERHEAD DESIGN STANDARDS/SIGN-OFF

Enclosed is the final draft of the Trolley Coach Overhead Design Standards. These standards were drafted by Carl Natvig of the Service Planning Department, and revised by the Trolley Coach Overhead Committee. The members of the committee are Art Curtis (Deputy Superintendent Surface Transportation), Harold Conklin (Manager, Hetch Hetchy Overhead Lines Department), Peter Straus (Director of Service Planning), and Galen Sarno (Chief Electrical Engineer, MRED). All have approved this final draft for use by UEB designers when designing new or reconstructed trolley overhead projects.

These standards incorporate the decision you made, based on the recommendation of Ed Pearson, that Ohio Brass-type suspension should be employed on all tangent wire at this time.

We recommend that you approve these guidelines by signing the enclosed transmission memo to UEB.

We also want to thank Bobbie Chapman for doing such a super job of typing the many drafts of this document in both a professional and pleasant manner.

Enc.

DESGNSTD

MUNICIPAL RAILWAY  
 HIGH PERFORMANCE TROLLEY COACH OVERHEAD WIRE  
 MINIMUM STANDARDS

*\*note: @ all cases, use template which has a better visual view of what is really happen.*

**I. SWITCHES**

*regular service switch*

*from station to route*

**A. Scheduled Service or Pull-in Pull-out Switches**

1. Mechanical Crossing.

-(10 degree switch is awaiting test results)-

- a. Leading Switches. A 10 or 15-degree mechanical crossing with stainless steel or similarly moveable runners shall be used for all regularly used leading switches.
- b. Trailing Switches. A 10 or 15-degree mechanical crossing with stainless steel or similarly durable moveable runners shall be used for all regularly used trailing switches.
- c. Preferred Direction. The runners shall be set to favor the more heavily used direction where use is 50% less and speeds below 15 mph in the less used direction.

2. Inductive Control.

*and 10°*  
 Inductive control shall be provided for all advance 15-degree switches.

3. Single-coil. A single-coil with mechanical reset shall be employed with inductive control switches.

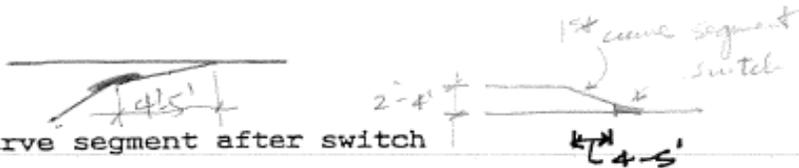
*min. - not prefer double-coil.*



4. Advance Switch Spacings. All regularly used leading switches shall be located in advance of the intersection as follows:



- a. Leading switch to intersection nearside stop line
  - (1) Left or right-hand - one or two lanes in each direction .....90-110 feet (one span)
  - (2) Left-turn - three or more lanes in direction of travel .....300-400 feet (three or four spans)
  - (3) Left-turn - unique condition (auto queues, etc.) .....as specified by MUNI



b. First curve segment after switch

First curve segment to advance switch  
 .....4-5 feet

(From the trailing tip of the switch crossing plate or insulated runner assembly to the leading tip of the curve segment.)  
 (To minimize forward acceleration on poles.)

- c. Inductive antenna to leading switch  
 .....40 feet
  - d. Inductive antenna to indicator light  
 .....170 to 240 feet  
 (i.e. second span from switch or as specified by MUNI)
5. Indicator Lights. Indicator lights (see reference drawing) shall have the following characteristics:
- a. 8 inch lenses.
  - b. Masked for 1-1/2 by 6 inches.
  - c. Double filament lamps if available.
  - d. Straight indication on top, diagonal turn indication below.
  - e. Pole-mounted wherever possible. Guy mounts may be used where there are visual obstructions or when requested by MUNI.
  - f. 8 inch hood.
  - g. Lamp voltage and series resistance designed for minimum 2-year life.
  - h. A micro-switch as specified by MUNI shall be used for the light switch.

6. Control Wiring.



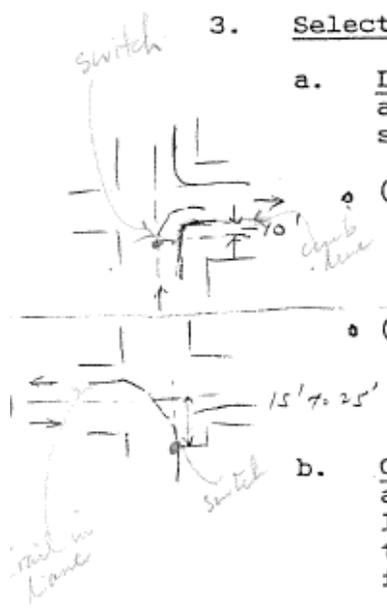
- a. Control wiring shall be suspended from a separate messenger wire of 3/16 inch diameter at least 2 feet above the contact wire level.
- b. Control wire cable shall be multi-conductor, color coded, single jacket. *in spec.*

7. Y-Switches. A 10 or 15-degree Y-switch shall be used where the dominant direction of travel is in the turning direction.



*mostly 30°* (NON REVENUE ROUTE)  
B. Emergency Switches (NON REVENUE ROUTE)

1. 30-Degree Switches. *Lead* Selectric 30-degree switches shall be employed for all right turns and for all left turns with the exception of left turns where there is more than one lane in the direction of travel. (No 23-degree switches shall be used.)
2. Advance Switches. Advance, left-hand, inductive 10 or 15-degree switches shall be employed for left turns on streets with more than one lane on the lead-in street.
3. Selectric Switch and Curve Segment Location.



a. Leading Selectric Switch. The following standards are intended to prevent the false activation of selectric switches:

- (1) Right-turns. The leading switch frogs shall be located approximately 10 feet before the curb line of the trail-in street for right turns.
- (2) Left-turns. The leading switch frogs shall be located approximately 15 to 25 feet before the traffic dividing line of the trail-in street for left turns.

b. Curve Segment. The first curve segment shall have a spacing of 0-5 feet from the trailing tip of the leading selectric switch to the leading tip of the curve segment for right turns and 0-10 feet for left turns.

c. Trailing Switch. The trailing switch shall be located over the center-rear of turning coaches wherever possible.

d. Selectric Switch Alignment. Selectric switch layouts need not be aligned over the inside rear corner of turning coaches.

*use len plate instead of these guidelines*  
*shall be a straight crossing always*

8. Combination Curve-Crossings. No combination curve-crossings shall be used unless specifically approved by MUNI. Additional curve segments shall be used to avoid use of combination curve-crossings.

9. Tangent Clamps. A maximum of 1.25 degrees per foot of curve runner or per HS-type clamp shall be used.  
*use if angle less than 5°*

10. Curve Alignment. All curve segments shall be located over the inside rear corner of the turning coach as determined by field tests. The location of coach stops should be considered in determining the typical path of a turning coach.

*Diagram for item 10: A hand-drawn diagram showing a curved path of a coach. It includes a 'stop line' and 'striping' markings. Dimensions of 2'-3" and 2'-4" are indicated. A 'Second' label is circled and points to a specific location on the curve.*

a. Right Turns. The contact wire axis shall be 2-3 feet from the curb at the apex of right turns; and the ~~apex~~ and last curve segments shall be 8 to 11 feet from the curb unless specified otherwise by MUNI. *Second*

b. Left Turns. As a general rule, the left turn wire should pass over the two intersecting points of the stop lines and the traffic dividing lines in the path of the turning coach (on two-way, one lane per direction streets).

11. Guying in Turns. Curve segments shall be located in such manner axially and laterally within plus or minus  $\pm$  2 feet of the path of the inner rear corner of the turning coach to minimize the amount of guying required to support the curve segments.

*Diagram for item 11: A hand-drawn diagram showing a rectangular path of a coach with dimensions 5'-4" and 2'-2". A 'path of coach' label points to the inner corner of the path.*

B. Emergency Routes

1. Curvature. A maximum of 30 degrees per curve segment shall be used.
2. Long Radius Turns. For turns with a radius of 50 feet or greater, additional curve segments shall be used as needed.
3. Combination Curve-Crossings. No combination curve-crossings shall be used unless specifically approved by MUNI. Additional curve segments shall be used to avoid use of combination curve-crossings.
4. Curve Alignment. (The same as for regularly used turns with the exception of selectric switch turn lay-outs.)

---

III. SECTION INSULATORS  
(No. Bos, Breakers, Insulated Runners)

- A. Far-Side Crossings. Insulated runners shall be in the far-side crossing for each direction of coach travel at intersections.
- B. Section Insulators. Insulated runners between circuits shall be located in non-accelerating locations if a far-side crossing is not available.
- C. Switches. Insulated runners in switches shall be in the turn-out direction in leading and trailing switches.
- D. Exceptions. Exceptions to the location of insulated runners shall be employed only when specified by MUNI. Possible exceptions may be as follows:
  - 1. Some crossings in left-turns.
  - 2. Some crossing locations with steep up-hill grades on narrow streets with heavy traffic.
  - 3. Some switches where the turning direction is the dominant direction of travel.
  - 4. Emergency routes will generally have all the insulated runners when crossing revenue routes.
- E. Magnetic Blowout. Magnetic blowouts of a type approved by MUNI (a permanent magnet type is now used) shall be used on the first insulated runner of switches, crossings, and section insulators.

IV. TANGENT WIRE

- A. Tangent Wire Suspension. OB type or equivalent suspension system will be used on all tangent runs.
- B. Concave and Convex Vertical Curves. All vertical curves shall be designed for 25 mph or the typical speed of traffic, whichever is greater, with a maximum of 1.25 degrees of curvature per foot of runner. (A lower design speed may be used where coaches turn sharply at the vertical curve.) Vertically curved K & M clamp-type curve runners (with rigid suspension), K & M copper tubing with passage clamps, or equivalent clamp-type runner shall be used.
- C. Single-Track. Bracket arms or davit poles with flexible suspension shall be used for single-track runs except: concave vertical curves; where distances between the curb and wire locations are more than 18 feet; or where trolley poles are already in place.
- D. Tangent Wire Axis. The following wire axis to curb distances shall be used:
  - 1. One or two lanes per direction.
    - a. For streets narrower than 48 feet:  
-14 feet OR center of traffic lane - whichever is greater.  
*Center of trolley wires to curb line*
    - b. For streets wider than 48 feet:  
-16 feet OR center of traffic lane - whichever is greater.
  - 2. Three lanes per direction.  
.....center of traffic lane plus 3 feet  
-18 feet maximum
  - 3. Three lanes per direction with loading bulbs  
-20 feet  
(only where all stops have bulbs)

\* Parameter = 450 - 18' CLEARANCE  
600 - 19' CLEARANCE. *according to DPT/OPW? criteria?*

VII. INTERSECTIONS

- A. Network Guys. A maximum of three guys shall be attached to bull rings on the high tension side of curve segment support networks. A greater effort to network and reduce guys should be employed in residential areas than in industrial areas.
- B. Brail Wires. Brail wires shall be used primarily on the inside of turn layouts and be located a minimum of 3 feet from parallel contact wires.
- C. Constant-Carbon-Contact. Constant-carbon-contact for all crossing plates and switches shall be used. Fabricated OB deep-runner crossing plates shall not be used. ?
- D. Design Life. Adequate minimum runner depth in flangeways of crossing plates and switch plates shall be employed to allow for a clearance of 1-3/8 inches after 2 million carbon trolley shoe passages (with a pressure of 28 pounds). Flangeways shall be configured to allow easy passage of bent poles.
- E. Pole Location. Generally, trolley support poles should be located to minimize the total length of guy wires. Generally, no more than 2 poles per corner should be used. Generally, advance switches should be located one span from the adjacent intersection, the main tension guy (head guy) attached to the switch should be attached to a pole or poles one span from the switch.
- F. Eyebolts. Eyebolts shall be employed wherever practical to install and if buildings of suitable strength are available. (City policy requires that all new buildings of adequate strength along existing or proposed trolley coach routes must provide eyebolts.)
- G. Traffic Signal Pre-empts. Traffic signal pre-empts shall be provided at signalized intersections as specified by MUNI (in consultation with other City departments). New signalized intersections shall be provided as specified by MUNI (in consultation with other City departments).

OVHDSTDS

9/18/85  
Revised 11/28/86  
Revised 5/17/88  
Revised 9/15/88  
Revised 11/2/88  
Revised 3/20/89  
Revised 4/5/89



POWER, SIGNALS & ELECTRONICS, 2502 ALAMEDA ST., SAN FRANCISCO, CA 94103

Appendix 2



August 4, 1994

T O : John Katz  
F R O M : Vic Lameyse *VL*  
S U B J E C T : NEW MUNI OVERHEAD TROUGH SUSPENSION INSTRUCTIONS

Attached is the new instruction on our overhead trough suspension. Also included is a drawing detailing the suspension.

If you have any comments, please let me know at 554-9201.

cc: Ray Favetti  
Draw Howard  
William Wong

PUBLIC UTILITIES COMMISSION CITY AND COUNTY OF SAN FRANCISCO



### MUNI OVERHEAD TROUGH SUSPENSION INSTRUCTION

The trough for Muni Overhead suspension should be made of hardwood and it should be waterproof for outside use. But if it has to be installed inside a building or in an enclosure, then the wood need not be necessarily be waterproof. All troughs should be designed in a way that will enable the crew to reach the top above the trough during maintenance so that you can repair insulators that support the overhead in the trough.

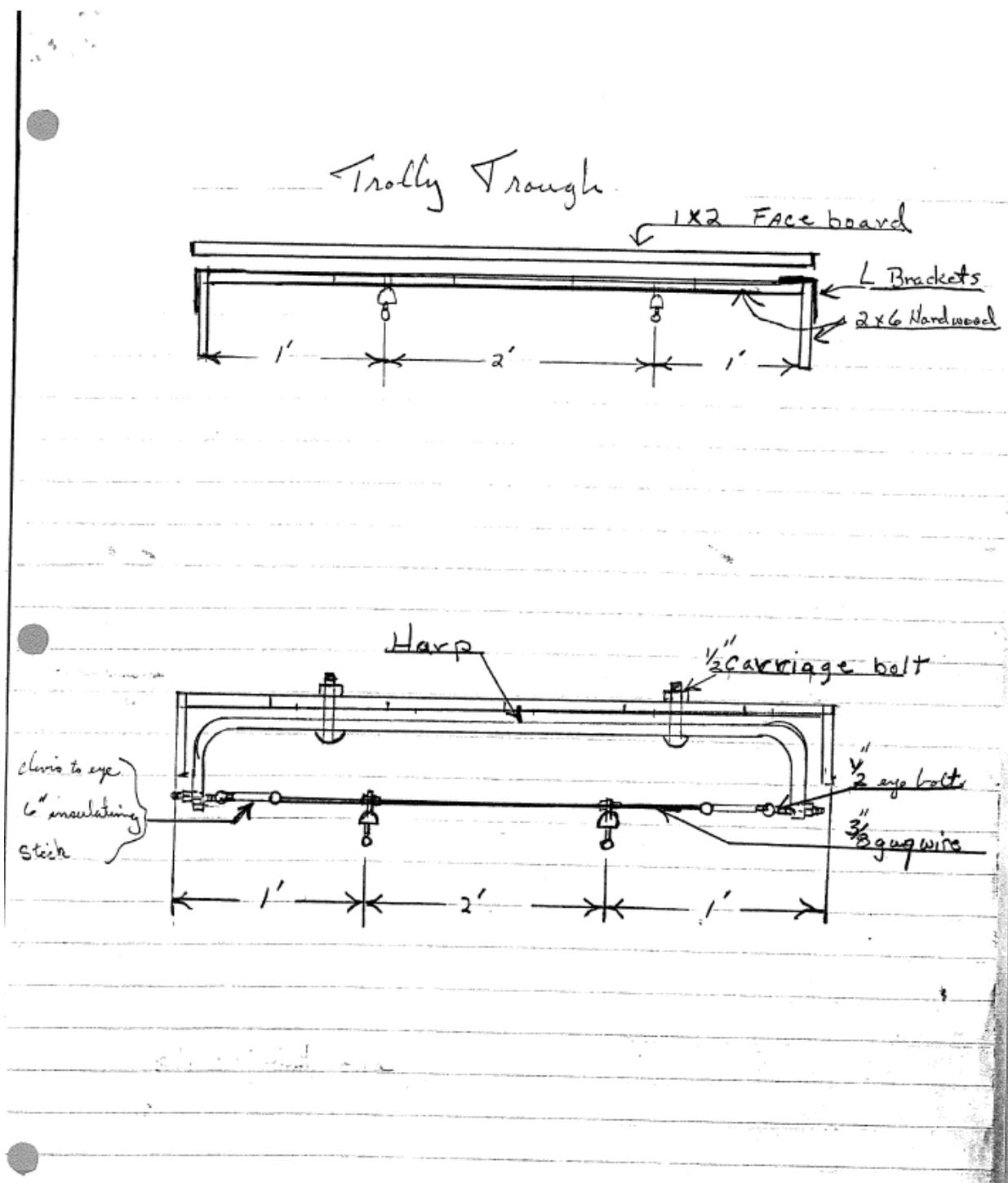
The wood should run parallel with the wire and be made of 2" x 6" as well as the kickboard on the sides. On each side of the outside wire, should have a 1 foot clearance between the wire and kickboard. A 1" x 2" board should be installed on the face of the trough to prevent the wood from splitting from poles hitting it. An "L" bracket should be installed to strengthen the kickboard from pulling apart. The trough should extend 2 feet passed the ends of the structure so we can mount a harp if needed.

Harps should be installed where the nearest tangent support wire is more than 60 feet from either end of the trough. Harps are made of steel channel iron 6" x 1" and have 2 clevis to eye 6" stick, with threaded eye bolt to adjust tension on harp. Harps should be 4 feet long (see attached drawing on Harp).

Splice joints should be made of channel iron 2" x 6" to give support to splices in trough so it would not sag.

Also, lags and wood screws should not be used because they will only pull apart. When putting together splices and attachments always use nuts, bolts, lock washers and flat washers.

*USE 1/2" CARTRIDGE BOLT*



525. 24 : 08 '87

## WORKING PROPERTIES OF COMMON WOODS

Name of Wood	General Characteristics							Machining					Remarks
	Weight per Cu. Ft. (1)	Hardness	Strength (2)	Stability (3)	Gluing	Nailing (4)	Steam Bending	Planing and Jointing (5)	Turning (6)	Sanding (7)	Shaping	Mortising (8)	
Ash	35	Med.	Med.	Best	Fair	Good	Good	Good 10-25		Best 2/0			Tough - Hard to work with hand tools.
Basswood	24	Soft	Weak	Good	Best	Best	Poor	Good 20-30	Poor	Poor	Poor	Fair	Excellent for trays, drafting boards.
Beach	39	Hard	Med.	Poor	Poor	Poor	Good	Fair 10-20	Fair	Good 4/0	Fair	Best	Not durable outside. Hard on tools because of mineral deposits.
Birch	40	Hard	Strong	Fair	Fair	Poor	Good	Good 15-20	Good	Fair 4/0	Best	Best	Excellent for furniture, turning, dowels, handles.
Butternut	25	Soft	Weak	Best	Good	Fair	Poor	Good 10-25	Good	Fair 4/0	Fair	Fair	Furniture—Perfect for walnut imitation.
Cherry	36	Med.	Med.	Good	Best	Fair	Poor	Best 10-25	Best	Best 4/0	Best	Best	Furniture, hand trim, novelties.
Chestnut	27	Soft	Weak	Best	Best	Good	Fair	Good 15-20	Best	Best 3/0	Good	Good	Stains badly in contact with wet iron. Very dusty in all machining ops.
Cottonwood	27	Soft	Weak	Fair	Best	Best	Poor	Poor 5-20	Poor	Poor 4/0	Poor	Fair	Excellent for boxes & other nailing jobs—wears very well for soft wood.
Cypress	29	Soft	Med.	Good	Fair	Fair	Poor	Good 15-25	Poor	Fair 2/0	Poor	Poor	Tends to splinter. Most durable of Amer. woods for outdoor & soil expos.
Elm (Southern)	34	Med.	Med.	Poor	Fair	Best	Good	Poor 15-20	Poor	Good 2/0	Poor	Good	Very durable under paint. A good furn. wood despite diff. in machining.
Gum (Red)	33	Med.	Med.	Poor	Best	Good	Fair	Fair 10-20	Best	Fair 4/0	Fair	Fair	One of the most used furn. woods for imitations of walnut & mahogany.
Hickory	42	Hard	Strong	Good	Good	Poor	Good	Good 10-25	Good	Best 2/0	Fair	Best	Excellent for furniture & steam bending, tool handles, wheels.
Poplar	30	Soft	Weak	Fair	Best	Best	Best	Good 5-15	Fair	Good 4/0	Good	Poor	Excellent for steam bending. Often marketed as poplar.
Mahogany	35	Med.	Med.	Best	Best	Good	Poor	Good 5-25	Best	Good 4/0	Best	Best	One of the best furniture woods
Mahogany (Phil.)	33	Med.	Med.	Best	Best	Good	Poor	Good 5-25	Good	Poor 3/0	Fair	Fair	Generally coarser & softer than true mahogany. Furn., boat planking, trim
(9) Maple (Hard)	41	Hard	Strong	Good	Fair	Poor	Fair	Fair 15-20	Good	Good 4/0	Best	Best	Fine furn., flooring, turnings, bowling pins. One of the best hardwoods.
Maple (Soft)	31	Med.	Med.	Fair	Good	Fair	Fair	Poor 10-15	Fair	Good 4/0	Fair	Poor	Some uses as hard maple but an inferior wood. Difficult to mach. smth.
Oak (Red)	39	Hard	Strong	Best	Good	Good	Best	Best 10-25	Good	Best 2/0	Fair	Best	Substitute for white oak in cheaper work.
Oak (White)	40	Hard	Strong	Best	Good	Good	Best	Best 10-20	Good	Best 2/0	Good	Best	Interior trim, floors, furniture. One of the most used American woods.
Pine (White)	25	Soft	Weak	Good	Best	Best	Poor	Good 10-25	Good	Fair 2/0	Good	Fair	Best all around soft wood. Excellent for paint.
Pine (Yellow)	38	Hard	Strong	Fair	Fair	Poor	Poor	Good 10-25	Poor	Fair 2/0	Good	Good	Main uses—house construction, trim, floors.
Poplar	29	Soft	Weak	Good	Best	Best	Fair	Good 5-20	Good	Poor 4/0	Poor	Fair	Excellent for carvings, toys, corestock.
Redwood	29	Soft	Med.	Best	Best	Good	Poor	Good 10-25	Fair	Poor 2/0	Good	Poor	Excellent for outdoor furniture, window sills, etc.
Sycamore	35	Med.	Med.	Poor	Good	Best	Poor	Poor 5-15	Good	Poor 3/0	Poor	Best	Interior trim, furniture. Difficult to mach. but excellent appearance.
Walnut	36	Med.	Strong	Best	Best	Fair	Good	Good 15-20	Best	Best 4/0	Good	Best	Has every good feature for furniture and cabinet work.

**NOTES:** Data in this chart is largely from extensive tests made by U.S. Forest Products Laboratory, with some additions.

- Pounds per cubic foot, dry. All woods vary in weight, even in the same tree from trunk to top. A variation of 10% or over under average should be allowed.
- Composite strength value. Woods rated weak are strong enough for all average work.
- Rated on unrestrained warp. Most woods are quite stable if properly seasoned and cared for.
- Rated on ability to take nails near end without splitting.
- Rated on flat grain stock, shallow cut. Rating is average from runs at 15, 20 and 25-degree cutting angles. Bottom figure is best knife angle for smooth cutting.
- Rated on smooth cutting and ability to hold detail. Not much difference between best and good.
- Rated on freedom from fuzz. Bottom figure is
- Rated on smoothness of cut. Work speed decreases with hardness of wood and this factor might be of more importance than smoothness in production work.
- Sugar, white or hard maple. Should be distinguished from silver, red, big-leaf or soft maple, which is an inferior machining wood although often marketed simply as "maple."

*Please file with your Trolley Overhead Standards*



SAN FRANCISCO MUNICIPAL RAILWAY 949 PRESIDIO AVENUE, SAN FRANCISCO, CALIF. 94115 415-673-6864



TO: DICK BRANDT

FROM: JOHNNY B. STEIN *Johnny B Stein*

DATE: JANUARY 31, 1994

RE: AMENDMENTS TO TROLLEY OVERHEAD DESIGN STANDARDS

The enclosed document is a set of amendments to the High Performance Trolley Overhead Standards originally transmitted to you in 1989. While the original standards have been extremely helpful in designing improved and consistent overhead projects, they were incomplete in some areas and need revisions in others.

Therefore the purpose of the enclosed amendments is to set standards in areas that were not covered by the original guidelines (tensioning and support), or to make changes in other areas (guy wire, control wiring).

Since these standards were worked out in meetings between our overhead committee and your overhead design staff they should be easy to understand and implement. In fact some of these concepts are being incorporated on a project by project basis but have not yet been codified as a set of amendments to the standards.

Please call John Katz if you have any questions about the content of these standards. Thank you.

cc: Phil Chin  
Phil Adams  
Kathy Gilbert  
John Katz  
Hoy Wong  
Vic Lameyse  
Peter Straus  
Art Curtis  
Carl Natvig

VIII. TENSIONING AND SUPPORT



- A. Head Guy. Only the head guy wire should be held with great tension.
- B. Side Guys.
  - 1. All side guys should be attached lightly to special work, usually about 200-300 lbs. tension.
  - 2. All side guy wires should be hung from the highest point on the pole so they will not interfere with other guy wires or contact wire.
- C. Tangent Span Tension.
  - 1. Tangent spans are installed to support the trolley wire weight only, except where there are significant grade slopes.
  - 2. In most cases tension on tangent spans should be not more than 500 lbs.
- D. Curve Segment Guy Strands. Where possible each curve segment guy strand should be supported independently of the other curve segments. Multiple guying to several segments in the opposing corner and/or special work should be avoided. The exception to this is where parallel turns can be supported by one guy wire.
- E. Final Contractor Adjustment. After initial installation but prior to final acceptance of the job the contractor should adjust pole band heights of guy wire in order to avoid guy wire interference coming within one foot of contact wire. This can be done by having the contractor leave a 2' tail on the end of the guy wire at the pole. The remaining tail should be cut off at the completion of the final adjustment.

IX. GUY WIRE SIZE AND TYPE

- A. Type. Use 3/8" utilities guy wire rated at least utilities grade 4. Do not use fiber guys. (replaces section VI-E)
- B. Securing Guy Wire. Preforms and dead end automatic will be used to secure guy wire. Do not use crimp on sleeves for dead ending.
- C. Do Not Use Thimbles. Thimbles for securing guy wire are not used and should be eliminated from all future material lists.

*tools can do by spec.*

X. CONTROL CABLE AND WIRING  
(Replaces existing section 1-A-6.)

- A. Type. Multiple Control Cable should be seven (7), #14 wire single jacket with messenger.
- B. Messenger Wire. Messenger wire should be 1/4 inch diameter, suspended at least 2 feet above contact wire.
- C. Color Code. Muni will provide the color coding for control wiring for switches and multiple control cable. The contractor should not proceed with installation unless the wire colors are consistent with Muni color coding.
- D. All control wire should be installed with fuse protection.

OVHDGID2

PUBLIC UTILITIES COMMISSION  
CITY AND COUNTY OF SAN FRANCISCO



KAY K. YU  
PRESIDENT  
MICHAEL E. HARDEMAN  
VICE PRESIDENT  
JAMES D. JEFFERSON  
MORTON MILLER  
E. DENNIS NORMANDY

FRANK M. JORDAN, MAYOR  
ANSON B. MORAN, GENERAL MANAGER  
UTILITIES ENGINEERING BUREAU  
RICHARD E. BRANDT, MANAGER

MUNICIPAL RAILWAY  
WATER DEPARTMENT  
HETCH HETCHY  
WATER AND POWER

February 22, 1994

**MEMORANDUM**

TO: Johnny B. Stein  
FROM: Richard E. Brandt *R.E.B.*  
SUBJECT: Trolley Overhead Design Standards

Thank you for your update of the Trolley Overhead Design Standards of January 31, 1994.

This update formalizes the current design practice being used as agreed by the Overhead Committee.

It should be remembered that these are general guidelines which sometimes have to be varied to meet site specific conditions.

For example, MUNI has advised as that esthetics and minimizing the impact on views are important considerations in the design of the overhead along the Embarcadero. If we were to follow VIII D literally and not use multiple guying, the additional poles and individual guy wires would block views and result in an unesthetic design.

bcc: M File  
W. Neilson  
W. Wong  
Overhead Section

ja-STANDRDS.WN

SECTION

OVERHEAD WIRE SYSTEM

1. GENERAL:

The overhead trolley wires will provide electrical power to streetcars at 615 VDC. The PCC and other historic streetcars will be equipped with trolley poles to take power from overhead trolley wires. Contact wire will be installed over each track by means of carbon wipers.

Current will be returned through the rails in the street.

2. DESIGN CRITERIA:

a. CONTACT WIRE:

The contact wire will be supported by span wires. The following characteristics will be used:

Material	Alloy 80 Bronze
Type	Round, grooved ASTM B9-47
Size	# 4/0 AWG
Height	18'-6" to 19'-0"
Supports	110 ft <i>100 ft</i>
Design Voltage	615 VDC
Design Tension	3,000 lbs

b. SPECIAL TRACKWORK & CURVE CONSTRUCTION:

At rail line crossovers and turnouts, the overhead system will be designed to maintain contact between the wire and the PCC trolley shoe.

Overhead system construction at the curves will require the ~~contact~~ <sup>contact</sup> wire to be offset (~~pulled off~~) to maintain continuity of contact between the cars and the contact wire. Each curve radius will require evaluation of the following parameters to determine the pull off spacing. *Pull-off will be spaced per drawing K-41, "Location of Contact Wire Above Track For Pole And Pantograph Operation"*

- minimum curve radius
- radius of spiral curve entering
- radius of spiral curve leaving
- curve super elevation

c. SWITCHES:

Leading and trailing switches shall be 15° mechanical crossings with stainless steel or similarly durable moveable runners used for all regularly used switches.

## Capital Programs & Construction

d. TURNS:

Curvature: Curve segment shall not exceed 3.125° per foot of runner on 90° turns.

VI-20

e. Poles: Number of poles will be minimized by combining trolley, streetlight and traffic signal poles where feasible. Poles will be ATEA 700 series.

### DESIGN CODES AND GUIDELINES

Design codes and guidelines applicable to this project are as follows:

#### Trolley Overhead

Muni High Performance Trolley Coach Overhead Wire Minimum Standards. Revised 03/20/89.

General Order No. 95 of the Public Utilities Commission of the State of California, March 1981.

Design standards and criteria developed on previous trolley overhead projects.

#### Safety - Cal/OSHA

Pole - American Transit Engineering Association (ATEA, Section DT5-57). Revised and approved as standard 1957.

#### Foundation and Concrete

City and County of San Francisco DPW Standard Specification (Section 800.11), July 1986.

American Concrete Institute (ACI 318-83) November 1983.

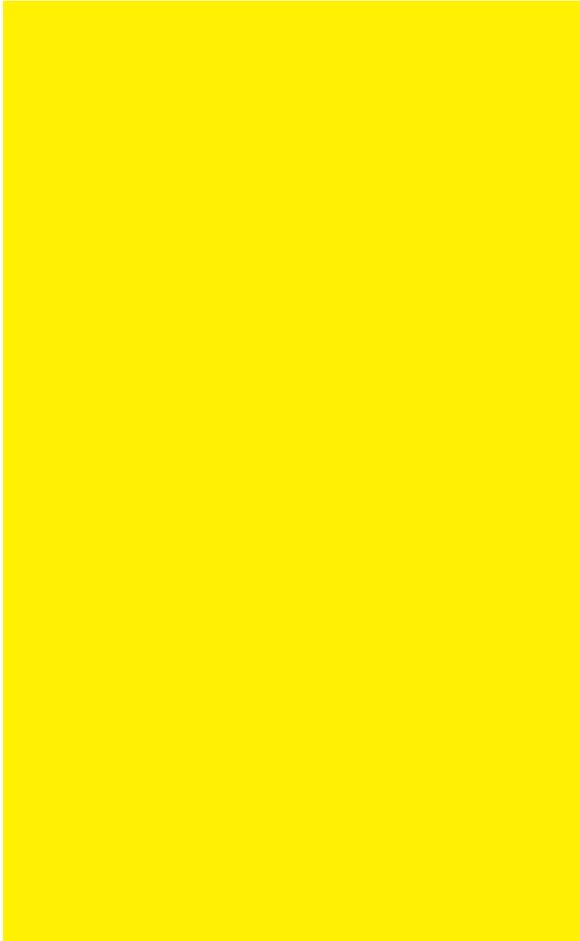
## Capital Programs & Construction

### Others (Latest Edition)

- Public Works Code Electrical Code, Traffic Code and other applicable ordinances of the City and County of San Francisco. July 1986
- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- Electric Industries Association (EIA)
- Insulated Cable Engineers Association (ICEA)
- Institute of Electrical and Electronic Engineers (IEEE)
- National Electrical Manufacturers Association (NEMA)
- Regulations for Working in San Francisco Streets, Department of Public Works, City and County of San Francisco. July 1986
- Underwriter Laboratories, Inc. (UL)
- General Order 128 of the Public Utilities Commission of the State of California.



APPENDIX C:  
SFPUC APPLICATION FOR  
ELECTRICAL SERVICE



**Potrero Yard Modernization Project**

**2500 Mariposa Street**

**SF Public Utilities Commission (PUC)**

**Wholesale Distribution Tariff (WDT) Application for Power Service**

## Enclosed Application Materials:

1. Feeder 1 Application (Industrial Load)	3
2. Feeder 2 Application (Mixed Use Load)	15
3. Single Line Diagram Feeder 1	27
4. Single Line Diagram Feeder 2	29
5. Floor Plan	31
6. Site Survey	33
7. Electrical Plans	35

## 1. FEEDER 1 APPLICATION (INDUSTRIAL LOAD)

This application covers the bus facility load and a portion of the battery electric bus charging load. NFPA70 Article 625 Sec42 states automatic load management system can be used for feeder rating. Based on modeling, estimated peak load with load management is 9,941kW. Designs include automatic load management and intelligent switchgear that can function as a backup to the load management limiting peak demand to 9,941kW. Second service requested for remainder of chargers & site load.

The total peak BEB charging load is ~12.7MW, split between two feeders. Feeder 1 is all BEB and anticipated to peak around 9.9 MW. Feeder 2 is mixed between BEB charging, residential, bus operations, and commercial uses. This totals 3MW peak for residential, 5MW for commercial/bus yard ops, and 2.8 MW for BEB charging. The connected load is higher than the peak load for BEBs because automatic load management systems should be used per NEC code Article 625 section 42.



# Hetch Hetchy POWER

## APPLICATION FOR ELECTRIC SERVICE

Refer to the [Application Checklist](#) to complete this form. Submit separate forms for temporary construction power and permanent power.

### Project Information

Project Name

Potrero Yard Modernization Project

Address \*

2500 Mariposa St, SF, CA 94110

Nearest cross street

Bryant Street

City \*

San Francisco

Supervisorial District

10

Project Type

New Service

Load Type \*

- Residential
- Light Commercial
- Commercial (industrial secondary)
- Industrial (industrial primary)
- Mixed Use
- Other

Service Type

- Underground
- Overhead

Service Duration \*

- Permanent
- Temporary

Will property be all electric? \*

- Yes
- No

Buy America Requirements/Federal Funding Restrictions?

- Yes
- No

Date Electrical Service Requested

06/01/2023

Construction Start Date

Anticipated Contractor Bid Date

Number of Buildings

1

Number of Stories

13

Total Building Area

1300000

Existing Meter No.

Meter Room No. and Location

Number of Independent Electric Services

Number of Residential Units

Avg. Sq. Foot per Residential Unit

702

	Hours /Day	Days/Week	Months/Year	Business Hours
Summer Operating Hours	24	7	12	0:00 to 24:00
Winter Operating Hours	24	7	12	0:00 to 24:00

Description \*

Brief description of the project and electric load type below. Please include the supply details, such as "irrigation pump" or "temporary construction power for new affordable housing development."

The Potrero Yard Modernization Project will demolish existing uses and construct a new 3-level bus maintenance and storage facility, equipped with battery electric bus infrastructure, up to 575 housing units, and ground floor retail as an integrated mixed-use development

Contact Information

Application submitted by

- Owner/developer
- Electrical engineer
- Electrical contractor
- General contractor
- Architect
- Other

Applicant Information

Company/Agency Name

San Francisco Public Works

Contact Name & Title \*

Rachel Alonso, Project Manager

Invoice For:

- Construction Charges
- Electricity

Email \*

rachel.alonso@sfdpw.org

Business Mailing Address \*

49 South Van Ness, 10th floor  
San Francisco, CA 94103

Daytime

Phone \*

628-271-2838

Cell

Phone \*

805-452-3125

**Owner/Developer Information (if different from Applicant)**

Company/Agency Name

SFMTA

Contact Name & Title

Licinia Iberri

Invoice For:

- Construction Charges
- Electricity

Business Mailing Address

1 South Van Ness, 8th floor  
San Francisco, CA 94103

Daytime

Phone

415-646-2715

Cell

Phone

###-###-####

**Representative Information (if different from Applicant/Owner)**

Company/Agency Name

Contact Name & Title

Invoice For:

- Construction Charges
- Electricity

Email

Business Mailing Address

Daytime

Phone

###-###-####

Cell

Phone

###-###-####

**Electric Load Information**

Complete one Load Summary for each Service Point. Add additional service points to Notes

Service Equipment Rating (amps)

600

Meter Disconnect Rating (amps)

600

Voltage

- 120/208 Volt, 3-wire, 1 $\phi$
- 120/240 Volt, 3-wire, 1 $\phi$
- 208/120 Volt, 4-wire, 3 $\phi$
- 240/120 Volt, 4-wire, 3 $\phi$
- 480/277 Volt, 4-wire, 3 $\phi$
- Primary Voltage (>or equal 2,400 Volts)
- Other

**Single Phase Circuit**

Service Point Description/Location

	Quantity	Load Each (kVA)	1 $\phi$ Load Total (kVA)	CALCULATIONS FOR INTERNAL USE: Reserve Capacity (kVA)
<b>Lighting</b>	<input type="text" value="NA"/>	<input type="text" value="NA"/>	<input type="text" value="0"/>	0
<b>Receptacles</b>	<input type="text" value="NA"/>	<input type="text" value="NA"/>	<input type="text" value="0"/>	0
Electric Water Heating	<input type="text"/>	<input type="text"/>	0	0
Electric Heating	<input type="text"/>	<input type="text"/>	0	0
Commercial Cooking	<input type="text"/>	<input type="text"/>	0	0
Refrigeration	<input type="text"/>	<input type="text"/>	0	0
Resistance Welders	<input type="text"/>	<input type="text"/>	0	0
Arc Welders (Largest Unit)	<input type="text"/>	<input type="text"/>	0	0
EV Charging Station	<input type="text"/>	<input type="text"/>	0	0
Other 1 (Describe)	<input type="text"/>	<input type="text"/>	0	0
Other 2 (Describe)	<input type="text"/>	<input type="text"/>	0	0
<b>Total (kVA)</b>	<input type="text" value="NA"/>	<input type="text" value="NA"/>	0	0

"Other 1" Description

"Other 2" Description

**Single Phase Horsepower**

(Note: hp will be converted to kVA at 0.746)

	Quantity	Load Each (hp)	1 $\phi$ Load Total (kVA)	CALCULATIONS FOR INTERNAL USE: Reserve Capacity (kVA)
Air Conditioning	<input type="text"/>	<input type="text"/>	0	0.000
Elevators	<input type="text"/>	<input type="text"/>	0	0.000
Fire Pump	<input type="text"/>	<input type="text"/>	0	0.000

	Quantity	Load Each (hp)	1 $\phi$ Load Total (kVA)	CALCULATIONS FOR INTERNAL USE: Reserve Capacity (kVA)
Other (Describe)	<input type="text"/>	<input type="text"/>	0	0.000
Total (hp)	NA	NA	0	0.000

"Other" Description

	Largest Motor:	Motors 40 hp & above:
Type	<input type="text"/>	<input type="text"/>
Rated hp	<input type="text"/>	<input type="text"/>
Locked-rotor current (amps)	<input type="text"/>	<input type="text"/>
Motor Use	<input type="text"/>	<input type="text"/>

**Three Phase Circuit**

Service Point Description/Location

Feeder #1

	Quantity	Load Each (kVA)	3 $\phi$ Load Total (kVA)	CALCULATIONS FOR INTERNAL USE: Reserve Capacity (kVA)
<b>Lighting</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0
<b>Receptacles</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0
Water Heating	<input type="text"/>	<input type="text"/>	0	0
Electric Heating	<input type="text"/>	<input type="text"/>	0	0
Commercial Cooking	<input type="text"/>	<input type="text"/>	0	0
Refrigeration	<input type="text"/>	<input type="text"/>	0	0
Resistance Welders	<input type="text"/>	<input type="text"/>	0	0
Arc Welders (Largest Unit)	<input type="text"/>	<input type="text"/>	0	0
EV Charging Station	90	205	18450	6457.5
Other 1 (Describe)	<input type="text"/>	<input type="text"/>	0	0
Other 2 (Describe)	<input type="text"/>	<input type="text"/>	0	0
Total (kVA)	NA	NA	18450	6457.5

"Other 1" Description

"Other 2" Description

**Three Phase Horsepower**

(Note: hp will be converted to kVA at 0.746)

	Quantity	Load Each (hp)	3 $\phi$ Load Total (kVA)	CALCULATIONS FOR INTERNAL USE: Reserve Capacity (kVA)
Air Conditioning	<input type="text"/>	<input type="text"/>	0	0.000
Elevators	<input type="text"/>	<input type="text"/>	0	0.000
Fire Pump	<input type="text"/>	<input type="text"/>	0	0.000
Other (Describe)	<input type="text"/>	<input type="text"/>	0	0.000
Total (hp)	NA	NA	0	0.000

"Other" Description

	Largest Motor:	Motors 40 hp & above:
Type	<input type="text"/>	<input type="text"/>
Rated hp	<input type="text"/>	<input type="text"/>
Locked-rotor current (amps)	<input type="text"/>	<input type="text"/>
Motor Use	<input type="text"/>	<input type="text"/>

**Ramp Up Schedule**

When will the load reach the below percentages of total forecast?

	Estimated Week from Service Energization:
25% of Electrical Load	<input type="text" value="104"/> *
50% of Electrical Load	<input type="text" value="104"/> *
75% of Electrical Load	<input type="text" value="234"/> *
100% of Electrical Load	<input type="text" value="234"/> *

**Street/Sidewalk Improvement**

Does the project include any street/sidewalk improvement along public streets?

- No
- Yes

If yes, contact slengineering@sfwater.org .

**Customer Self Generation and Net Energy Metering**

This Application form is for electric service only. The installation and interconnection of self-generation equipment, including photovoltaic systems, requires the submission of an interconnection application and SFPUC approval. Please contact hhpower@sfwater.org for more assistance.

Do you plan to install onsite self-generation equipment?

- Yes
- No

Generation type:

Total output in kWAC

**Attachments**

**A. Site Plan(s)**

Drawn to scale, indicating proposed locations of electric metering (including any sprinkler controller meter), switchgear, and (if applicable) transformers. Show easements, rights-of-way, property lines, grading, roads, road names, sidewalks, driveways. Indicate location of fire hydrants and other structures, drains (water, sewer, storm) and proposed future improvements. **Minimum 300 dpi, include relevant directional, scale, legend, and context information.** Upload at least one file. \*

Potrero Yard - 2500 Mariposa - floor plan.pdf  Upload a different file

Potrero Yard - 2500 Mariposa - site survey.pdf  Upload a different file

No file chosen

**B. Building floor plans and exterior elevations**

Minimum 300 dpi, Include relevant directional, scale, legend, and context information.

No file chosen

No file chosen

No file chosen

**C. Electrical Drawings**

Electrical drawings and schedules with complete breakdown of equipment, including electric switchboard drawings. Minimum 300 dpi, include relevant directional, scale, legend, and context information. Upload at least one file. \*

Potrero Yard - 2500 Mariposa - electrical drawings.pdf  Upload a different file

No file chosen

No file chosen

**D. Single Line Diagrams**

Single line diagram showing the meter, customer main service panel (and its main switch size), transformers (if any), poles, vaults, and /or junction boxes (if any). Minimum 300 dpi, include relevant directional, scale, legend, and context information. Upload at least one file. \*

Potrero Yard - 2500 Mariposa - single line diagram feeder 1.pdf  Upload a different file

No file chosen

No file chosen

**E. Street Light and Traffic Signal Plans (if applicable)**

If applicable. Minimum 300 dpi, include relevant directional, scale, legend, and context information.

No file chosen

No file chosen

**F. Department of Building Inspection permit (if applicable)**

No file chosen

**G. Request for Unmetered Service (if applicable)**

No file chosen

**H. Proposed Joint Trench Agreement (if applicable)**

No file chosen

**Other Notes or Requests**

Additional information, such as existing active WDT Application

This application covers the bus facility load and a portion of the battery electric bus charging load. NFPA70 Article 625 Sec42 states automatic load management system can be used for feeder rating. Based on modeling, estimated peak load with load management is 9,941kW. Designs include automatic load management and intelligent switchgear that can function as a backup to the load management limiting peak demand to 9 941kW. Second service requested for remainder of chargers

**Acknowledgement**

The applicant hereby applies to the SFPUC for electric service. Applicant acknowledges that this Application is subject to the SFPUC's *Rules and Regulations Governing Electric Service* that can be found at <https://sfwater.org/ElectricRules> .

By clicking "Submit" below, I agree that the information contained in this Application is correct to the best of my knowledge. I understand that any changes made to the above information or attached documents may increase the time and costs required for SFPUC to provide electric service at the requested service address and that I will be responsible for any increased costs resulting from such changes.

I understand that service will be engineered and installed based in part upon the information provided here. The SFPUC will provide the Applicant with a service agreement estimating the Applicant's cost responsibility. Subject to entering into a service agreement with the SFPUC, I agree to pay SFPUC for all work SFPUC performs and all costs SFPUC incurs to provide the service requested by this Application. SFPUC may cancel this project if I do not proceed with the project and it becomes inactive for 12 months. If the project is cancelled, by either party, I will pay SFPUC for all such work and costs incurred by SFPUC prior to the cancellation.

I have read and agree to the terms above.

Contact Name & Title \*

Rachel Alonso, Project Manager

**Hidden Fields for Record Transfer to Salesforce (INTERNAL USE)**

This is the default information for the required fields in Salesforce.

Opportunity Type

WDT Application

Close Date

06/01/2023

Stage

Pre-Application

Total Connected

18450

Reserve Capacity  
6457.5

**Summer Demand**

	Residential	Light Commercial	Commercial	Industrial
1:00 AM				5628.650570865
2:00 AM				5538.270832605
3:00 AM				5457.51133578
4:00 AM				5439.2611815675
5:00 AM				5518.6666956225
6:00 AM				5761.193444685
7:00 AM				6066.5730559875
8:00 AM				6145.9886243695
9:00 AM				6245.81212059
10:00 AM				6295.6619477325
11:00 AM				6382.8269164795
12:00 PM				6419.647878525
1:00 PM				6430.5134488345
2:00 PM				6427.6270173675
3:00 PM				6457.0436743045
4:00 PM				6420.2402702025
5:00 PM				6457.5
6:00 PM				6415.0976657245
7:00 PM				6375.2459212575
8:00 PM				6297.4351772325
9:00 PM				6136.528503105
10:00 PM				6002.52988923
11:00 PM				5843.304354195
12:00 AM				5695.510156875

**Winter Demand**

	Residential	Light Commercial	Commercial	Industrial
1:00 AM				5457.51133578
2:00 AM				5439.2611815675
3:00 AM				5518.6666956225
4:00 AM				5761.193444685
5:00 AM				6066.5730559875
6:00 AM				6145.9886243695
7:00 AM				6245.81212059

	Residential	Light Commercial	Commercial	Industrial
8:00 AM				6295.6619477324
9:00 AM				6382.8269164799
10:00 AM				6419.647878525
11:00 AM				6430.5134488349
12:00 PM				6427.6270173674
1:00 PM				6457.0436743049
2:00 PM				6420.2402702024
3:00 PM				6457.5
4:00 PM				6415.0976657249
5:00 PM				6375.2459212574
6:00 PM				6297.4351772324
7:00 PM				6136.528503105
8:00 PM				6002.52988923
9:00 PM				5843.304354195
10:00 PM				5695.510156875
11:00 PM				5628.650570865
12:00 AM				5538.270832605

Submit

[Contact Information](#)

## 2. FEEDER 2 APPLICATION (MIXED USE LOAD)

This application covers housing and retail loads and a portion of the battery electric bus charging load. NFPA70 Article 625 Sec42 states automatic load management system can be used for feeder rating. Based on modeling, estimated peak load with load management is 2.8MW BEB chargers. New service estimate 5MW commercial, 3MW residential and 2.8MW BEB Chargers. Designs have automatic load management & intelligent switchgear that function as backup limiting peak demand to 10.8MW.

The total peak BEB charging load is ~12.7MW, split between two feeders. Feeder 1 is all BEB and anticipated to peak around 9.9 MW. Feeder 2 is mixed between BEB charging, residential, bus operations, and commercial uses. This totals 3MW peak for residential, 5MW for commercial/bus yard ops, and 2.8 MW for BEB charging. The connected load is higher than the peak load for BEBs because automatic load management systems should be used per NEC code Article 625 section 42.



# Hetch Hetchy POWER

## APPLICATION FOR ELECTRIC SERVICE

Refer to the [Application Checklist](#) to complete this form. Submit separate forms for temporary construction power and permanent power.

### Project Information

Project Name

Potrero Yard Modernization Project

Address \*

2500 Mariposa Street, SF, CA 94110

Nearest cross street

Bryant Street

City \*

San Francisco

Supervisory District

10

Project Type

New Service

Load Type \*

- Residential
- Light Commercial
- Commercial (industrial secondary)
- Industrial (industrial primary)
- Mixed Use
- Other

Service Type

- Underground
- Overhead

Service Duration \*

- Permanent
- Temporary

Will property be all electric? \*

- Yes
- No

Buy America Requirements/Federal  
Funding Restrictions?

- Yes
- No

Date Electrical Service Requested

06/01/2023

Construction Start Date

Anticipated Contractor Bid Date

Number of Buildings

1

Number of Stories

13

Total Building Area

1300000

Existing Meter No.

Meter Room No. and Location

Number of Independent  
Electric Services

Number of Residential Units

Avg. Sq. Foot per  
Residential Unit

702

	Hours /Day	Days/Week	Months/Year	Business Hours
Summer Operating Hours	24	7	12	0:00 to 24:00
Winter Operating Hours	24	7	12	0:00 to 24:00

Description \*

Brief description of the project and electric load type below. Please include the supply details, such as "irrigation pump" or "temporary construction power for new affordable housing development."

The Potrero Yard Modernization Project will demolish existing uses and construct a new 3-level bus maintenance and storage facility, equipped with battery electric bus infrastructure, up to 575 housing units, and ground floor retail as an integrated mixed-use development

Contact Information

Application submitted by

- Owner/developer
- Electrical engineer
- Electrical contractor
- General contractor
- Architect
- Other

Applicant Information

Company/Agency Name

San Francisco Public Works

Contact Name & Title \*

Rachel Alonso, Project Manager

Invoice For:

- Construction Charges
- Electricity

Email \*

rachel.alonso@sfdpw.org

Business Mailing Address \*

49 South Van Ness, 10th floor  
San Francisco, CA 94103

Daytime

Phone \*

628-271-2838

Cell

Phone \*

805-452-3125

**Owner/Developer Information (if different from Applicant)**

Company/Agency Name

SFMTA

Contact Name & Title

Licinia Iberri

Invoice For:

Construction Charges

Electricity

Business Mailing Address

1 South Van Ness, 8th floor  
San Francisco, CA 94103

Daytime

Phone

415-646-2715

Cell

Phone

###-###-####

**Representative Information (if different from Applicant/Owner)**

Company/Agency Name

Contact Name & Title

Invoice For:

Construction Charges

Electricity

Email

Business Mailing Address

Daytime

Phone

###-###-####

Cell

Phone

###-###-####

**Electric Load Information**

Complete one Load Summary for each Service Point. Add additional service points to Notes

Service Equipment Rating (amps)

600

Meter Disconnect Rating (amps)

600

Voltage

120/208 Volt, 3-wire, 1φ

120/240 Volt, 3-wire, 1φ

208/120 Volt, 4-wire, 3φ

240/120 Volt, 4-wire, 3φ

480/277 Volt, 4-wire, 3φ

Primary Voltage (>or equal 2,400 Volts)

Other

**Single Phase Circuit**

Service Point Description/Location

	Quantity	Load Each (kVA)	1 $\phi$ Load Total (kVA)	CALCULATIONS FOR INTERNAL USE: Reserve Capacity (kVA)
<b>Lighting</b>	<input type="text" value="NA"/>	<input type="text" value="NA"/>	<input type="text" value="0"/>	0
<b>Receptacles</b>	<input type="text" value="NA"/>	<input type="text" value="NA"/>	<input type="text" value="0"/>	0
Electric Water Heating	<input type="text"/>	<input type="text"/>	0	0
Electric Heating	<input type="text"/>	<input type="text"/>	0	0
Commercial Cooking	<input type="text"/>	<input type="text"/>	0	0
Refrigeration	<input type="text"/>	<input type="text"/>	0	0
Resistance Welders	<input type="text"/>	<input type="text"/>	0	0
Arc Welders (Largest Unit)	<input type="text"/>	<input type="text"/>	0	0
EV Charging Station	<input type="text"/>	<input type="text"/>	0	0
Other 1 (Describe)	<input type="text"/>	<input type="text"/>	0	0
Other 2 (Describe)	<input type="text"/>	<input type="text"/>	0	0
<b>Total (kVA)</b>	<input type="text" value="NA"/>	<input type="text" value="NA"/>	0	0

"Other 1" Description

"Other 2" Description

**Single Phase Horsepower**

(Note: hp will be converted to kVA at 0.746)

	Quantity	Load Each (hp)	1 $\phi$ Load Total (kVA)	CALCULATIONS FOR INTERNAL USE: Reserve Capacity (kVA)
Air Conditioning	<input type="text"/>	<input type="text"/>	0	0.000
Elevators	<input type="text"/>	<input type="text"/>	0	0.000
Fire Pump	<input type="text"/>	<input type="text"/>	0	0.000

	Quantity	Load Each (hp)	1 $\phi$ Load Total (kVA)	CALCULATIONS FOR INTERNAL USE: Reserve Capacity (kVA)
Other (Describe)	<input type="text"/>	<input type="text"/>	0	0.000
Total (hp)	NA	NA	0	0.000

"Other" Description

	Largest Motor:	Motors 40 hp & above:
Type	<input type="text"/>	<input type="text"/>
Rated hp	<input type="text"/>	<input type="text"/>
Locked-rotor current (amps)	<input type="text"/>	<input type="text"/>
Motor Use	<input type="text"/>	<input type="text"/>

**Three Phase Circuit**

Service Point Description/Location

Feeder 2

	Quantity	Load Each (kVA)	3 $\phi$ Load Total (kVA)	CALCULATIONS FOR INTERNAL USE: Reserve Capacity (kVA)
<b>Lighting</b>	<input type="text"/>	<input type="text"/>	500.40	500.4
<b>Receptacles</b>	<input type="text"/>	<input type="text"/>	460.14	57.5175
Water Heating	<input type="text"/>	<input type="text"/>	0	0
Electric Heating	23	68.10	1566.3	1174.725
Commercial Cooking	<input type="text"/>	<input type="text"/>	0	0
Refrigeration	<input type="text"/>	<input type="text"/>	0	0
Resistance Welders	<input type="text"/>	<input type="text"/>	0	0
Arc Welders (Largest Unit)	<input type="text"/>	<input type="text"/>	0	0
EV Charging Station	26	205	5330	1865.4999999999
Other 1 (Describe)	23	107.52	2472.96	865.536
Other 2 (Describe)	576	5.21	3000.96	1050.336
Total (kVA)	NA	NA	13330.7599999999	5514.0145

"Other 1" Description

Commercial

"Other 2" Description

Residential

**Three Phase Horsepower**

(Note: hp will be converted to kVA at 0.746)

	Quantity	Load Each (hp)	3 $\phi$ Load Total (kVA)	CALCULATIONS FOR INTERNAL USE: Reserve Capacity (kVA)
Air Conditioning	<input type="text"/>	<input type="text"/>	0	0.000
Elevators	<input type="text"/>	<input type="text"/>	0	0.000
Fire Pump	<input type="text"/>	<input type="text"/>	0	0.000
Other (Describe)	<input type="text"/>	<input type="text"/>	0	0.000
Total (hp)	NA	NA	0	0.000

"Other" Description

	Largest Motor:	Motors 40 hp & above:
Type	<input type="text"/>	<input type="text"/>
Rated hp	<input type="text"/>	<input type="text"/>
Locked-rotor current (amps)	<input type="text"/>	<input type="text"/>
Motor Use	<input type="text"/>	<input type="text"/>

**Ramp Up Schedule**

When will the load reach the below percentages of total forecast?

	Estimated Week from Service Energization:
25% of Electrical Load	<input type="text" value="4"/> *
50% of Electrical Load	<input type="text" value="8"/> *
75% of Electrical Load	<input type="text" value="12"/> *
100% of Electrical Load	<input type="text" value="104"/> *

**Street/Sidewalk Improvement**

Does the project include any street/sidewalk improvement along public streets?

- No
- Yes

If yes, contact slengineering@sfwater.org .

**Customer Self Generation and Net Energy Metering**

This Application form is for electric service only. The installation and interconnection of self-generation equipment, including photovoltaic systems, requires the submission of an interconnection application and SFPUC approval. Please contact hhpower@sfwater.org for more assistance.

Do you plan to install onsite self-generation equipment?

- Yes
- No

Generation type:

Total output in kWAC

**Attachments**

**A. Site Plan(s)**

Drawn to scale, indicating proposed locations of electric metering (including any sprinkler controller meter), switchgear, and (if applicable) transformers. Show easements, rights-of-way, property lines, grading, roads, road names, sidewalks, driveways. Indicate location of fire hydrants and other structures, drains (water, sewer, storm) and proposed future improvements. **Minimum 300 dpi, include relevant directional, scale, legend, and context information.** Upload at least one file. \*

Potrero Yard - 2500 Mariposa - floor plan.pdf  Upload a different file

Potrero Yard - 2500 Mariposa - site survey.pdf  Upload a different file

No file chosen

**B. Building floor plans and exterior elevations**

Minimum 300 dpi, Include relevant directional, scale, legend, and context information.

No file chosen

No file chosen

No file chosen

**C. Electrical Drawings**

Electrical drawings and schedules with complete breakdown of equipment, including electric switchboard drawings. Minimum 300 dpi, include relevant directional, scale, legend, and context information. Upload at least one file. \*

Potrero Yard - 2500 Mariposa - electrical drawings.pdf  Upload a different file

No file chosen

No file chosen

**D. Single Line Diagrams**

Single line diagram showing the meter, customer main service panel (and its main switch size), transformers (if any), poles, vaults, and /or junction boxes (if any). Minimum 300 dpi, include relevant directional, scale, legend, and context information. Upload at least one file. \*

Potrero Yard - 2500 Mariposa - single line diagram feeder 2.pdf  Upload a different file

No file chosen

No file chosen

**E. Street Light and Traffic Signal Plans (if applicable)**

If applicable. Minimum 300 dpi, include relevant directional, scale, legend, and context information.

No file chosen

No file chosen

**F. Department of Building Inspection permit (if applicable)**

No file chosen

**G. Request for Unmetered Service (if applicable)**

No file chosen

**H. Proposed Joint Trench Agreement (if applicable)**

No file chosen

**Other Notes or Requests**

Additional information, such as existing active WDT Application

NOTE: This application covers housing and retail loads and a portion of the battery electric bus charging load. NFPA70 Article 625 Sec42 states automatic load management system can be used for feeder rating. Based on modeling, estimated peak load with load management is 2.8MW BEB chargers. New service estimate 5MW commercial, 3MW residential and 2.8MW BEB Chargers. Designs have automatic load management & intelligent switchgear that function as backup limiting

**Acknowledgement**

The applicant hereby applies to the SFPUC for electric service. Applicant acknowledges that this Application is subject to the SFPUC's *Rules and Regulations Governing Electric Service* that can be found at <https://sfwater.org/ElectricRules> .

By clicking "Submit" below, I agree that the information contained in this Application is correct to the best of my knowledge. I understand that any changes made to the above information or attached documents may increase the time and costs required for SFPUC to provide electric service at the requested service address and that I will be responsible for any increased costs resulting from such changes.

I understand that service will be engineered and installed based in part upon the information provided here. The SFPUC will provide the Applicant with a service agreement estimating the Applicant's cost responsibility. Subject to entering into a service agreement with the SFPUC, I agree to pay SFPUC for all work SFPUC performs and all costs SFPUC incurs to provide the service requested by this Application. SFPUC may cancel this project if I do not proceed with the project and it becomes inactive for 12 months. If the project is cancelled, by either party, I will pay SFPUC for all such work and costs incurred by SFPUC prior to the cancellation.

I have read and agree to the terms above.

Contact Name & Title \*

Rachel Alonso, Project Manager

**Hidden Fields for Record Transfer to Salesforce (INTERNAL USE)**

This is the default information for the required fields in Salesforce.

Opportunity Type

WDT Application

Close Date

06/01/2023

Stage

Pre-Application

Total Connected

13330.759999999998

Reserve Capacity  
5514.0145

**Summer Demand**

	Residential	Light Commercial	Commercial	Industrial
1:00 AM				
2:00 AM				
3:00 AM				
4:00 AM				
5:00 AM				
6:00 AM				
7:00 AM				
8:00 AM				
9:00 AM				
10:00 AM				
11:00 AM				
12:00 PM				
1:00 PM				
2:00 PM				
3:00 PM				
4:00 PM				
5:00 PM				
6:00 PM				
7:00 PM				
8:00 PM				
9:00 PM				
10:00 PM				
11:00 PM				
12:00 AM				

**Winter Demand**

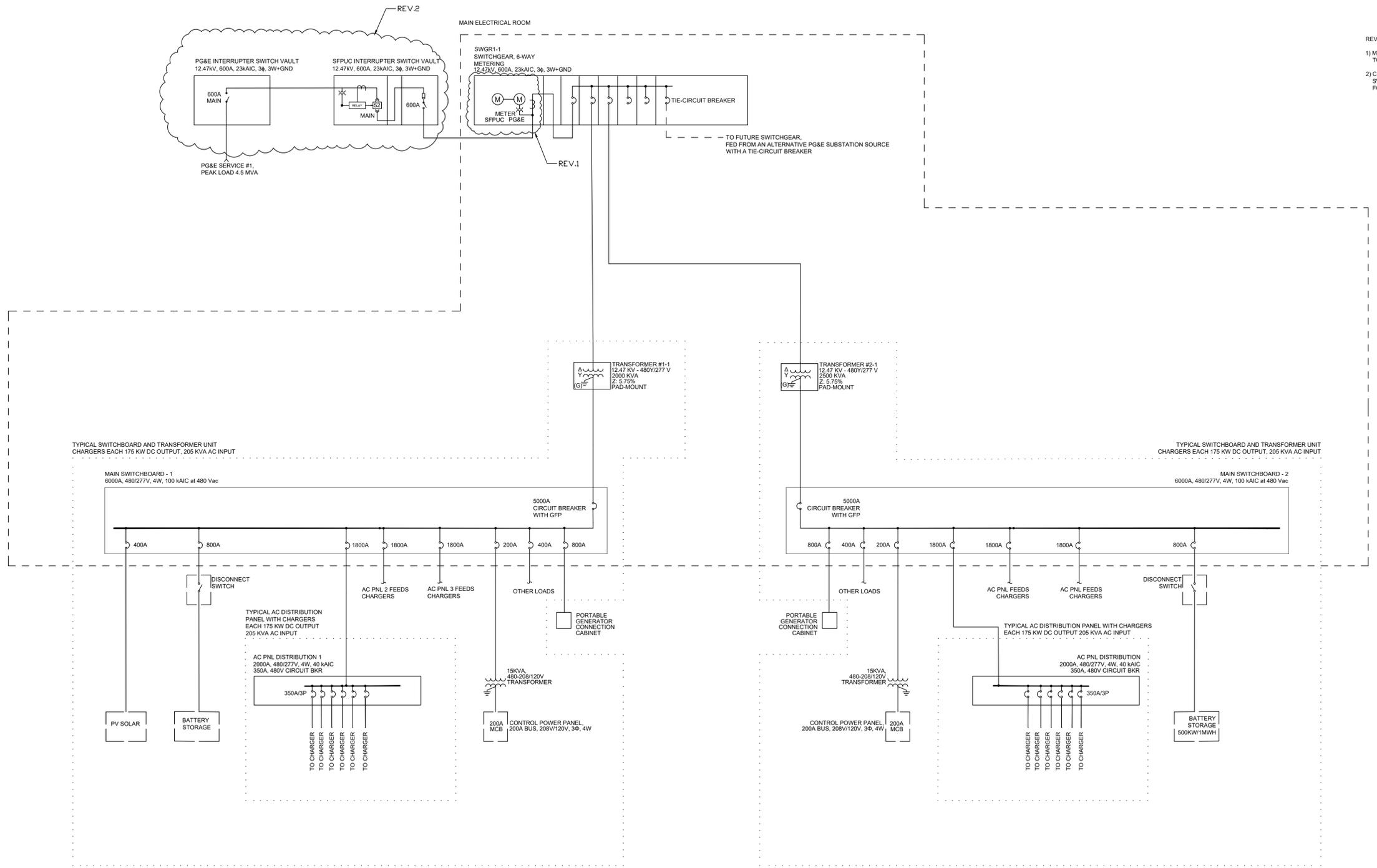
	Residential	Light Commercial	Commercial	Industrial
1:00 AM				
2:00 AM				
3:00 AM				
4:00 AM				
5:00 AM				
6:00 AM				
7:00 AM				
8:00 AM				
9:00 AM				
10:00 AM				
11:00 AM				

	Residential	Light Commercial	Commercial	Industrial
12:00 PM				
1:00 PM				
2:00 PM				
3:00 PM				
4:00 PM				
5:00 PM				
6:00 PM				
7:00 PM				
8:00 PM				
9:00 PM				
10:00 PM				
11:00 PM				
12:00 AM				

Submit

[Contact Information](#)

### 3. SINGLE LINE DIAGRAM FEEDER 1



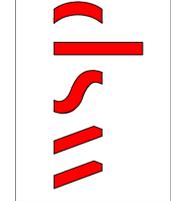
REVISION NOTES:  
 1) MOVED PRIMARY PG&E AND SFPUIC METERS TO MAIN MV SWITCHGEAR IN ELECTRICAL ROOM  
 2) CHANGED GRAPHICAL DEPICTION OF INTERRUPTER SWITCHES TO CLEARLY DELINEATE SEPARATE VAULTS FOR PG&E AND SFPUIC INTERRUPTERS.

PROJECT NO.	189247
DRAWN BY	VGG Systems
DATE	08/04/21
SCALE	NTS

PROJECT TITLE  
**SFTMA ZE FACILITY  
 PLAN**



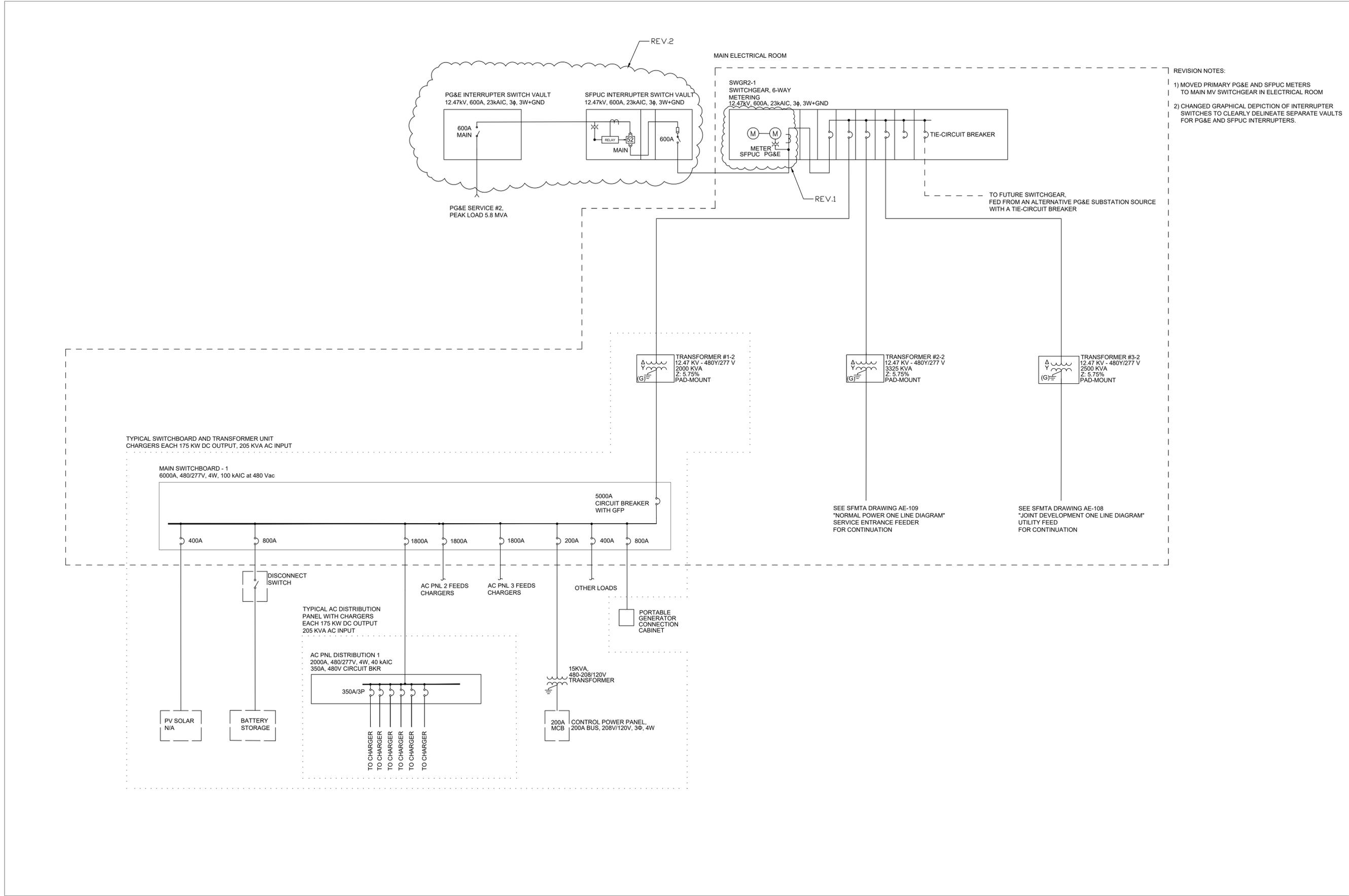
WSP USA, Inc.  
 18200 PARK ROW  
 SUITE 200  
 HOUSTON, TEXAS 77084  
 TEL: (281) 589-5900  
 FAX: (281) 759-5164



DRAWING TITLE  
**SINGLE-LINE DIAGRAM  
 POTRERO YARD,  
 SERVICE #1**

DRAWING NUMBER  
**E.T.**

## 4. SINGLE LINE DIAGRAM FEEDER 2



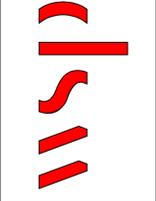
REVISION NOTES:  
 1) MOVED PRIMARY PG&E AND SFPUC METERS TO MAIN MV SWITCHGEAR IN ELECTRICAL ROOM  
 2) CHANGED GRAPHICAL DEPICTION OF INTERRUPTER SWITCHES TO CLEARLY DELINEATE SEPARATE VAULTS FOR PG&E AND SFPUC INTERRUPTERS.

PROJECT NO.	189247
DRAWN BY	VGG Systems
DATE	08/04/21
SCALE	NTS

PROJECT TITLE  
**SFTMA ZE FACILITY  
 PLAN**



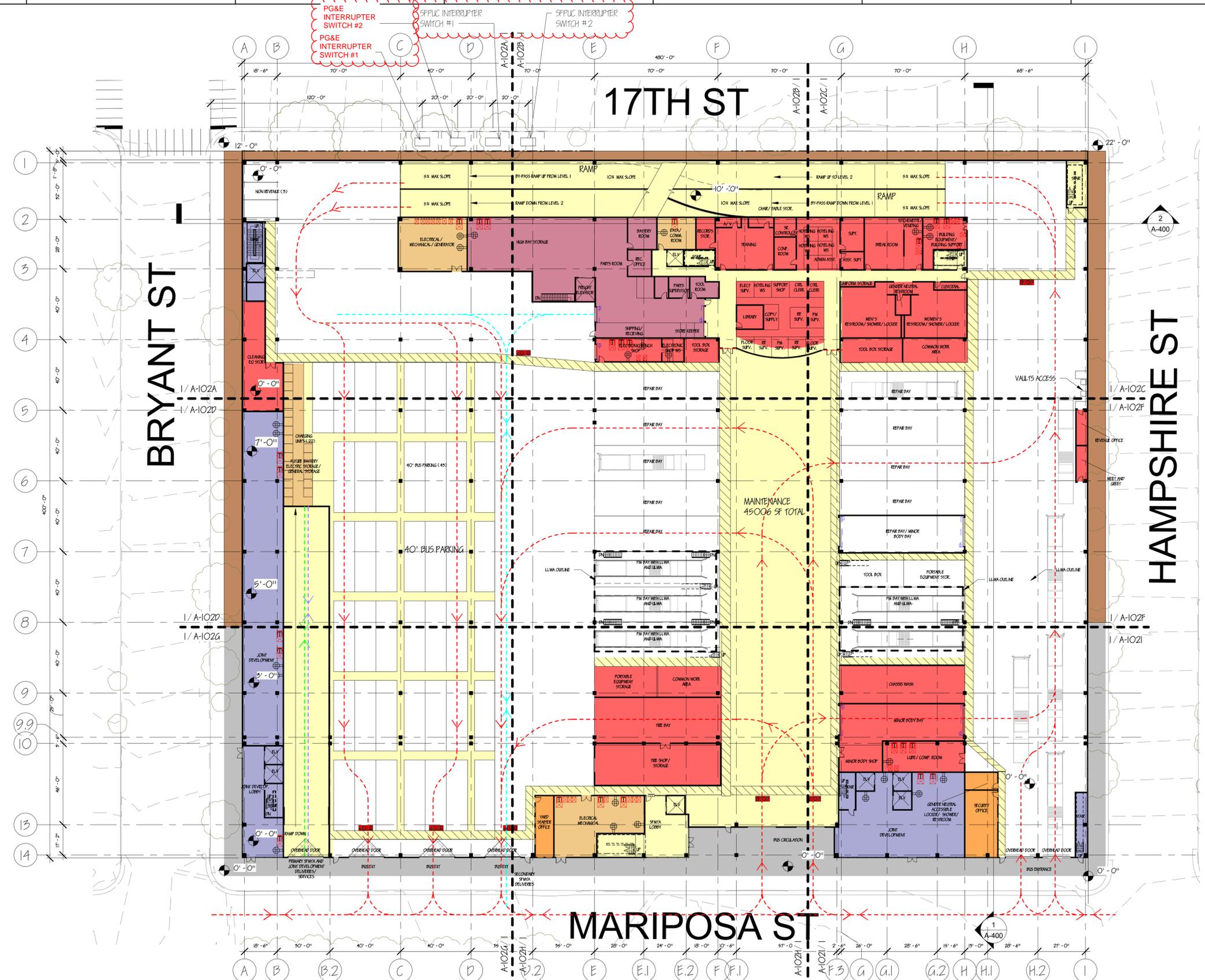
WSP USA, Inc.  
 18200 PARK ROW  
 SUITE 200  
 HOUSTON, TEXAS 77084  
 TEL: (281) 589-5900  
 FAX: (281) 759-5164



DRAWING TITLE  
**SINGLE-LINE DIAGRAM  
 POTRERO YARD,  
 SERVICE #2**

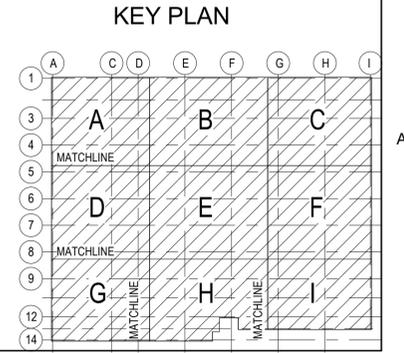
DRAWING NUMBER  
**E.T.**

## 5. FLOOR PLAN



**REVISION NOTES:**  
 1) RENAMED INTERRUPTER SWITCH LOCATIONS FOR CLARITY  
 2) PRIMARY METERS TO BE LOCATED IN MAIN SWITCHGEAR IN MAIN ELECTRICAL ROOM  
 3) THERE ARE A TOTAL OF FOUR (4) UNDERGROUND VAULTS NEEDED FOR ELECTRICAL SERVICE. THERE ARE TWO (2) NEW SERVICES PLANNED AND EACH SERVICE REQUIRES TWO (2) INTERRUPTER VAULTS: ONE FOR THE PG&E INTERRUPTER AND ONE FOR THE SFPUC INTERRUPTER.  
 4) INTERRUPTER VAULT LOCATIONS ARE FIXED. LOCATION OF ALL ELECTRICAL WORK DOWNSTREAM OF THE INTERRUPTERS, INCLUDING THE LOCATION OF THE MAIN ELECTRICAL ROOM, IS AT THE DISCRETION OF THE DESIGNER.

- |  |  |
|--|--|
| <span style="display:inline-block; width:15px; height:15px; background-color:lightgreen; border:1px solid black;"></span> OPEN SPACE         | <span style="display:inline-block; width:15px; height:15px; background-color:lightblue; border:1px solid black;"></span> JOINT DEVELOPMENT |
| <span style="display:inline-block; width:15px; height:15px; background-color:lightorange; border:1px solid black;"></span> MECH./ SERVICE    | <span style="display:inline-block; width:15px; height:15px; background-color:lightpurple; border:1px solid black;"></span> PARTS           |
| <span style="display:inline-block; width:15px; height:15px; background-color:lightyellow; border:1px solid black;"></span> SERVICE AND CLEAN | <span style="display:inline-block; width:15px; height:15px; background-color:lightgrey; border:1px solid black;"></span> PARKING           |
| <span style="display:inline-block; width:15px; height:15px; background-color:lightred; border:1px solid black;"></span> OPERATIONS           | <span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> CIRCULATION          |
| <span style="display:inline-block; width:15px; height:15px; background-color:lightpink; border:1px solid black;"></span> MAINTENANCE         | <span style="display:inline-block; width:15px; height:15px; background-color:lightcyan; border:1px solid black;"></span> TRAINING          |
| <span style="color:blue; font-weight:bold;">---</span> SFMTA DELIVERY PRIMARY  | <span style="color:blue; font-weight:bold;">---</span> JOINT DEVELOPMENT STORAGE/ SERVICE  |
| <span style="color:red; font-weight:bold;">---</span> SFMTA BUS/ TROLLEY   | <span style="color:cyan; font-weight:bold;">---</span> SFMTA DELIVERY SECONDARY  |



I:\depn-mdg\sf01\_intranet\hdm\img\PROJ\Public\WDG\PROJECTS\10093201\_Hatch\_San Francisco\_CA\_SFMTA\03\_Design\06\_Master Planning\Layouts\Revit\SFMTA\_Potrero\_AR\_2018\_3\_Level\_Central.rvt  
 6/4/2021 9:42:48 AM



ISSUE	DATE	DESCRIPTION
3	March 13, 2020	Submittal
2	June 14, 2019	Draft Submittal
1	February 20, 2019	Draft Submittal

**PROJECT MANAGER**

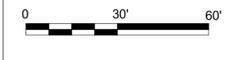
TEAM 1	Don Leidy
TEAM 2	Sheena Zimmerman
TEAM 3	Justin Kraegel
TEAM 4	Sara Jandaghi Jafari
TEAM 5	Jialing Sun
TEAM 6	Kashfi Kalam
TEAM 7	F. M. LAST

**PROJECT NUMBER** 10093201

**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

**SFMTA POTRERO  
SCENARIO 2  
(3-LEVEL)**

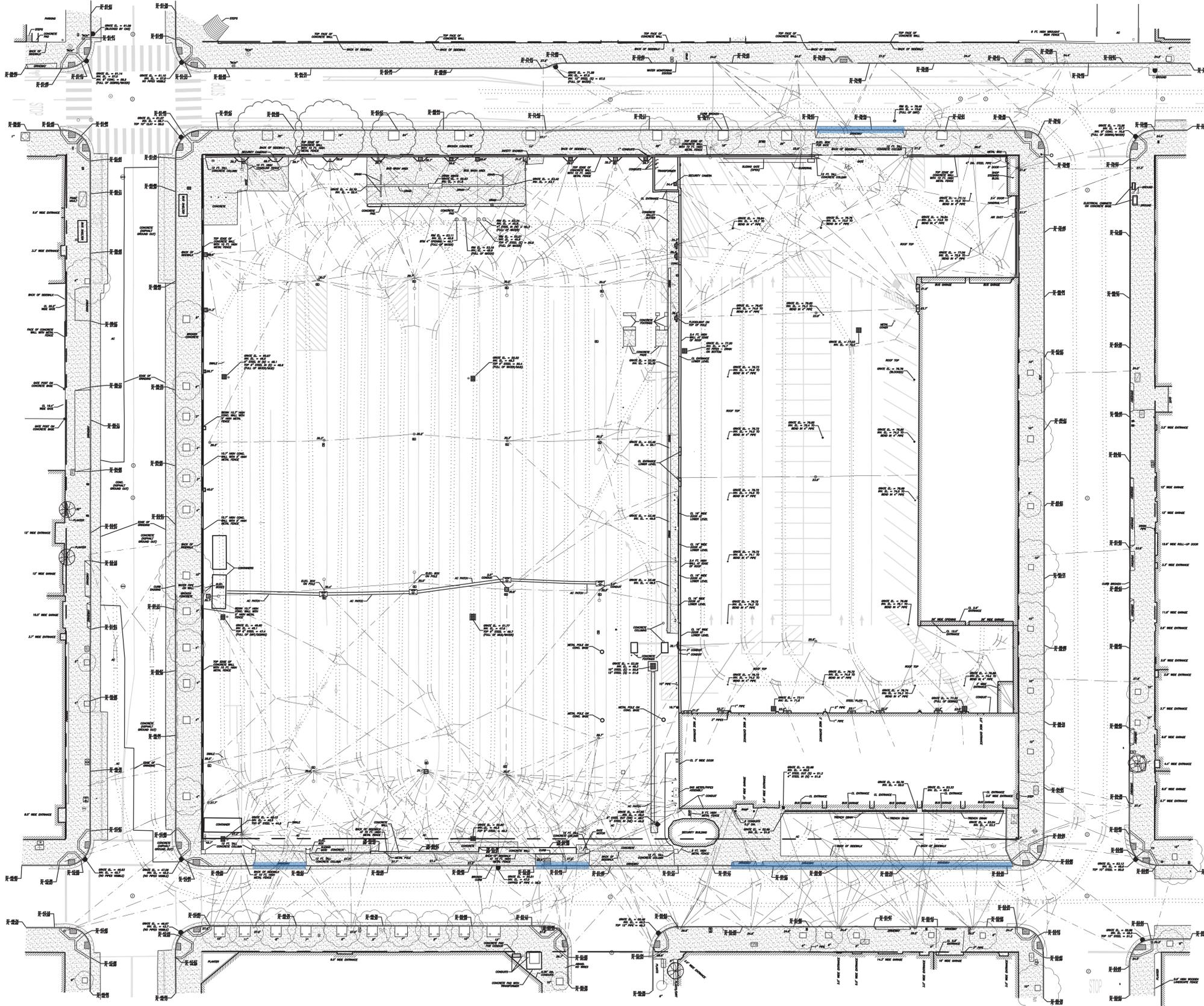
**GROUND LEVEL-  
1ST FLOOR OVERALL PLAN**



FILENAME SFMTA\_Potrero\_AR\_2018\_3  
 SCALE 1" = 30'  
 SHEET A-102

## 6. SITE SURVEY

# Site Survey/ Existing Site Plan



## LEGEND

- BENCH MARK
- ▲ SURVEY CONTROL POINT
- ⊞ BIKE RACK
- BOLLARD
- AREA DRAIN
- ⊞ CATCH BASIN
- ⊞ DRAIN
- CONDUIT
- ⊞ ELECTRIC VAULT
- ⊞ ELECTROLIER
- ⊞ FIRE ALARM BOX
- ⊞ FIRE HYDRANT
- ⊞ FLOOD LIGHT
- ⊞ HPFS HYDRANT
- ⊞ HPFS VALVE
- ▲ FIRE HYDR VALVE
- GAS VALVE
- GATE POST
- GUY POLE
- GUY WIRE
- ⊞ MUNI GUYPOLE
- ⊞ MUNI GUYPOLE+LIGHT
- ⊞ GROUND LIGHT
- ⊞ MAIL BOX
- ⊞ MAIL BOX RELAY
- ⊞ MH ELEC
- ⊞ MH HETCH HETCHY
- ⊞ MH SEWER
- ⊞ MH TELEPHONE
- ⊞ MH UNKNOWN
- ⊞ PG&E VAULT
- PIPE
- POWER POLE
- ⊞ POWER POLE WITH COBRA LIGHT
- ⊞ PULL BOX DTIS
- ⊞ PULL BOX UNKNOWN
- ⊞ PULL BOX CABLE TV
- ⊞ PULL BOX ELECTRIC
- ⊞ PULL BOX PG&E
- ⊞ PULL BOX SHELTER
- ⊞ PULL BOX STREET LIGHT
- ⊞ PULL BOX TELEPHONE
- ⊞ PULL BOX TV
- ⊞ PULL BOX WATER
- ⊞ SECURITY CAMERA
- ⊞ SEWER CLEAN OUT
- ⊞ SEWER
- SIGN POLE
- SIGN POLES
- STAND PIPE
- TELEPHONE POLE
- ⊞ TELEPHONE VAULT
- ⊞ TRASH CAN
- ⊞ UNKNOWN UTILITIES
- ⊞ WATER METER
- ⊞ WATER VALVE
- ⊞ TREE WITH DRIP LINE
- ⊞ TRUNCATED DOME

- MUNI OVERHEAD TRANSMISSION CABLES
- MUNI TENSION CABLES
- RIGHT OF WAY
- ⊞ CONCRETE
- ⊞ BRICK
- ⊞ BUILDING
- MAJOR CONTOUR
- MINOR CONTOUR

## ABBREVIATIONS

- AC = ASPHALT
- BW = BOTTOM OF WALL
- FL = FLOW LINE
- TC = TOP OF CURB
- TW = TOP OF WALL

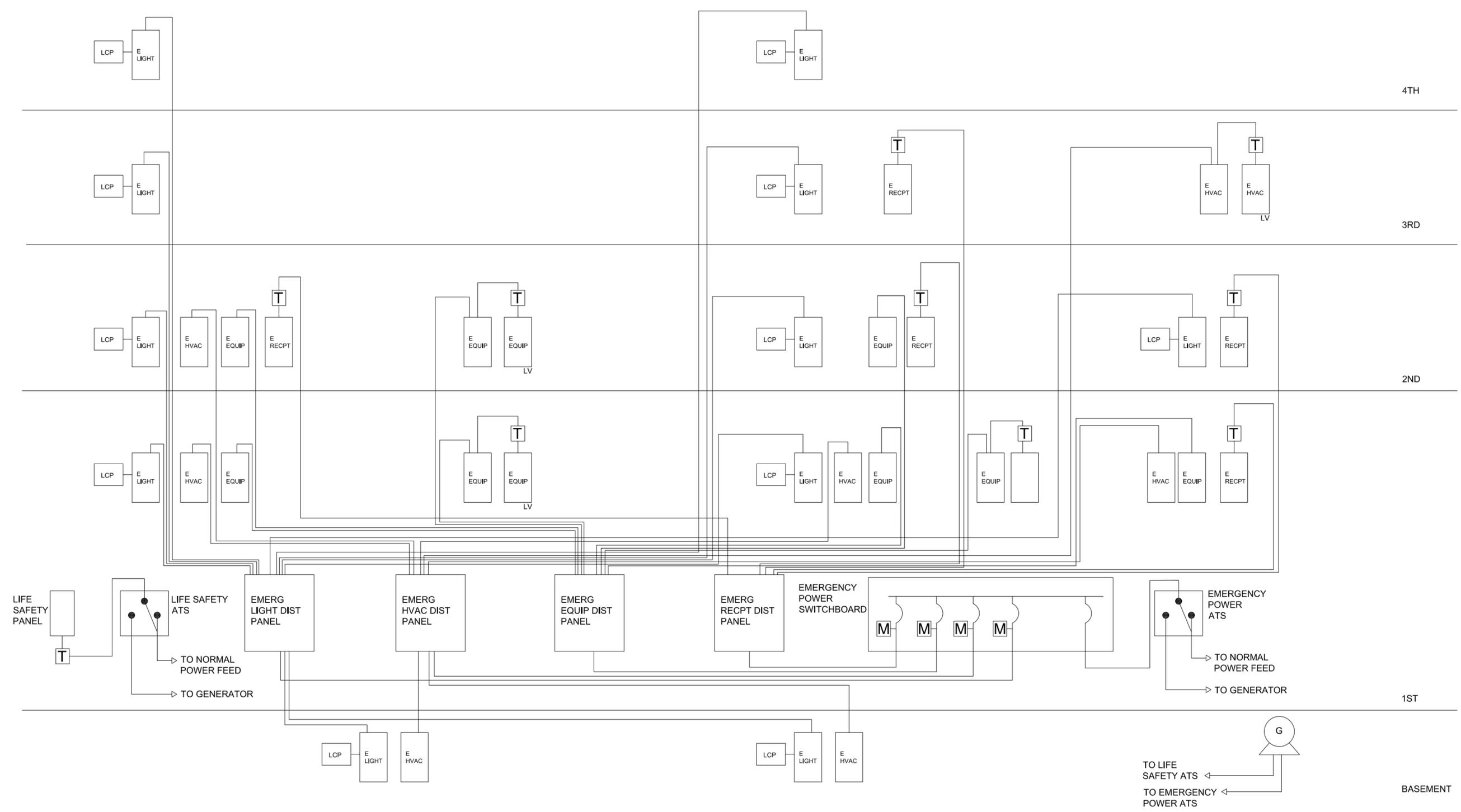
Prepared by	Bureau of Street Use and Mapping
Project Address	2500 Mariposa St, San Francisco, CA 94110
Date	11/20/2019
Scale	1"=30"
Sheet Number	02

Existing Curb Cuts

Site survey by Bureau of Street Use and Mapping San Francisco, City and County of San Francisco, 06/05/2017. Provided by SFMTA.



## 7. ELECTRICAL PLANS



C:\p\2018\SFMFTA\_Potrero\_AR\_2018\_3\_Level\_Central\_kashfi.kalam\F6FA\_06Apr2021\_075440.rvt  
4/6/2021 1:43:19 PM



ISSUE	DATE	DESCRIPTION
3	March 13, 2020	Submittal
2	June 14, 2019	Draft Submittal
1	February 20, 2019	Draft Submittal

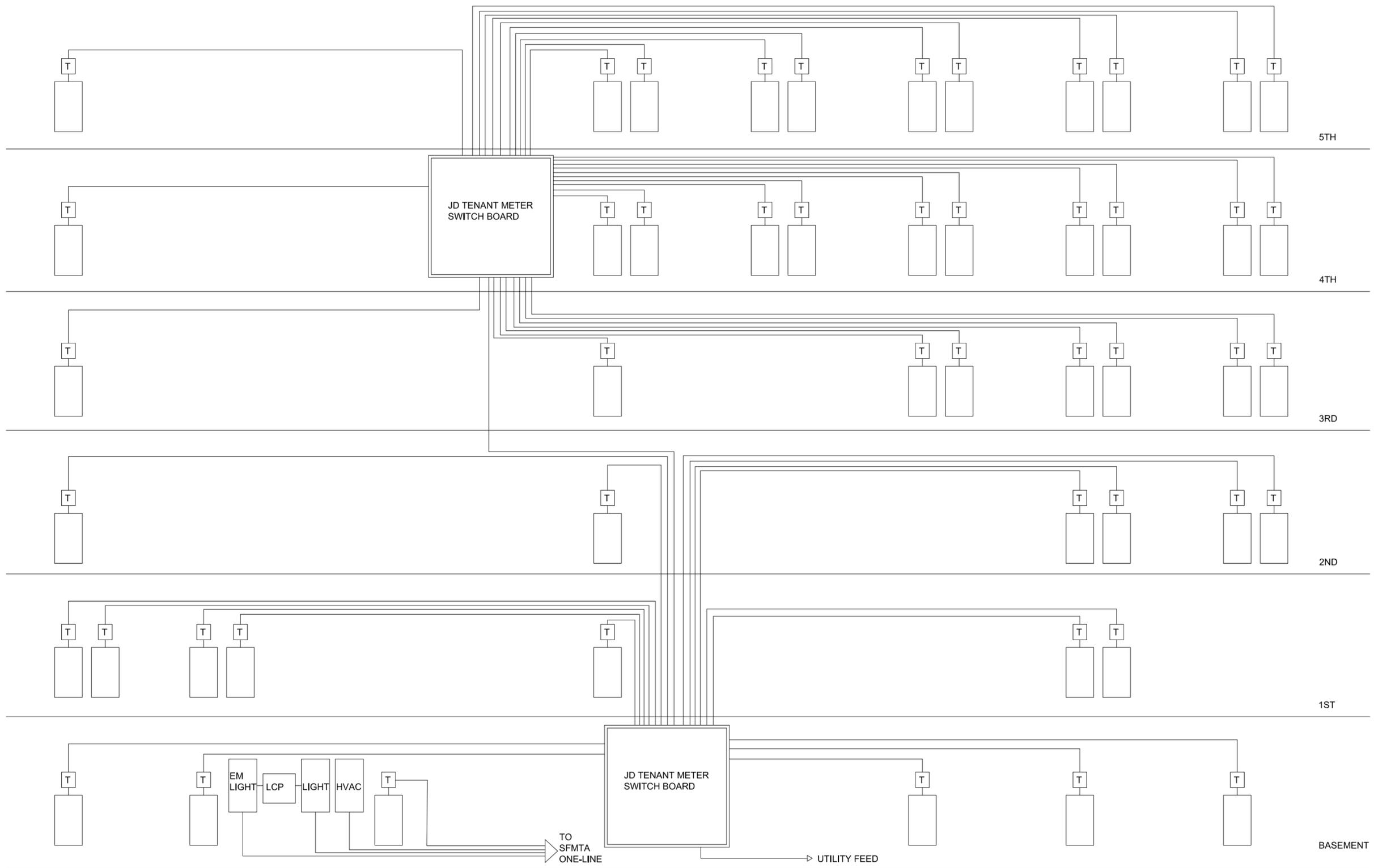
PROJECT MANAGER	
TEAM 1	Don Leidy
TEAM 2	Sheena Zimmerman
TEAM 3	Justin Kraegel
TEAM 4	Sara Jandaghi Jafari
TEAM 5	Jialing Sun
TEAM 6	Kashfi Kalam
TEAM 7	F. M. LAST
PROJECT NUMBER	10093201

**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

**SFMFTA POTRERO  
SCENARIO 2  
(3-LEVEL)**

**EMERGENCY POWER ONE LINE  
DIAGRAM- NTS**

FILENAME	SFMFTA_Potrero_AR_2018_3 Level	SHEET	AE-107
SCALE			



C:\p\2018\SFMTA\_Potrero\_AR\_2018\_3\_Level\_Central\_Kashfi.kalam\F6FA\_06Apr2021\_075440.rvt  
4/6/2021 1:43:20 PM



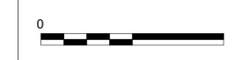
ISSUE	DATE	DESCRIPTION
3	March 13, 2020	Submittal
2	June 14, 2019	Draft Submittal
1	February 20, 2019	Draft Submittal

PROJECT MANAGER	
TEAM 1	Don Leidy
TEAM 2	Sheena Zimmerman
TEAM 3	Justin Kraegel
TEAM 4	Sara Jandaghi Jafari
TEAM 5	Jialing Sun
TEAM 6	Kashfi Kalam
TEAM 7	F. M. LAST
PROJECT NUMBER	
10093201	

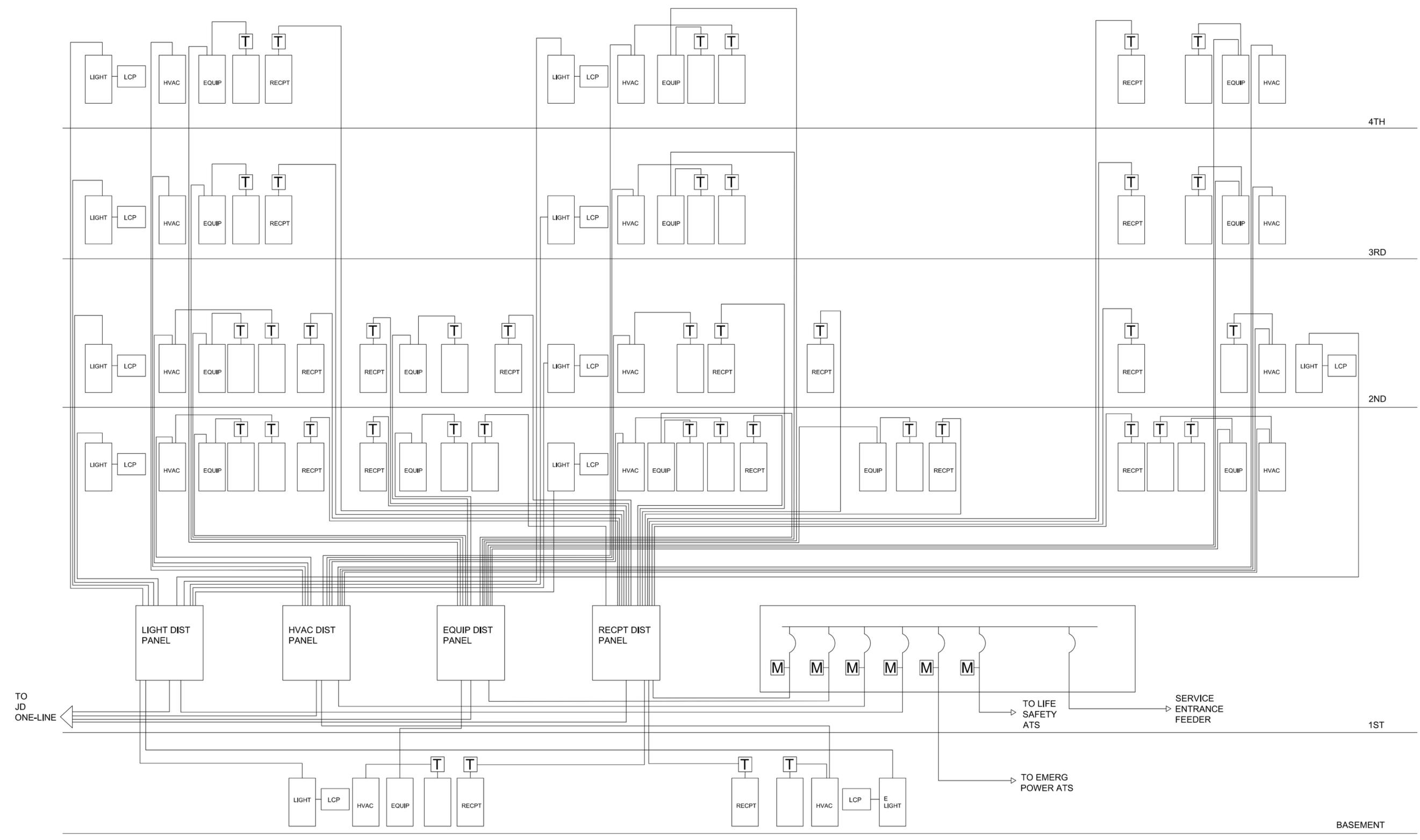
**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

**SFMTA POTRERO  
SCENARIO 2  
(3-LEVEL)**

**JOINT DEVELOPMENT ONE LINE  
DIAGRAM- NTS**



FILENAME SFMTA\_Potrero\_AR\_2018\_3 LevelC SHEET  
SCALE AE-108



C:\v\2018\SFMTA\_Potrero\_AR\_2018\_3\_Level\_Central\_kashfi.kalam\F6FA\_06Apr2021\_075440.rvt  
4/6/2021 1:43:20 PM



ISSUE	DATE	DESCRIPTION
3	March 13, 2020	Submittal
2	June 14, 2019	Draft Submittal
1	February 20, 2019	Draft Submittal

PROJECT MANAGER	
TEAM 1	Don Leidy
TEAM 2	Sheena Zimmerman
TEAM 3	Justin Kraegel
TEAM 4	Sara Jandaghi Jafari
TEAM 5	Jialing Sun
TEAM 6	Kashfi Kalam
TEAM 7	F. M. LAST
PROJECT NUMBER	10093201

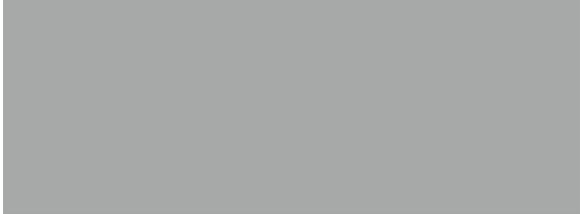
**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

**SFMTA POTRERO  
SCENARIO 2  
(3-LEVEL)**

**NORMAL POWER ONE LINE DIAGRAM-  
NTS**



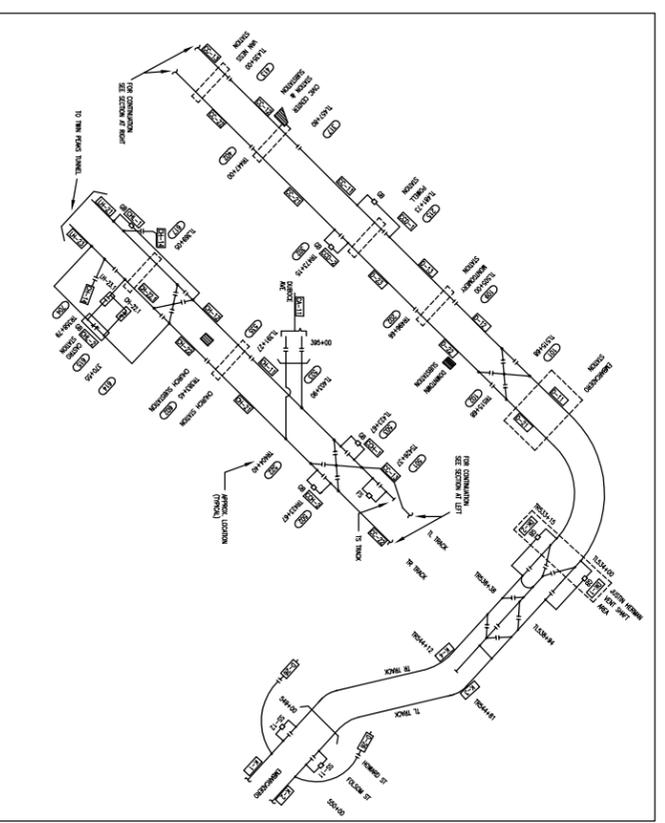
FILENAME	SFMTA_Potrero_AR_2018_3	SHEET	Level
SCALE			AE-109



APPENDIX D:  
TRACTION POWER FEEDER MAP



SYMBOLS	
	CONNECTION BETWEEN TROLLEY WIRES
	NO CONNECTION BETWEEN TROLLEY WIRES
	TROLLEY SECTION BREAK
	NO ELECTRICAL CONNECTION
	MANUAL SWITCH NUMBER
	SECTIONALIZING SWITCH NUMBER
	SECTIONALIZING BREAKER NUMBER
	TROLLEY SECTION BREAK WITH JUMPER
	GAP BREAKER
	CIRCUIT BREAKER NUMBER
	SURVEY STATION
	LOCATION SIGN
	FUTURE INSTALLATION



- NOTES:
1. ONLY POSITIVE WIRES ARE SECTIONALIZED. ALL NEGATIVE WIRES, CABLES AND RAILS ARE CONNECTED IN COMMON.
  2. FIGURES IN RECTANGLES THIS:
    - 0-11 INDICATES FEED FROM DOWNTOWN SUBSTATION, FDR. BRG. NO. 11
    - RM-2 INDICATES FEED FROM RICHMOND SUBSTATION, FDR. BRG. NO. 2

SUBSTATIONS		
CODE	NAME	LOCATIONS
B	BRYANT	2502 ALAMEDA, EAST OF BRYANT
BA	BALBOA	682 32nd AVE AT BALBOA
BE	BENAL (676-1085)	425 ANDOVER, SOUTH OF CORTLAND
CA	CARL	823 CLAYTON, NORTH OF CARL
CC	CIVIC CENTER	1150 MARKET, WEST OF CHURCH
CH	CHURCH	2120 MARKET, WEST OF CHURCH
D	DOWNTOWN	79 STINSON, EAST OF 2nd
E	STATION E	200 LENOX, AT 19th
F	FILLMORE	1825 FILLMORE, NORTH OF SUTTER
GP	GLEN PARK	100 RANDALL, AT MISSION OR SAN JOSE
I	ILINOS	555 ILINOS STREET AT WARDROCK ST
J	STATION J	520 SACRAMENTO, AT LEBESGOREFF
JU	JUDAH	2710 JUDAH, WEST OF 32nd AVE
K	KING	2 BERRY STREET, AT KING ST.
KE	KEITH	3400 KEITH ST. AT LE CONTE
LH	LAGUNA HONDA	375 LAGUNA HONDA, AT LAUNDRY BLDG.
M	MARINA	1575 NORTH POINT, EAST OF BUCHANAN
MI	MICHIGAN	M&E FACILITY BY 25th ST & MICHIGAN
N	STATION N	1437 - 9th AVE., SOUTH OF JUDAH
OM	OUTER MISSION	98 RUSSIA, AT LONDON
OW	OWEN	702 PHELPS ST AT HUDSON
PA	RANDOLPH	8 BYRSEE, NORTH OF RANDOLPH
RM	RICHMOND	435 - 8th AVE., SOUTH OF GEARY
SI	SAN JOSE	2200 SAN JOSE, AT OCEAN
T	TARVALE	3027 TARVALE, WEST OF 40th AVE.
WP	WEST PORTAL	145 LENOX, NORTH OF ULLA

IN EMERGENCY NOTIFY: POWER CONTROL CENTER 554-9204  
CENTRAL CONTROL 759-4431

CITY AND COUNTY OF SAN FRANCISCO  
PUBLIC TRANSPORTATION DEPARTMENT  
TRANSIT POWER FACILITIES

MUNICIPAL RAILWAY  
TROLLEY SECTIONS

REC. DATE	BY	REC. DATE	BY
JAN. 1979	J.M.W.	FEB. 1979	R.V. QUINN
APPROVED BY	A. O. OLSON	DATE	MARCH, 1979
PROJECT NO.	100-200-100	SCALE	AS SHOWN
PROJECT NO./SHEET NO.	100-200-100	PROJECT NO.	D-2200

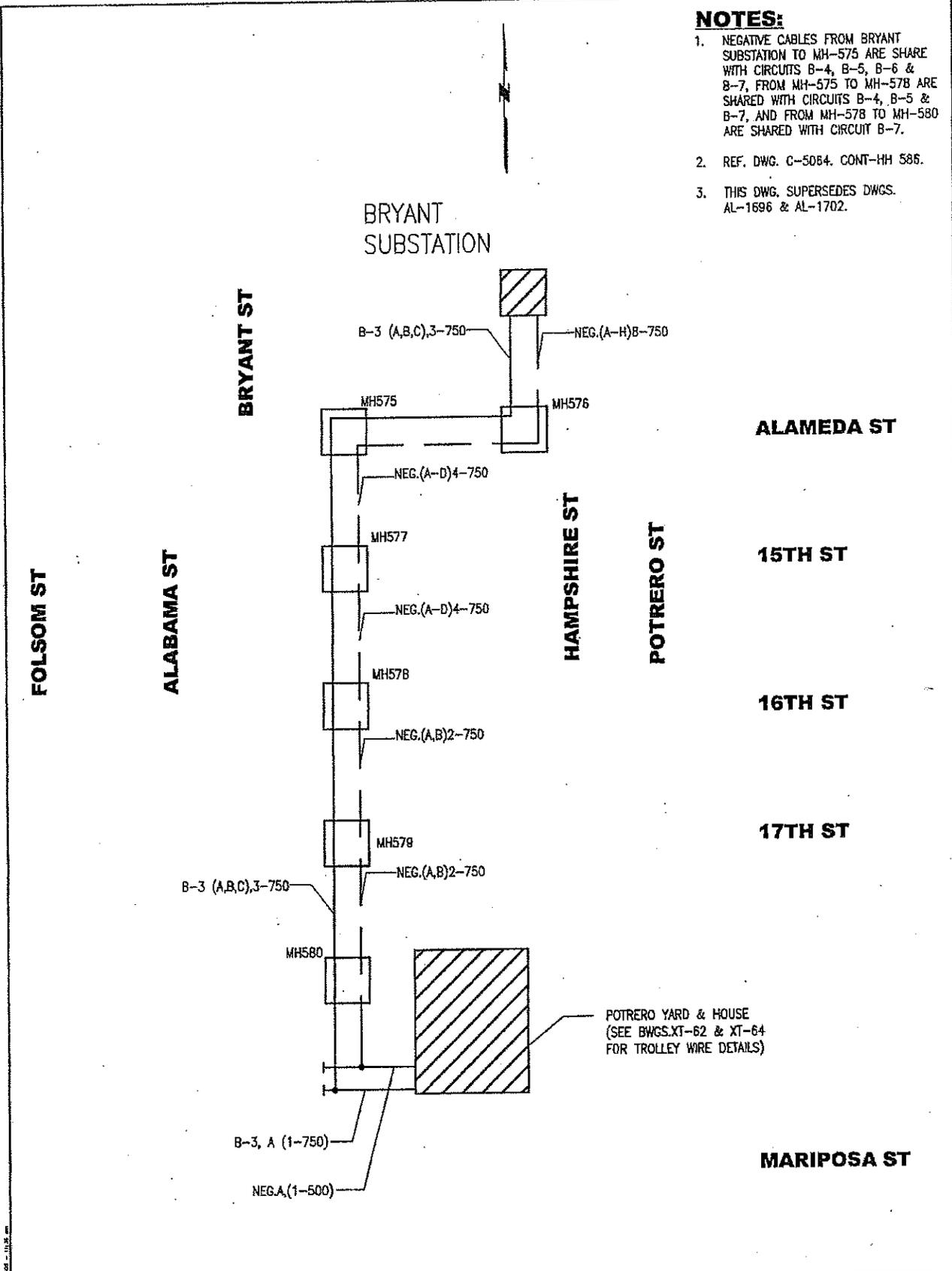
NO.	DATE	DESCRIPTION	REVISIONS	NO.	DATE	DESCRIPTION	REVISIONS
1	12-21-78	ISSUED FOR CONSTRUCTION	1	1	12-21-78	ISSUED FOR CONSTRUCTION	1
2	1-11-79	REVISIONS TO CORRECT FIELD ERRORS	2	2	1-11-79	REVISIONS TO CORRECT FIELD ERRORS	2
3	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	3	3	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	3
4	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	4	4	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	4
5	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	5	5	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	5
6	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	6	6	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	6
7	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	7	7	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	7
8	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	8	8	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	8
9	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	9	9	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	9
10	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	10	10	2-1-79	REVISIONS TO CORRECT FIELD ERRORS	10

# FEEDER B-3

<u>MANHOLE #</u>	<u>LOCATION</u>	<u>COMMENTS</u>
MH 576	IFO Bryant Substation	
MH 575	Alameda & Bryant	
MH 577	N/E 15th St. & Bryant	
MH 578	N/E 16th St. & Bryant	
MH 579	W/S Bryant S/O 17th St.	
MH 580	IFO Abbet Electric	

**NOTES:**

1. NEGATIVE CABLES FROM BRYANT SUBSTATION TO MH-575 ARE SHARED WITH CIRCUITS B-4, B-5, B-6 & B-7, FROM MH-575 TO MH-57B ARE SHARED WITH CIRCUITS B-4, B-5 & B-7, AND FROM MH-57B TO MH-580 ARE SHARED WITH CIRCUIT B-7.
2. REF. DWG. C-5064. CONT-HH 586.
3. THIS DWG. SUPERSEDES DWGS. AL-1696 & AL-1702.



CITY AND COUNTY OF SAN FRANCISCO  
**MUNICIPAL TRANSPORTATION AGENCY**

MUNICIPAL RAILWAY FEEDER DIAGRAM  
**FEEDER B-3**

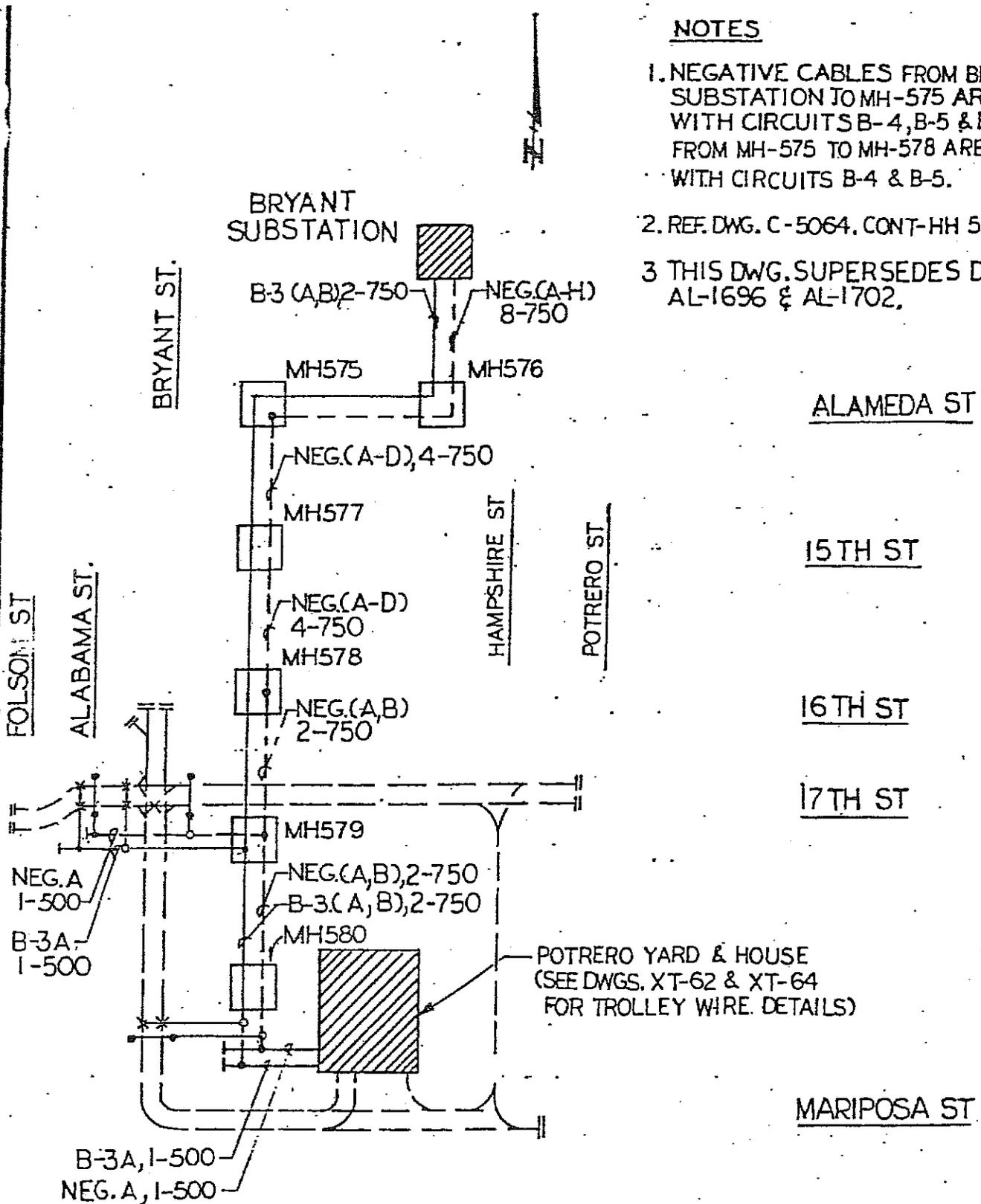
NO	DATE	DESCRIPTION	BY	CH	APPROV	DR	CH	APPROV	SCALE	DATE	LATEST REVISION	REVISION NO
REVISIONS												

**NOTES**

1. NEGATIVE CABLES FROM BRYANT SUBSTATION TO MH-575 ARE SHARED WITH CIRCUITS B-4, B-5 & B-6, AND FROM MH-575 TO MH-578 ARE SHARED WITH CIRCUITS B-4 & B-5.

2. REF. DWG. C-5064, CONT-HH 586.

3 THIS DWG. SUPERSEDES DWGS. AL-1696 & AL-1702.



CITY AND COUNTY OF SAN FRANCISCO

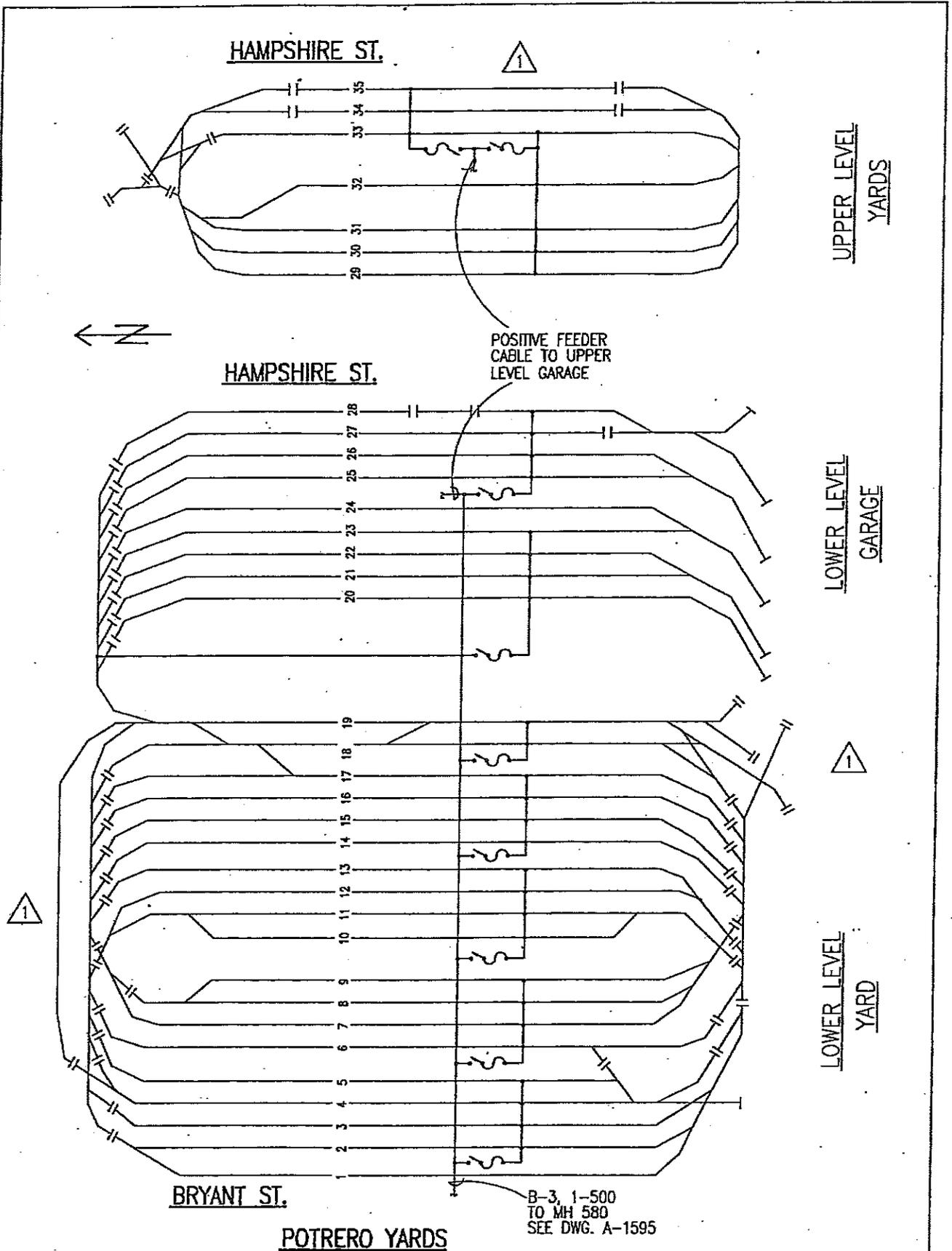
PUBLIC UTILITIES COMMISSION

HETCH HETCHY WATER AND POWER

MUNICIPAL RAILWAY FEEDER DIAGRAM

FEEDER B-3

BY TBQ	TR.	APPROVED <i>[Signature]</i>	SCALE NONE	DATE AUG. 1980	LATEST REVISION
DR.	CH.	APPROVED	APPROVED	DRAWING NO.	REVISION NO.



**NOTE:**

1. THIS DWG. SUPERSEDES  
DWG. AL-1702

CITY AND COUNTY OF SAN FRANCISCO											
HETCH HETCHY WATER AND POWER											
TRANSIT POWER DIVISION											
<b>FEEDER B-3 (YARD)</b>											
NO.	DATE	DESCRIPTION	BY	APPRD.	CHK.	DATE	SCALE	LATEST REVISION	REVISION NO.		
1	JAN/95	ADDED MORE LANES	AZ	CJM	RK	APR. 83					

Mar 7 07: 15...





APPENDIX E:  
SAMPLE ROUTE SCHEDULES



**SEE PAGE 9 FOR 30 LINE THAT NEED TO PULL OUT FROM PRESIDIO**  
**SEE PAGE 10 FOR 6 & 22 LINE THAT NEED TO PULL OUT FROM PRESIDIO**

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018

FOR \_\_\_\_\_ 20\_\_\_\_

DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT

SERVICE : WEEKDAY

AND COACH MILEAGE RECORD

PAGE 1 OF 10

C O U N T	TRAIN	HOLD	T Y P E	P A N D S O	PULL OUT	PULL IN	CAR COACH	T B R E A K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
104	1401		TC60		356A	128X			301		A			
103	501		TC60		419A	1259X			304		B			
102	1402		TC60		426A	1058P			306		C			
101	1403		TC60		436A	628P			308		D			
100	502		TC60		439A	948P			309		E			
99	2201		ET40		440A	755P			310		A			
98	1404		TC60		441A	1010P			311		F			
97	1405		TC60		447A	822P			313		G			
96	503		TC60		450A	1041P			314		H			
95	2202		ET40		453A	810P			315		B			
94	1406		TC60		456A	1013P			318		I			
93	504		TC60		456A	834P			319		J			
92	1407		TC60		503A	1046P			321		I			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : WEEKDAY

PAGE 2 OF 10

C O U N T	TRAIN	HOLD	T Y P E	P A N D S O	PULL OUT	PULL IN	CAR COACH	T B R E A K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
91	2203		ET40		506A	825P			322		C			
90	601		ET40		508A	811P			317		D			
89	1408		TC60		509A	213X			323		J			
88	3021		TC60		511A	707P			326		A			
87	3301		ET40		515A	743P			327		E			
86	1409		TC60		516A	151X			328		B			
85	1410		TC60		517A	746P			330		C			
84	505		TC60		517A	853P			329		D			
83	2204		ET40		518A	840P			332		F			
82	3009		ET40		518A	837P			331		G			
81	1411		TC60		521A	1034P			334		E			
80	602		ET40		522A	722P			324		H			
79	1412		TC60		524A	846P			335		F			
78	2205		ET40		530A	1032P			336		I			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : WEEKDAY

PAGE 3 OF 10

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
77	603		ET40		534A	737P			333		J			
76	3302		ET40		535A	110X			338		A			
75	1413		TC60		536A	254X			339		G			
74	506		TC60		538A	905P			340		H			
73	2206		ET40		542A	718P			342		B			
72	3022		TC60		542A	753P			343		I			
71	507		TC60		545A	923P			345		J			
70	3304		ET40		546A	1250X			346		C			
69	604		ET40		546A	1101A			337		D			
68	3303		ET40		550A	140X			347		E			
67	1414		TC60		551A	806P			348		A			
66	2207		ET40		551A	918P			350		F			
65	605		ET40		551A	105X			341		G			
64	2208		ET40		557A	910P			352		H			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : WEEKDAY

PAGE 4 OF 10

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
63	606		ET40		557A	136X			344		I			
62	2209		ET40		600A	933P			354		J			
61	2210		ET40		603A	741P			356		A			
60	3306		ET40		603A	1014P			357		B			
59	508		TC60		603A	1133P			355		B			
58	3305		ET40		606A	120X			359		C			
57	509		TC60		606A	750P			360		C			
56	607		ET40		609A	847P			351		D			
55	3023		TC60		613A	650P			362		D			
54	608		ET40		618A	115X			358		E			
53	3012		ET40		622A	807P			363		F			
52	2211		ET40		623A	115X			365		G			
51	510		TC60		623A	957P			364		E			
50	609		ET40		624A	135X			361		H			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : WEEKDAY

PAGE 5 OF 10

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
49	511		TC60		625A	118X			366		F			
48	1415		TC60		626A	1046A			367		G			
47	512		TC60		631A	1015P			369		H			
46	1416		TC60		634A	809P			370		I			
45	3307		ET40		636A	1111P			372		I			
44	2212		ET40		639A	1134P			373		J			
43	513		TC60		639A	910P			374		J			
42	2213		ET40		640A	1155P			375		A			
41	3024		TC60		641A	701P			376		A			
40	610		ET40		641A	854P			368		B			
39	514		TC60		646A	129X			377		B			
38	2214		ET40		654A	810P			378		C			
37	515		TC60		656A	1030P			380		C			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : WEEKDAY

PAGE 6 OF 10

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
36	3025		TC60		704A	725P			381		D			
35	3014		TC60		706A	655P			382		E			
34	1417		TC60		707A	836P			383		F			
33	611		ET40		708A	1235X			379		D			
32	2215		ET40		710A	646P			384		E			
31	516		TC60		717A	1053P			385		G			
30	2216		ET40		718A	1223X			386		F			
29	3309		ET40		725A	754P			387		G			
28	3308		ET40		735A	703P			388		H			
27	3026		TC60		739A	759P			390		H			
26	2217		ET40		740A	1023A			501		I			
25	612		ET40		748A	949P			389		J			
24	1418		TC60		803A	929P			391		I			
23	3015		TC60		842A	719P			392		J			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : WEEKDAY

PAGE 7 OF 10

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
22	3016		TC60		859A	736P			393		A			
21	3017		TC60		907A	741P			394		B			
20	3018		TC60		934A	804P			395		C			
19	3019		TC60		939A	644P			396		D			
18	1431		TC60		139P	240X			375		E			
17	2252		ET40		158P	656P			386		B			
16	551		TC60		157P	743P			398		F			
15	1432		TC60		225P	1231X			373		G			
14	2253		ET40		235P	730P			371		B			
13	552		TC60		249P	837P			364		H			
12	1433		TC60		251P	750P			399		I			
11	553		TC60		328P	720P			389		J			
10	554		TC60		348P	810P			397		A			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : WEEKDAY

PAGE 8 OF 10

C O U N T	TRAIN	HOLD	T Y P E	P A N D S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
9	2291		ET40		858P	506X			486		C			
8	591		ET40		904P	527X			487		D			
7	1491		ET40		910P	608X			488		E			
6	2292		ET40		913P	536X			489		F			
5	1492		ET40		921P	554X			490		G			
4	592		ET40		924P	557X			491		H			
3	1494		ET40		949P	524X			492		I			
2	1493		ET40		950P	538X			493		J			
1	2293		ET40		1013P	606X			494		A			

PULL OUT FROM PRE

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018	FOR	_____	20
	DAY	_____	DATE

DIVISION: POT/PRE

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : WEEKDAY

PAGE 9 OF 10

C O U N T	TRAIN	HOLD	T Y P E	P A N D S O	PULL OUT	PULL IN	CAR COACH	T B R E A K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
14	3001		ET40		408A	747P			302		A			
13	3002		ET40		418A	111X			303		B			
12	3003		ET40		425A	131X			305		C			
11	3004		ET40		434A	151X			307		D			
10	3005		ET40		444A	929P			312		E			
9	3006		ET40		454A	211X			316		F			
8	3007		ET40		502A	730P			320		G			
7	3008		ET40		510A	1009P			325		H			
6	3010		ET40		551A	855P			349		I			
5	3011		ET40		600A	713P			353		J			
4	3013		ET40		635A	116X			371		A			

PULL OUT FROM PRE

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018
-----------------------

FOR \_\_\_\_\_ 20\_\_\_\_  
 DAY DATE

DIVISION: POT/PRE

COACH ASSIGNMENT, OPERATOR REPORT  
 AND COACH MILEAGE RECORD

SERVICE : WEEKDAY

PAGE 9 OF 10

C O U N T	TRAIN	HOLD	T Y P E	P A N D S O	PULL OUT	PULL IN	CAR COACH	T B R E A K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
3	2251		ET40		156P	1000P			444		B			
2	651		ET40		226P	717P			394		C			
1	652		ET40		343P	821P			411		D			

**SEE PAGE 7 FOR 30 LINE THAT NEED TO PULL OUT FROM PRESIDIO**

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018	FOR	_____	20____
		DAY	DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SATURDAY

PAGE 1 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
81	501		TC60		418A	108X			311		K			
80	502		TC60		438A	822P			314		L			
79	1401		TC60		442A	1014P			313		M			
78	3001		ET40		447A	754P			312		K			
77	2201		ET40		454A	1031P			315		L			
76	503		TC60		457A	922P			325		N			
75	504		TC60		458A	1031P			316		O			
74	1402		TC60		459A	115X			326		P			
73	1403		TC60		507A	601P			323		Q			
72	601		ET40		507A	1242X			317		M			
71	2202		ET40		514A	725P			322		N			
70	3301		ET40		516A	1111P			329		O			
69	505		TC60		516A	1046P			353		R			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SATURDAY

PAGE 2 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
68	1405		TC60		521A	1022P			332		K			
67	1404		TC60		523A	1242X			335		L			
66	602		ET40		525A	134X			328		P			
65	2203		ET40		534A	923P			336		Q			
64	1406		TC60		537A	946P			337		M			
63	603		ET40		545A	716P			333		R			
62	3302		ET40		546A	853P			339		K			
61	3303		ET40		546A	148X			341		L			
60	2204		ET40		551A	116X			343		M			
59	1407		TC60		601A	807P			346		N			
58	1408		TC60		601A	706P			347		O			
57	604		ET40		604A	137X			342		N			
56	2205		ET40		606A	823P			350		O			
55	506		TC60		612A	123X			354		P			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SATURDAY

PAGE 3 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
54	1409		TC60		620A	202X			351		Q			
53	605		ET40		624A	1257X			352		P			
52	507		TC60		634A	714P			359		R			
51	2206		ET40		635A	658P			360		Q			
50	508		TC60		655A	1103P			344		K			
49	1410		TC60		658A	1122P			361		L			
48	607		ET40		707A	117X			357		R			
47	510		TC60		713A	804P			363		M			
46	2207		ET40		716A	757P			368		K			
45	606		ET40		726A	949P			367		L			
44	1411		TC60		729A	732P			370		N			
43	3008		ET40		730A	941P			369		M			
42	509		TC60		733A	1022P			375		O			
41	511		TC60		738A	135X			373		P			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SATURDAY

PAGE 4 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
40	3304		ET40		744A	1255X			371		N			
39	2208		ET40		751A	1023P			372		O			
38	3013		TC60		818A	700P			382		Q			
37	3010		ET40		819A	710P			384		P			
36	608		ET40		819A	729P			381		Q			
35	2209		ET40		823A	908P			380		R			
34	1412		TC60		825A	937P			391		R			
33	3015		TC60		832A	708P			394		K			
32	3017		TC60		841A	717P			395		L			
31	512		TC60		841A	734P			392		M			
30	3019		TC60		847A	734P			396		N			
29	3014		TC60		853A	615P			397		O			
28	2210		ET40		854A	1133P			399		K			
27	3016		TC60		903A	624P			398		P			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SATURDAY

PAGE 5 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
26	3018		TC60		913A	633P			400		Q			
25	3020		TC60		923A	642P			403		R			
24	2211		ET40		924A	611P			406		L			
23	1413		TC60		927A	227X			376		K			
22	3305		ET40		927A	1013P			407		M			
21	3021		TC60		933A	651P			408		L			
20	609		ET40		937A	750P			405		N			
19	3306		ET40		943A	121X			404		O			
18	610		ET40		950A	749P			411		P			
17	513		TC60		953A	853P			414		M			
16	1414		TC60		955A	150X			410		N			
15	1415		TC60		1003A	255X			416		O			
14	3022		TC60		1006A	725P			420		P			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SATURDAY

PAGE 6 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
13	2212		ET40		1013A	1227X			417		Q			
12	3307		ET40		1023A	119X			422		R			
11	3023		ET40		1111A	152X			361		K			
10	2213		ET40		1131A	1159P			347		L			
9	1491		ET40		839P	539X			488		M			
8	2291		ET40		859P	507X			486		N			
7	591		ET40		901P	534X			487		O			
6	1492		ET40		907P	527X			490		P			
5	2292		ET40		914P	537X			489		Q			
4	1493		ET40		915P	609X			492		R			
3	592		ET40		921P	604X			491		K			
2	1494		ET40		943P	557X			493		L			
1	2293		ET40		1014P	607X			494		M			

# 30 LINE THAT NEED TO PULL OUT FROM PRESIDIO

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018

FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POT/PRE

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

PAGE 7 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
9	3002		ET40		504A	617P			320		K			
8	3003		ET40		524A	1049P			334		L			
7	3004		ET40		541A	904P			348		M			
6	3005		ET40		630A	915P			356		N			
5	3006		ET40		705A	728P			364		O			
4	3007		ET40		715A	132X			365		P			
3	3009		ET40		749A	212X			378		Q			
2	3011		ET40		840A	113X			393		R			
1	3012		ET40		921A	811P			402		K			

**SEE PAGE 7 FOR 30 LINE THAT NEED TO PULL OUT FROM PRESIDIO**

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018	FOR	_____	_____	20____
		DAY	DATE	

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SUNDAY

PAGE 1 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
81	501		TC60		418A	108X			311		S			
80	502		TC60		438A	822P			314		T			
79	1401		TC60		442A	1014P			313		U			
78	3001		ET40		447A	754P			312		S			
77	2201		ET40		454A	1031P			315		T			
76	503		TC60		457A	922P			325		V			
75	504		TC60		458A	1031P			316		W			
74	1402		TC60		459A	115X			326		X			
73	1403		TC60		507A	601P			323		Y			
72	601		ET40		507A	1242X			317		U			
71	2202		ET40		514A	725P			322		V			
70	3301		ET40		516A	1111P			329		W			
69	505		TC60		516A	1046P			353		Z			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SUNDAY

PAGE 2 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
68	1405		TC60		521A	1022P			332		S			
67	1404		TC60		523A	1242X			335		T			
66	602		ET40		525A	134X			328		X			
65	2203		ET40		534A	923P			336		Y			
64	1406		TC60		537A	946P			337		U			
63	603		ET40		545A	716P			333		Z			
62	3302		ET40		546A	853P			339		S			
61	3303		ET40		546A	148X			341		T			
60	2204		ET40		551A	116X			343		U			
59	1407		TC60		601A	807P			346		V			
58	1408		TC60		601A	706P			347		W			
57	604		ET40		604A	137X			342		V			
56	2205		ET40		606A	823P			350		W			
55	506		TC60		612A	123X			354		X			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018

FOR

DAY

DATE

20

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SUNDAY

PAGE 3 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
54	1409		TC60		620A	202X			351		Y			
53	605		ET40		624A	1257X			352		X			
52	507		TC60		634A	714P			359		Z			
51	2206		ET40		635A	658P			360		Y			
50	508		TC60		655A	1103P			344		S			
49	1410		TC60		658A	1122P			361		T			
48	607		ET40		707A	117X			357		Z			
47	510		TC60		713A	804P			363		U			
46	2207		ET40		716A	757P			368		S			
45	606		ET40		726A	949P			367		T			
44	1411		TC60		729A	732P			370		V			
43	3008		ET40		730A	941P			369		U			
42	509		TC60		733A	1022P			375		W			
41	511		TC60		738A	135X			373		X			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SUNDAY

PAGE 4 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
40	3304		ET40		744A	1255X			371		V			
39	2208		ET40		751A	1023P			372		W			
38	3013		TC60		818A	700P			382		Y			
37	3010		ET40		819A	710P			384		X			
36	608		ET40		819A	729P			381		Y			
35	2209		ET40		823A	908P			380		Z			
34	1412		TC60		825A	937P			391		Z			
33	3015		TC60		832A	708P			394		S			
32	3017		TC60		841A	717P			395		T			
31	512		TC60		841A	734P			392		U			
30	3019		TC60		847A	734P			396		V			
29	3014		TC60		853A	615P			397		W			
28	2210		ET40		854A	1133P			399		S			
27	3016		TC60		903A	624P			398		X			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018 FOR \_\_\_\_\_ 20\_\_\_\_\_  
DAY DATE

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SUNDAY

PAGE 5 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D T S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
26	3018		TC60		913A	633P			400		Y			
25	3020		TC60		923A	642P			403		Z			
24	2211		ET40		924A	611P			406		T			
23	1413		TC60		927A	227X			376		S			
22	3305		ET40		927A	1013P			407		U			
21	3021		TC60		933A	651P			408		T			
20	609		ET40		937A	750P			405		V			
19	3306		ET40		943A	121X			404		W			
18	610		ET40		950A	749P			411		X			
17	513		TC60		953A	853P			414		U			
16	1414		TC60		955A	150X			410		V			
15	1415		TC60		1003A	255X			416		W			
14	3022		TC60		1006A	725P			420		X			

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018

FOR

DAY

DATE

20

DIVISION: POTRERO

COACH ASSIGNMENT, OPERATOR REPORT  
AND COACH MILEAGE RECORD

SERVICE : SUNDAY

PAGE 6 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D S O	PULL OUT	PULL IN	CAR COACH	T B R E A R C T K H	RUN NUM	OPERATOR REPORT	CODE ACS	VEH MILE EXCP	LPO	EPI
13	2212		ET40		1013A	1227X			417		Y			
12	3307		ET40		1023A	119X			422		Z			
11	3023		ET40		1111A	152X			361		S			
10	2213		ET40		1131A	1159P			347		T			
9	1491		ET40		839P	539X			488		U			
8	2291		ET40		859P	507X			486		V			
7	591		ET40		901P	534X			487		W			
6	1492		ET40		907P	527X			490		X			
5	2292		ET40		914P	537X			489		Y			
4	1493		ET40		915P	609X			492		Z			
3	592		ET40		921P	604X			491		S			
2	1494		ET40		943P	557X			493		T			
1	2293		ET40		1014P	607X			494		U			

# 30 LINE THAT NEED TO PULL OUT FROM PRESIDIO

SIGNUP : 2018 SPRING

EFFECTIVE: 02-24-2018	FOR _____	20____
	DAY	DATE

DIVISION: POT/PRE

## COACH ASSIGNMENT, OPERATOR REPORT AND COACH MILEAGE RECORD

SERVICE : SUNDAY

PAGE 7 OF 7

C O U N T	TRAIN	HOLD	T Y P E	P A N D S O	PULL OUT	PULL IN	CAR COACH	T B R E A K H	R U N N U M	O P E R A T O R R E P O R T	C O D E A C S	V E H I C L E E X C E P T	L P O	E P I
9	3002		ET40		504A	617P			320		S			
8	3003		ET40		524A	1049P			334		T			
7	3004		ET40		541A	904P			348		U			
6	3005		ET40		630A	915P			356		V			
5	3006		ET40		705A	728P			364		W			
4	3007		ET40		715A	132X			365		X			
3	3009		ET40		749A	212X			378		Y			
2	3011		ET40		840A	113X			393		Z			
1	3012		ET40		921A	811P			402		S			



APPENDIX F:  
SECURITY SENSITIVE INFORMATION  
PROCESS REGARDING TRACTION POWER  
STANDARD SPECIFICATIONS



**SFMTA POTRERO YARD MODERNIZATION PROJECT**  
**SENSITIVE SECURITY INFORMATION CONFIDENTIALITY**  
**AND NONDISCLOSURE AGREEMENT**

**RECITALS**

- A.** On November 2, 2022, the City and County of San Francisco, through its Municipal Transportation Agency (SFMTA), and Potrero Neighborhood Collective LLC, a limited liability company organized under the laws of the State of Delaware (Lead Developer) entered into an agreement for predevelopment services (Predevelopment Agreement) for the SFMTA Potrero Yard Modernization Project (Project).
- B.** The Project is a joint development project that includes the design, construction, financing, operation, and maintenance of an infrastructure facility to be comprised of at a transit facility for the SFMTA's fleet of electric trolley buses (Bus Yard Component) and common infrastructure to be shared by the Bus Yard Component and a housing and commercial component or other use.
- C.** The SFMTA wishes to share with Lead Developer certain drawings and specifications related to the SFMTA's traction power system and related design elements, which are marked as "Sensitive Security Information" or "SSI Documents" are confidential and protected from public disclosure under federal law. See 49 CFR Parts 15 and 1520; Lead Developer requires these SSI Documents for design work on the Project's Bus Yard Component.
- D.** The disclosure of SSI Documents to unauthorized persons is a violation of federal law, may cause irreparable damage to the SFMTA, and may threaten or compromise the security of the traveling public, transit employees, or transit infrastructure.
- E.** SFMTA will make available SSI Documents in connection with the Project to Lead Developer (SSI Recipient), subject to the following terms and conditions.

**AGREEMENT**

- 1. Acknowledgment.** By signing this Agreement, SSI Recipient acknowledges that the disclosure to the public of any documents denoted as SSI would cause security risks that may cause irreparable damage to the SFMTA, and may threaten or compromise the security of the traveling public, transit employees, or transit infrastructure. The SFMTA will make the following SSI Documents available to the SSI Recipient:
  - 1. Sample construction specification 16121 – Traction Power Cable, August 2023
  - 2. Sample construction specification 16180 – DC Trolley Switch and Catenary Detection, August 2023
  - 3. Sample construction specification 16312 – Traction Power Substation, August 2023
  - 4. Sample construction specification 16790 – Traction Power SCADA System, August 2023
  - 5. Central Subway Chinatown Station Drawings, dual feed traction power substation, 2012
  - 6. King Substation Upgrade Drawings, single feed traction power substation, 2017
  - 7. King Substation Upgrade construction specifications, traction power substation upgrade, 2017
  - 8. King Substation Upgrade, surge arrest final design, 2022

- 2. Agreements.** By signing this Agreement, SSI Recipient agrees to the following:
- 2.1. Non-Disclosure of SSI Documents.** SSI Recipient shall not disclose to any person or firm any SSI Document without the prior express written consent of the SFMTA, which consent shall be by Kerstin Magary, Section Director, CSO Facilities and Real Property Manager or her designee, and without such person or firm executing a Confidentiality and Nondisclosure Agreement attached as Exhibit A to this Agreement.
  - 2.2. Use of SSI Documents.** SSI Recipient shall use SSI Documents provided by the SFMTA only for the following purpose: to assess whether they are applicable to be incorporated into the Project's bus yard infrastructure, and if so, to then incorporate them into the design of the Bus Yard Component.
  - 2.3. Reproduction and Cover/Removal of Markings Prohibited.** SSI Recipient shall not copy or otherwise reproduce SSI Documents without express written authorization from the SFMTA. SSI Recipient shall not cover, remove or otherwise hide from display markings identifying SSI Documents as Sensitive Security Information.
  - 2.4. Safeguards Against Unauthorized Disclosure of SSI.** With respect to SSI, SSI Recipient shall implement the following safeguards and procedures to prevent the unauthorized disclosure of SSI. SSI Recipient shall designate a responsible managing employee or responsible managing officer as its Sensitive Security Information Handler (SSIH), who shall ensure that all safeguards are maintained, including the following:
    - (a)** Ensuring that the SSI Documents are properly marked as required under federal law.
    - (b)** Providing authorized employees and consultants adequate instructions with regard to the use and disclosure of SSI, including obtaining the employees' signed Confidentiality and Nondisclosure Agreement forms (Exhibit A).
    - (c)** Implementing safeguards to restrict copies and reproductions of SSI in any form, including, but not limited to, paper copies and electronically formatted copies. SSI Recipient's SSIH shall authorize copies of portions of SSI only on a need-to-know basis, as determined by SFMTA, and shall retrieve all such copies upon completion of the task for which they were required. Copies and reproductions of SSI shall not be made for or retained for distribution to any third party unless the third party has complied with the requirements of Section 2.1. SSI Recipient shall identify each copy of SSI released by copy number and maintain a record of all copies of SSI released to employees and third parties on the Log of Copies of SSI provided as Exhibit B.
- 3. SSI Documents Taken Off SFMTA Premises.** If the SFMTA provides SSI Recipient copies of SSI Documents and allows said documents to be removed from SFMTA premises, the SSI Recipient shall maintain said documents in a secure location and shall use them only for the purposes described in this Agreement. Upon request of the SFMTA, SSI Recipient shall certify that all SSI Documents have been returned to the SFMTA or destroyed by shredding.
- 4. Unauthorized Disclosure or Loss of SSI Documents.** SSI Recipient agrees that if at any time he/she misplaces or loses control over SSI Documents in his/her custody or inadvertently provides access to persons or parties not authorized by the SFMTA to receive SSI Documents, the SSI Recipient shall notify the SFMTA immediately (i.e., no later than 24 hours) upon discovery that an unauthorized disclosure or loss of control of SSI Documents has occurred. Such notice shall be given orally and in writing, and shall provide all details that are available regarding the event. The oral notices shall be given by telephone to

Kerstin Magary at (415) 608-3004. The written notices shall be mailed to Kerstin Magary at the SFMTA address listed in paragraph 10, below. The SFMTA will investigate the facts underlying SSI Recipient's disclosure or loss of control over SSI Documents. In the event that the SFMTA determines that such unauthorized disclosure or loss of control constituted an unauthorized disclosure or improper use of SSI Documents by SSI Recipient, the SFMTA may pursue remedies as set forth in Section 6.

5. **Ownership of Sensitive Security Information.** Recipient agrees that all SSI Documents provided to the SSI Recipient will at all times remain the property of the SFMTA, which retains all rights to them.
6. **SFMTA Remedies.** SSI Recipient acknowledges that the unauthorized disclosure or improper use of SSI Documents by Recipient may cause irreparable harm to the SFMTA and the public. The SFMTA retains all of its legal rights and remedies to enforce this Agreement. Furthermore, SSI Recipient acknowledges that the SFMTA is entitled to seek equitable remedies, including temporary and permanent injunctive relief, without the necessity of posting a bond or other security, to enforce this Agreement. No remedy or election under this Agreement shall be deemed exclusive but shall, whenever possible, be cumulative with all other remedies at law or in equity.
7. **Attorneys' Fees.** In the event that a suit or other legal action is necessary to enforce any of the provisions herein contained, the prevailing party shall be entitled to reasonable attorneys' fees in addition to costs.
8. **Assignment.** SSI Recipient shall not assign any rights or transfer any obligation under this Agreement without the express written consent of the SFMTA.
9. **Severability.** Should the application of any provision of this Agreement to any particular facts or circumstances be found by a court of competent jurisdiction to be invalid or unenforceable, then (a) the validity of other provisions of this Agreement shall not be affected or impaired thereby, and (b) such provision shall be enforced to the maximum extent possible so as to effect the intent of the parties and shall be reformed without further action by the parties to the extent necessary to make such provision valid and enforceable..
10. **Notices.** All written communications sent by the parties may be by U.S. mail, e-mail or by fax, and shall be addressed as follows:

To SFMTA:

Kerstin Magary  
Section Director, CSO Facilities and Real Property Management  
1 South Van Ness Ave., 8th Floor, #8191  
San Francisco, CA 94103  
Kerstin.Magary @sfmta.com

To SSI Recipient:

Name:  
Address:  
Phone:  
Email:

Any notice of default must be sent by registered mail or by personal service.

11. **Applicable Law.** This Agreement shall be governed by, and construed and interpreted in accordance with the laws of California. Venue for any action arising from this Agreement or related thereto shall be in courts located in San Francisco, California.

**12. Successors.** This Agreement shall be binding on and inure to the benefit of SSI Recipient's successors or assigns.

IN WITNESS WHEREOF, the SSI Recipient has caused this Agreement to be duly executed in San Francisco, California.

Dated: \_\_\_\_\_

**SSI Recipient:**

\_\_\_\_\_  
Signature  
Name (please print)

\_\_\_\_\_  
Title:

\_\_\_\_\_  
Name, business address, and phone number of SSI Recipient:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**EXHIBIT A**

**NON-DISCLOSURE CONSENT FORM  
to be executed by Employees of SSI Recipient or Third Party**

**Firm Name:** \_\_\_\_\_

**Employee Name:** \_\_\_\_\_

**Employee Address:** \_\_\_\_\_

I agree that any disclosure to me of information designated as Sensitive Security Information pertaining to the San Francisco Municipal Transportation Agency (SFMTA) SFMTA Potrero Yard Modernization Project (the Project), will be subject to the following obligations:

1. I have received, read, and understand: (1) FTA Resource Document for Transit Agencies – SSI Designation, Markings, and Control; and (2) TSA Sensitive Security Information Best Practices Guide for Non-DHS Employees and Contractors.
2. I confirm that I have been provided a copy of the Confidentiality Agreement between the SFMTA and SSI Recipient. I confirm that I will comply at all times with the SSI Recipient’s obligations in relation to the SSI Documents as set out in the Confidentiality Agreement, and will not do anything that would or could jeopardize any of the SSI Recipient’s obligations in relation to the SSI Documents, or lead to a breach or compromise of the security of the SSI Documents.
3. I will not disclose or permit disclosure of the SSI Documents, or permit anyone to use the SSI Documents, without the prior written approval of the SSI Recipient’s Sensitive Security Information Handler and the SFMTA.
4. The above obligations of confidentiality and non-use will apply to my work on the Project, and will continue to apply without limitation of time after the date of termination of my work.

Executed by:

\_\_\_\_\_  
**Employee Signature**

\_\_\_\_\_  
**SSI Handler**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Date**





APPENDIX G:  
DESIGN CRITERIA PARATRANSIT  
(FOR REFERENCE)



FOR REFERENCE ONLY

## SPACE NEEDS PROGRAM

**1.0 Introduction**

This section presents the Space Needs Program for the SFMTA Paratransit. The Space Needs Program illustrates the space requirements for efficient operations. The program is summarized at the end of this section, which includes projected square footage needs for building areas and exterior areas. These projected space needs are subtotaled to include site access, landscaping, and setbacks for total site acreage requirements.

**1.1 Staff Summary**

Facility staffing levels are crucial to planning efforts when determining the number of parking spaces, size of support facilities, and developing occupancy levels. Table 1.A is the summary of facility staffing levels for each scenario.

**1.2 Vehicle Parking Summary**

The following Table 1.B is the summary of vehicles for each scenario.

TABLE 1.A - PARATRANSIT - STAFF SUMMARY

Scenario 1A New Facility	
Function	Staff
Maintenance	23
Operations	27
<b>TOTAL</b>	<b>50</b>

TABLE 1.B - PARATRANSIT- VEHICLE SUMMARY

Scenario 1A New Facility	
Function	Number of Spaces
Cutaway Buses	150
Vans	10
<b>TOTAL</b>	<b>160</b>



## SPACE NEEDS PROGRAM

**1.3 Rule of Thumb Planning Ratio**

The table lists the key planning ratios. Information taken from *2017 SFMTA Facilities Framework Addendum*, published October 2017.

TABLE 1.C	
SPACE	RATIO OR SPACE STANDARDS
Maintenance Repair Bay (20' x 40')	1 bay for every 20 buses to be maintained
Chassis Wash Bay (25' x 40')	1 bay for every 150-200 buses to be maintained
Brake Shop	5 SF per bus
Tire Storage	5 SF per bus for 1 tire per bus
Parts Storage	20 SF per bus with High Density Storage System
*SQUARE FEET (SF)	



## SPACE NEEDS PROGRAM

## 1.4 Space Standards

Space standards were applied to the Space Needs Program and generally apply to the Offices, Shops, Bays, and Vehicle Parking Areas. Area requirements in Shops and Storage Areas were derived from functional requirements and equipment space needs. The space standards listed below were utilized to develop the facility program and overall area requirements. The space standards are based on functional needs and requirements established through the design of other facilities, rules of thumb, and specific requirements of each functional group.

TABLE 1.D	
AREA	SIZE
<b>SHOP:</b>	
Common Work Area	300 SF
Portable Equipment Storage	200 SF
Lube Room	200-300 SF
Compressor Room	200 SF
<b>PARKING:</b>	
Cutaway Buses	324 SF (12 x 27)
Vans	200 SF (10 x 20)
Large Non- Revenue Vehicles	420 SF (12 x 35)
Standard Non-Revenue Vehicles	200 SF (10 x 20)
<b>CIRCULATION:</b>	
Aisles for 90 degree turns	40' turning into parking lanes or service
Aisles for 90 degree turns	50' turning into maintenance bays
Forklift Circulation	10' wide
*SQUARE FEET (SF)	



## SPACE NEEDS PROGRAM

### 1.5 Circulation Factors

The space requirements shown for each function are net usable area. By using the urban design approach to this development of the facility, the Project Team hopes to minimize the amount of circulation necessary for an efficient facility. Interior or Building Circulation is the only applicable circulation factor for the SFMTA facilities.

### 1.6 Interior or Building Circulation

This factor is applied to the program as a percentage of the total building square footage. It accounts for miscellaneous building spaces such as hallways, stairwells, custodial closets, mechanical, plumbing, and electrical rooms, wall thickness, structure (Circ/Mech/Elec/Struct - Net:Gross), and access requirements. The following is a list of the factors (in general) that have been applied to the program:

- Bays, Shops, & Parts 40%
- Maintenance 40%
- Operations 40%

### 1.7 Parking Circulation

This factor is included to account for the drive aisles, walkways, islands, and other areas created by site and access inefficiencies. This factor can vary from 15% to 100% of the actual space occupied by a vehicle. For this project the following factors were applied:

- Vehicle parking areas 75%

### 1.8 Space Needs Program & Summary

A summary of the Space Needs Program for each of the three scenarios is provided on the following pages. The summary tables include projected square footage needs for building areas, parking, and staff totals.

These projected space needs are subtotaled into net square footage requirements.

The detailed Space Needs Program begins with the identification of each space by name and a space standard (if applicable). The space column represents spaces required to accommodate the fleet inclusively and operation for the Final build out.



## SPACE NEEDS PROGRAM

TABLE 1.E - P A R A T R A N S I T

Function	Space Standard			Staff or Vehicles	Number of Spaces	Unit Size (sf)	Subtotal (sf)	Comments
<b>P A R K I N G</b>								
Cutaway Buses	12	x	27		150	324	48,600	
Vans	10	x	20		10	200	2,000	
<b>Assignable Area</b>							<b>50,600</b>	
<b>B A Y S , S H O P S , &amp; P A R T S</b>								
Maintenance Bays	20	x	40		8	800	6,400	
Chassis Wash Bay	85	x	40		1	3400	3,400	
Parts Room					1	600	600	
Tire & Brake Shop					1	800	800	
Lube & Compressor Room					1	500	500	
CWA					1	300	300	
PES					1	200	200	
<b>Assignable Area</b>							<b>12,000</b>	
<b>Subtotal (Add 20%)</b>							<b>14,400</b>	
<b>M A I N T E N A N C E</b>								
Men's Locker			7	18	18	7	126	
Men's Restroom					1	200	200	
Women's Locker			7	5	5	7	35	
Women's Restroom					1	150	150	
Gender Neutral Locker/Restroom					1	150	150	
<b>Assignable Area</b>							<b>661</b>	
<b>Subtotal (Add 40%)</b>							<b>925</b>	



## SPACE NEEDS PROGRAM

Function	Space Standard	Staff or Vehicles	Number of Spaces	Unit Size (sf)	Subtotal (sf)	Comments
<b>OPERATIONS</b>						
Lobby			1	120	120	
General Manager	224	1	1	224	224	Private Office
Assistant General Manager	120	1	1	120	120	Private Office
HR Manager	120	1	1	120	120	Private Office
Administrative Assistant	48	1	1	48	48	Workstation
Safety Manager	120	1	1	120	120	Private Office
FTA or SFMTA Monitor		2	1	120	120	Shared Office
Counting and Payroll		2	1	120	120	Shared Office
Group Van Dispatch		1	1	64	64	Workstation
Scheduling, Group Van, Admin		8	8	64	512	Workstation
Field Supervisors	64	6	2	64	128	Workstation
Trainers	64	1	1	64	64	Workstation
Dispatch Supervisor	120	1	1	120	120	Private Office
Dispatch	64	1	8	64	512	Workstation
Call Center	36	1	8	36	288	Workstation
Dispatch Window			1	224	224	
Copy/Supply			1	120	120	
Mail Box Alcove			1	20	20	
Dispatch /Call Center Locker Alcove			1	24	24	
Office Coffee Alcove			1	30	30	
Conference Room			1	240	240	
Training Room			1	680	680	



**SPACE NEEDS PROGRAM**

Function	Space Standard	Staff or Vehicles	Number of Spaces	Unit Size (sf)	Subtotal (sf)	Comments
Driver Ready Room			1	500	500	
Kitchenette			1	120	120	
Driver Men's Locker		3	100	3	300	
Driver Women's Locker		3	100	3	300	
Lactation Room			1	80	80	
Men's Restroom			1	250	250	
Women's Restroom			1	250	250	
Gender Neutral Locker/Shower/Restroom			1	60	60	
Mechanical			1	500	500	
Electrical			1	500	500	
Data/Comm Room			1	100	100	
Custodial			1	100	100	
<b>Assignable Area</b>					7,078	
<b>Subtotal (Add 40%)</b>					<b>9,909</b>	
<b>VEHICLE CIRCULATION (will vary depending on site configuration, number of levels, and number of ramps required)</b>						
Parking Circulation (75%)					37,950	
Bay Circulation			8	700	5,600	
<b>Vehicle Circulation</b>					<b>43,550</b>	
<b>PARATRANSIT SUBTOTAL</b>					<b>75,800</b>	



**DESIGN CRITERIA NARRATIVE**

**2.1 Purpose & Intent**

The purpose of this section is to define goals that were developed throughout the SFMTA Planning Study. Guided by planning, compliance, and general site criteria, simple narratives are included to provide an overview of specific systems and assemblies that the facilities will require. The intent of these narratives is to present SFMTA and client representatives an easy to understand, non-technical explanation of how this facility is proposed to function, and includes considerations from employee and stakeholder input during the Design Charrette (January/February 2018).

**2.2 Planning Criteria**

The following, Table 4.2, is a general description of the planning objectives, building quality, and transit specialty needs for paratransit facilities.

TABLE 2.A - PLANNING CRITERIA

Design Life	75 years
Quality	The planning, design, and construction of the facility shall be high quality and long-lasting, have the necessary spaces and systems to function well, provide a safe and healthy work environment, and be economical and resource efficient to operate and to maintain.
Planning	The facility layout shall have a logical and efficient organization and flow to allow easy and safe access and circulation for staff, vehicles, and service providers. The layout shall be open and modular with the structure located to support building and equipment loads.
Flexibility	The facility shall be designed to be flexible. Vehicle parking, service, and maintenance spaces shall have an open and modular layout to accommodate paratransit vehicles. Staff areas shall be designed with an open plan with modular partitions and furnishings that can accommodate staffing and programming needs over time.
Space Utilization	The facility shall include all required spaces and assignable square footages (area inside room or boundary) in Section Two of the Facility Program as well as minimum dimensions and clearances as defined in the Space Standards. Vehicle areas shall be planned to maximize fleet capacity, sharing where possible circulation between functions such as parking and maintenance bays.
Workspace	Workspaces shall be designed based on needs to be highly functional spaces with quality environments that support staff health, safety, and productivity with good lighting, good ventilation, and durable finishes.
Safety	The facility shall have the best practice safety features including fire life safety systems; adequate means of egress and wayfinding components to exit discharge; fall protection; eye and ear protection; unobstructed circulation and equipment clear space; easy to use fluids collection; and good ventilation with positive pressure in staff areas
Security	The facility shall have passive and active security. The site shall have limited vehicular and pedestrian entries that are easy to find and visible. The facility shall have card readers at all exterior entries, suite entries, and support spaces. Security camera system shall be installed to monitor all exterior access and interior areas.



**DESIGN CRITERIA NARRATIVE**

**2.3 Compliance**

The Paratransit Facility shall comply with all applicable governing codes and ordinances that regulate building construction, site design, life

safety, fire protection, accessibility, energy, and environmental requirements as follows (or those which are applicable at the time the design is initiated):

**TABLE 2.B - BUILDING CODE & ZONING REQUIREMENTS**

Authority Having Jurisdiction:	City and County of San Francisco
Zoning Code:	San Francisco Municipal Code
Applicable Codes (Adopted):	2016 California Building Standards Code (2016 International Code Council) California Residential Code (2015 International Residential Code) California Electrical Code (2014 National Electrical Code) California Mechanical Code (2015 Uniform Mechanical Code) California Plumbing Code (2015 Uniform Plumbing Code) California Existing Building Code (2015 International Existing Building Code) California Energy Code California Historical Building Code California Fire Code California Green Building Standards Code California Reference Standards Code 2016 San Francisco Code Amendments, State Amendments, Ordinances, and Law
OCCUPANCY GROUP	S-2, B, R-2

**CONSTRUCTION TYPE/ HEIGHT & AREA (ICC TABLE 504.3) SEE ALSO ICC TABLE 503**

Type I-B Max.	150'-0" / _ Floors @ _SF ea. Per ICC 2016; 85' per San Francisco Municipal Code
FIRE PROTECTION:	Sprinkler System
(PLANNED) ZONING/ F.A.R.	UMU (Urban Mixed-Use)/ 6.0 to 1 (currently zoned as Public)

**AREA CALCULATIONS (IF @144'-0" TO PARAPET)**

Space	Occupancy Group	Existing	Demo	Renovation
Garage, Training/ Operations	S-2, B			
Joint Development	R-2			
<b>TOTALS</b>				

**FIRE RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS, FOR TYPE 1-B CONSTRUCTION (ICC TABLE 601)**

Structural Frame Including Columns, Joists, & Girders	Supporting Floors - 2 hours
---	-----------------------------



**DESIGN CRITERIA NARRATIVE**

**TABLE 2.B (CONT.) - BUILDING CODE & ZONING REQUIREMENTS**

	Supporting Roof ONLY - 1 hour
Bearing Walls Exterior	(per ICC Table 602) - 2 hours
Bearing Walls Interior	Supporting Floors - 2 hours
	Supporting Roof ONLY - 1 hour
Non-Bearing Walls & Partitions Exterior	(per ICC Table 602) - 1 hour
Floor Construction Including Supporting Beams & Joists	2 hours
Roof Construction Including Supporting Beams & Joists	2 hours

**OCCUPANCY SEPARATION, FIRE BARRIERS, FIRE PARTITIONS, & REQUIRED OPENING PROTECTIVES, FOR TYPE I-B CONSTRUCTION (ICC TABLE 504.3, TABLE 504.4, TABLE 716.5)**

	PARTITIONS	OPENINGS
Occupancy Separation between (S-2, Bus Repair Garage) & (B, Training Area, Operations)	2 hours	
Occupancy Separation between (S-2, Bus Repair Garage) & (R-2, Residential T.O.D.)	2 hours	
Exit Passageways	1 hour	1 hour
Exit Enclosures	1 hour	1 hour
Vertical Shafts (for 14 stories, 144'-0" total height)	1 hour	1 hour

**INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY (SPRINKLERED BUILDING), FOR TYPE I-B CONSTRUCTION (ICC TABLE 803.11)**

Occupancy Group	Exist Enclosures & Exit Passageways	Corridors	Rooms & Enclosed Spaces
S-2	Class C	Class C	Class C
B	Class B	Class C	Class C
R-2	Class C	Class C	Class C



## DESIGN CRITERIA NARRATIVE

**2.4 General Site Requirements**

There are specific site requirements necessary to ensure safe, efficient, and functional facilities. These specific requirements are outlined (and not limited to) the following:

GENERAL SITE REQUIREMENTS	
Site Accessibility	Provide a minimum of two vehicular entries/exits configured such that either could work as the entry/exit in the event that the other is unavailable
Site Lighting	Use appropriate and adequate lighting for typical operations and to ensure high level of surrounding visibility
Pedestrian Safety & Accessibility	Observe all code and regulation requirements to insure safe and defined pedestrian circulation paths (necessary striping, bollards, curb cuts, etc.); and that paths minimally intersect fleet ingress and egress
Site Stormwater Drainage	Positive drainage and appropriate stormwater discharge from site and upper exterior/open decks; a stormwater management and pollution prevention plan shall be established
Sustainability	Provide as required including CALGreen, LEED Gold requirements detailed in Chapter Seven of the Environmental Code of the City and County of San Francisco
Parking	(Employee Parking will not be provided)
Security	Provide site video surveillance and building security



## DESIGN CRITERIA NARRATIVE

**2.5 Architectural Narrative**

The Paratransit Facility is intended to service, maintain and store a fleet of cutaway buses and vans. It consists of Bays & Shops, Maintenance, and Operations.

**2.5.1 Site**

The current Potrero Yard and Garage Facility, located on a city block bound by Mariposa Street to the south, 17th Street to the north, Hampshire Street to the east, and Bryant Street to the west, sits at the edge of the Mission District and Potrero Facility Hill. The site is currently zoned as P (Public), with adjacent sites having the zoning designations as PDR-1 (Production, Distribution, and Repair Businesses) and UMU (Urban Mixed Use). Through discussions with Planning, it has been agreed upon that we will use UMC (within the Eastern Neighborhoods District MUD (Mixed Use Development)).

The New Facility site, located between McKinney Avenue and Kirkwood Avenue, with Highway 280 running between the New Facility and adjacent trucking operations. The site is currently zoned as Industrial.

**2.5.3 Planning/Programming**

Following the release of the 2017 SFMTA Facilities Framework to address facility needs in January 2017, an Addendum was later released describing the SFMTA's pared down, refined scenarios to address its facility needs. The Framework included five scenarios, which were later narrowed to three with Paratransit included.

**2.6 Structural Narrative**

The Potrero and New Facility Yard Reconstruction project will require several considerations in the appropriate selection of a structural system. Given the long spans of the Bus Garage & Maintenance Facility and the load requirements for the residential development above, a post-tensioned, cast-in-place concrete beam and slab system with concrete shear walls for resisting lateral loads are appropriate.

A separate geotechnical investigation will be required depending on location. Final Design will be responsible for geotechnical analysis.

**2.7 Mechanical Narrative***General HVAC:*

Supply, exhaust, and return ducts shall be designed with a maximum of 0.06-inch water gauge static pressure drop per 100 feet of duct. Supply ductwork serving mechanical air conditioning will be insulated. Exposed ductwork will be round, uninsulated and suitable for painting.

Seismic-restraint systems shall comply with CBC requirements.

**2.7.1 Operations Areas**

The operations portion of the facility will include heating and air conditioning capabilities. Zoning will be determined by essential and non-essential personnel. No more than three offices per thermostat. Ventilation will be in accordance with ASHRAE 62.1.

Exhaust will be included for locker rooms,

restrooms, kitchen/breakrooms and janitorial areas. A minimum of 0.50 to 1.0 CFM per square foot exhaust is recommended for these types of spaces.

**2.7.2 Maintenance Areas**

Filtered and heated ventilation supply air distribution system, plus exhaust will serve the maintenance areas.

Vehicle maintenance and enclosed parking areas will maintain 0.75 to 1.0 CFM per square foot at all times in accordance with CFC, CMC and NFPA. Enclosed parking areas will have exhaust grilles within 18-inches of finished floor every 50 feet along perimeter in accordance with CMC Article 403.7.2.3 requirements. Additional exhaust grilles within 18-inches of the ceiling structure for capture of H<sub>2</sub> gases is also required.



**DESIGN CRITERIA NARRATIVE**

Upon detection of CO, NO<sub>2</sub>, and/or H<sub>2</sub>, exhaust rate will immediately increase to achieve 4 air changes per hour for 10 minutes after CO, NO<sub>x</sub> and/or H<sub>2</sub> detection system readings return to normal levels.

Exhaust fans serving enclosed parking areas will be rated for Class 1, Div. 2 hazard classification and have control dampers. Fans shall be capable of exhausting ten air changes per hour when CO, NO<sub>2</sub> and/or H<sub>2</sub> levels exceed 20% LEL.

**2.8 Plumbing Systems**

Domestic and fire protection water will be provided to the building from a water line extended from the site service connection. A strainer, lead-free reduced pressure backflow and utility grade remote reading water meter will be provided on domestic water lines serving the building. The backflow relief will discharge outside of the building.

The building domestic water service will be a complete connection to the existing street water main. Pipe sizing inside of the building shall comply with the requirements in the CPC and a maximum system piping loss to provide a 10% pressure safety factor at full system flow. Velocities within any main or branch of the piping shall not exceed seven feet per second (FPS). Interior domestic water piping above grade will be Type L copper with copper solder- or pressure-sealed joints. All buried domestic water pipe below slab will be protected with 20 mil polyethylene tape and pipe sleeve at slab penetration.

The supply line to each item of equipment or fixture shall be equipped with a shutoff valve to enable isolation of the item for repair and maintenance without interfering with operation of other equipment or fixtures. Water hammer arrestors will be in accessible location, on the domestic water piping system where shock pressures could occur. Water hammer arrestors will be PDI-WH 201 certified.

A high efficiency domestic water heating system will be provided with hot water recirculation. Per CALGreen standards, a recirculation pump with timer are required to provide sufficient hot water throughout the facility. A thermostatic mixing valve will be installed on hot water systems. Domestic hot water system to be provided with thermal expansion tank, and re-circulating pump, for hot water return system.

All hot water piping shall be insulated. High-efficiency, low-flow plumbing fixtures will be employed throughout the building to meet CALGreen's current standards. ADA-compliant electric water coolers and toilet room fixtures will be incorporated.

Water closets will be low flow, vitreous china, siphon jet, 1.28 gallon per flush (maximum); commercial seat with self-sustaining check hinge. Ultra-low flow vitreous urinals (0.125 GPF).

Lavatories will be under-counter or wall-hung mounting, with deck mounted, hydraulic powered, 0.35 GPM infrared faucets, with sensor under spout.

Floor mounted mop basin of molded stone with

wall-mounted chrome-plated service sink faucet with vacuum breaker; ADA compliant handles with maximum flow rate of 2.0 GPM. Break (coffee) and kitchen area sinks will be stainless steel, with a 1.5 GPM single lever faucet and a half-horsepower garbage disposal.

A gravity sanitary lateral will handle all levels, except the basement. The basement will have a sewage ejection system consisting of a sump tank, duplex ejectorpumps and pits sized to unit pump to a maximum of six starts per hour. Ejector pumps will be connected to standby power. Sanitary waste will discharge to the street main.

All industrial waste and covered parking decks will drain to an appropriately sized oil/water interceptor prior to connecting to the municipal sanitary system.

The storm water system will consist of area drains, roof drains and over-flow drains.

**2.9 Fire Protection Systems**

Integrate all requirements and criteria for safety, security and reliability to design, furnish, and install a complete fire protection system. Establish the hazard and coverage requirements for fire protection systems in conjunction with the City and authority having jurisdiction (AHJ). Provide fire suppression systems in compliance with NFPA 13, 14, 30A, and 88A. The need for a fire pump will be determined by the fire suppression designer. Fire protection system will be design delegated to a licensed contractor. The system will be hydraulically calculated.



## DESIGN CRITERIA NARRATIVE

Sprinkler system occupancy hazard classification, minimum density and maximum sprinkler spacing and standpipe requirements shall be determined in concert with the authority having jurisdiction (AHJ) and using NFPA 13 and 14 guidelines. Current street hydrant flow test data will need to be determined.

### 2.9.1 Mechanical Sustainable Design Systems

Sustainable design requirements and best practices will be complied with, adopted, and implemented where such requirements are promoted by the United States Green Building Council (USGBC), as defined under the published LEED Standards. Code required restrictions placed on the use and quantities of toxic and/or environmentally deleterious substances such as Volatile Organic Compounds, (VOCs), that are components in certain sealants and construction materials, and on the use of HCFC refrigerants in HVAC systems, are specific examples of applicability of such sustainable-based Code design requirements.

An energy model will be required based on performance approach to confirm compliance with CALGreen requirements.

Heating and cooling load calculations for the industrial areas will be performed in accordance with LEED, CALGreen, and Climate Zone 3. The design of the mechanical ventilation systems, heating systems and cooling systems will comply with the respective requirements of the CMC, ASHRAE Standards of Indoor Air Quality and Thermal Comfort, and CALGreen where applicable.

### 2.10 Electrical

*Governing Codes, Acts, and Guidelines:*  
Applicable Codes and Standards include: NFPA 70 NEC, California Building Code with Local Amendments, and California Green Building Standards with Local Amendments. Seismic-restraint systems shall comply with California Building Code requirements.

The building and electrical systems shall be designed in compliance with LEED GOLD Certification.

#### 2.10.1 Systems Overview

Basic electrical systems for the SFMTA Potrero and New Facility Yards will include powering the mechanical systems, maintenance equipment, convenience receptacle power, interior and exterior lighting systems with controls, and an addressable fire alarm system.

#### 2.10.2 General Building Requirements

Basic Electrical Systems for the building, mechanical systems and other miscellaneous equipment; convenience receptacle power; and interior and exterior lighting systems with controls.

The utility will bring Medium-voltage power at approximately 15,000 VAC to feed the facility transformer. The transformer will step down the voltage to 480 volts.

Power for the facility will be 480Y/277V, 3 phase, 4 wire, with solid neutral. All large equipment will be served at the highest voltage possible, 480 volt

three phase. All equipment will be coordinated to ensure the utilization equipment will be served at their required voltage.

The electrical distribution system will be set up to comply with LEED. Loads will be segregate the load by type; life safety, lighting, and mechanical equipment. Meters to verify the load for each of these loads types will not be initially installed, however it would be a simple task to add them in the future.

CALGreen receptacle control will be achieved by tying receptacle control devices into the lighting system control panel. The Lighting System occupancy sensors will be utilized to turn off, 50% of the receptacles within a room when the room is not occupied.

A fully addressable fire alarm system will be provided for the facility. The fire alarm system shall contain pull stations, smoke detectors, heat detectors, duct detectors for the HVAC system, monitor the buildings sprinkler system, and provide occupant notification in the case of a fire event. Premise monitoring will be provided by an off-site entity.

#### 2.10.4 Lighting

*Interior Lighting:*

Lighting Systems for the facilities will utilize LED light sources. Dimmable drivers will be specified for the LED drivers. Daylight harvesting will be utilized wherever practical. Daylight sensors will be installed to allow the dimming of the LED lights when there is enough natural daylight within the space.



## DESIGN CRITERIA NARRATIVE

Occupancy and vacancy sensors will be incorporated into a low voltage lighting control system for all interior and exterior lighting systems. All offices and small room shall be provided with occupancy sensor(s) as required for full room coverage. The facility lighting control shall operate on the following properties:

- An addressable lighting control system shall be provided. The system shall be programmed with normal building operational hours and shall turn the lights on and off in compliance with the hours of operation.
- All offices, bathrooms, back of house spaces, and other rooms shall be provided with occupancy sensors. All regularly occupied spaces shall be provided with vacancy sensors, all other spaces shall be provided with occupancy sensors. All sensors shall turn off the lights 5 minutes after no occupancy.
- All areas with natural daylight shall be provided with daylight harvesting. Once the sensor picks up there is enough daylight within a space the lighting control system shall dim the LED luminaires. The luminaires shall be dimmed to a minimum level of 10% while maintaining design footcandle levels.

*Exterior Lighting:*

Site lighting fixtures will be an LED light source. The fixtures will be controlled by a programmable low voltage lighting control panel. Luminaires shall be provided with occupancy sensors. The use of occupancy sensors in the exterior luminaires is suggested. The proposed control of the exterior lighting shall be:

- An addressable lighting control system shall be provided. The system shall be programmed with normal exterior lighting hours, on at dusk, off at

dawn.

- After 11:00 P.M. the luminaires shall reduce to 25% light output. If the luminaire senses motion, the luminaires shall increase brightness to full bright. After 10 minutes of no motion the luminaires shall drop back down to 25%.

**2.10.5 Emergency Power**

The sites will be provided with an emergency generator. It is anticipated that the generator will provide to allow the facility to operate, but not at full capacity, in the event of a power outage/emergency. The exact size of the generator has not yet been finalized. Coordination efforts with the SFMTA staff is required to ensure the generator will allow the facility to operate as the staff requires size to be determined in Final Design.

The code required emergency power for the lights will be provided with either internal battery back-up or a battery backed up inverter. These batteries will provide the code required back-up power. Some luminaires may be connected to the generator to provide operational lighting in the event of a power outage.

**2.10.6 Electrical Sustainable Design Systems**

Along with following the California Energy Code we will incorporate daylight harvesting and occupancy and vacancy sensors throughout the facility.

In addition to the above measures the use of photovoltaic panels to produce power is another option to increase sustainability for the project.

**2.10.7 Electrical Communications**

*Electronic Communications System Overview:* Communications systems include a Structured Cable System, Public Address (PA) System, and a Telecommunications Grounding Connection.

This narrative describes the systems and basic operations of the communication system for the new Maintenance and Operation Building.

*Governing Codes:*

California Electrical Code (CEC) provides minimum safety requirements for these systems. Design and installation is based on the minimum CEC requirements, BICSI, and IT best practice and manufacturer's recommendations. Structured Cable System pathways will be based on current telecommunications performance standards.

*Public Address (PA) System:*

Amplifiers and speakers will be provided throughout parts of the facility and utilized through the telephone system or dedicated microphone. PA speakers will be strategically within the areas of the facility requiring a PA system to provide uniform sound coverage of those facility areas for all PA announcements.

*Structured Cable System:*

Intra-facility Structured Cable System pathways will be provided for owner provided equipment including, but not limited to: wireless access points (full building coverage if required), administrative workstations, shop workstations, fuel station.



## DESIGN CRITERIA NARRATIVE

*Telecommunications Rooms:*

The facility will have a Main Telecommunications Room (MTC) for the Main Distribution Frame (MDF), Servers, security equipment, routers and switches. The MTC will also act as the Main Point of Entry (MPOE) for offsite service. Telecommunications Closets (TC) will be provided as required to provide connectivity to the Intermediate Distribution Frame (IDF) for all work stations. All rooms shall be designed for future expansion and be equipped with equipment racks and cable management systems for organized and efficient cable routing.

*Grounding System:*

A telecommunications grounding will be implemented to protect telecommunications equipment. The telecommunications grounding system will connect to the Electrical Safety Grounding System.

**2.10.8 Electrical - Security***Electronic Security Systems Overview:*

Security Systems include a Video Surveillance System (VSS), and an Access Control System. Security system devices will be strategically placed throughout the facility based on client requests, best practice, and industry standards. This narrative describes the systems and basic operations of each electronic security system for the new Transit Operations and Maintenance Facility.

*Governing Codes:*

California Electrical Code (CEC) provides minimum safety rules for these systems. Design and installation is based on the minimum CEC

requirements, best practice and manufacturer's recommendations.

*Systems Monitoring:*

Security Systems will be monitored in operations or general manager office (TBD) with exact locations to be determined. Off-site monitoring, if required, can be included.

*Video Surveillance System (VSS):*

A VSS will be provided to real time and recorded video of critical areas and the vehicle parking areas. The VSS will utilize strategically located cameras for video monitoring and recording for forensic use. Real time monitoring and forensic play back will be available onsite (TBD). Viewing and playback can be viewed using password on computers or a dedicated VSS workstation. Video recording retention length to be determined.

*Access Control System:*

A card access system compatible with the existing systems to allow access to the site gates, building staff entry, and critical areas will be provided.

*Building Access Doors:*

Entrance into facility buildings through building doors will be controlled by a card reader system. When a valid RFID card is presented to the local card reader at the door, the lock will be opened, allowing ingress.

Entrance gates can also function on a schedule. For example, doors / gates may be left open during business hours for free ingress/egress, but after-hours ingress is controlled by the card reader system.

*Intercom System (if required):*

The facility will be equipped with an intercom system consisting of 2-way intercom stations located at desired locations in the yard and building.

The intercom system can be used in conjunction with the access control system as ingress or egress requests can be made from an intercom station.

*Uninterruptible Power Supply (UPS) System:*

A UPS system will be provided for security electronics to allow security electronics to maintain function in the event of a power interruption. Length of power back up to be determined.

**2.10.10 Generator****2.10.11 Radio & Computer Aided Dispatching (CAD)****2.10.12 IT/Radio Team****2.10.13 Fare Collection****2.10.14 Bus CCTV Backend****2.10.15 Fleet Watch**

## DESIGN CRITERIA NARRATIVE

**2.11 Functional Equipment**

This section will cover the functional equipment required to effectively operate in a bus operation and maintenance facility.

**2.11.1 Vehicle Lifts**

Vehicle lifts are implemented in facilities to allow a technician to inspect and maintain the underside of vehicles. The advantages of vehicle lifts include ease of use, safety, and improved productivity. The selection of the appropriate lift should be carefully considered and designed for the specific functions within the bay. There are several factors to be considered in the appropriate vehicle lift selection including (but not limited to) the following:

- Function and bay sizing requirements
- Facility budget
- Type of vehicle
- Number of vehicle axles
- Wheelbase range(s) between vehicle axles
- Vehicle access and orientation in bay

**2.11.2 Vehicle Lift Types**

The following are lift types to accommodate the SFMTA Fleet. Portable lifts are ideal for supplementing flat bays with functional lifts. They offer flexibility for facilities and are an economical addition to a newly constructed, renovated, or existing facility. Portable lifts can be paired in any grouping to meet the bay needs to lift a wide range of vehicles. Together the set of lifts, most common sets include four or six, will lift a vehicle in unison. Because the portable lift raises the vehicle from the wheel or tire, it inherently prevents the mechanic from accessing areas

behind the wheel such as the brake drums/rotors, the suspension, and the steering components of the vehicle.

*Battery Powered (Wireless) Portable Lifts*

The battery option brings a benefit from a planning and operating perspective, as well. Nearby electrical outlets to power the lifts are not required in each work area. The wireless column lifts are truly the most versatile of the mobile column lifts available. The wireless column lifts have no cords on the shop floor reducing clutter and promoting a safe and efficient facility environment. Wireless lifts address the issue of excess cables in a bay but this feature is a cost premium compared to wired lifts.

Some batteries can be charged with a standard outlet and do not require a specialty receptacle or voltage, which translates to savings on installation costs. Battery powered lifts can be stored in a dedicated, remote charging location to allow for a less cluttered bay and shop area.

Battery-powered options can be moved out to the shop floor as needed and then stored in a small charging zone when not in use.

*Axle Engaging Lifts:*

Axle-engaging lifts allows the mechanic to work on the vehicle while it is lifted and are ideal for heavy maintenance, tire repair, and body repair. The vehicles are lifted to a comfortable working height for technicians and allow for maintenance and inspection on all four sides and underside of the two- or three-axle vehicle. The wheelbase range can be tailored for the various vehicles

maintained at the facility. Axle-engaging lifts come in two different styles: post (piston) and scissor.

The post (piston)-style lift allows for maximum operational clearance and comes in either two- or three-post configuration. Generally, the posts take up less space compared to the scissor-style lifts and allow greater work coverage underneath the vehicle.

The scissor-style lift comes in either two- or three-scissor configuration. The scissor containment box is shallower compared to the post-style lift and typically costs less to purchase and install. The shallower containment box is ideal for facilities located on a site with high water table or unstable soils.

The axle-engaging scissor-style lifts take up more space than the post (piston)-style lifts, creating a more constrained work setting for a technician. The articulating scissors have more moving parts which may result in more maintenance compared to a post-style lift. These lifts can be sold with an aftermarket bellows or skirt cover to protect the articulating scissor components and openings.

*Platform, Pit-Emulating Lifts:*

Platform or pit-emulating lifts are ideal for preventative maintenance and inspection operations. These lifts can either be flush mounted or surface mounted. The surface mounted configuration requires vehicle ramps to allow the vehicle to access the platforms. Additional space should be considered to allow for these access ramps.



## DESIGN CRITERIA NARRATIVE

The lifts can either rise straight up (vertical rise) or displace (parallelogram) in one direction or another.

In a Chassis or Undercarriage Wash Bay, the vehicle is lifted and displaced with the engine compartment positioned over a large, grated pit. The engine compartment, which typically collects the most dirt and grit, is washed, and the horizontal displacement allows for the dirt and grit to fall into the pit below, instead of at the base of the lift.

### 2.11.3 Cranes and Hoists

Cranes and hoists allow a user to transport large components and equipment within various areas of a facility. It is important to define what functional areas of a facility need to have crane coverage in an effort to define the crane's travel direction and select the correct crane type. There are several factors to be considered in the appropriate crane and hoist system selection including (but not limited to):

- Desired area coverage
- Interior clearance
- Building structural systems
- Coordination with other facility systems (such as mechanical, electrical, lighting, fire protection, overhead doors, etc.)

### 2.11.4 Crane Types

The following are crane types recommended for SFMTA.

*Overhead Bridge Cranes:*  
Overhead bridge cranes allow for maximum

coverage within a desired area. Bridge cranes include a single or double girder supported by end trucks which travel the length of the area on running rails and beams. The girder(s) carry a hoist used to raise and lower the large components or equipment. Bridge cranes are available as top-running or underhung configurations.

#### *Top-Running Bridge Cranes:*

Top-running cranes are typically used to lift heavier loads (above 20 tons). Top-running cranes require a bracket attached to the building structural system or an independent structural system entirely to support the crane's running rails for lateral movement. This crane support system limits the top-running crane coverage area.

A top-running double girder bridge crane creates a smaller profile compared to a single girder bridge cranes. Double girder cranes should be used in applications where minimal clearance is allowed for the bridge crane travel.

Top-running cranes are also beneficial if additional headroom is required. Because the single or double girder is positioned on top of the end trucks, it allows for additional clearance below the girder.

#### *Jib Cranes:*

Jib Cranes may swing through an arc to give lateral movement to any items. They are ideal for lifting items and transferring short distances of 20 feet or less. Jib cranes generally have a lower capacity limit than bridge cranes. Jib Cranes can be freestanding, foundation mounted, column

mounted, or compression mounted/cantilevered. Jib cranes cover more of the floor space than a monorail hoist but less than an overhead bridge crane.

#### *Monorail Hoists:*

Monorail hoists are ideal for facilities or processes which require lifting and transporting materials along a fixed path, especially from one level to another. Despite operating on a fixed path, monorail hoists can provide flexibility by operating on curves, slopes, or multiple support tracks. Typically, the weight capacities for hoists are less than capacities of bridge and jib cranes.

### 2.11.5 Vacuum Systems

Part of servicing a vehicle fleet means regular interior vacuuming to keep vehicles clean for vehicle operators and passengers and to extend the useful life of the interior surfaces.

### 2.11.6 Factors in Equipment Selection

Typically, the larger the fleet is the more variables that enter into the decision of selecting the best-suited vacuum system for an agency. There are several factors to be considered in the appropriate vacuum system selection including (but not limited to):

- Length of service cycle
- Type, size, and number of vehicle to be vacuumed
- Positioning of the vacuum



## DESIGN CRITERIA NARRATIVE

### 2.11.7 Vacuum Equipment Types

Since SFMTA will be cleaning the interior of the buses in the parking positions backpack-type and canister-type vacuums will be beneficial.

#### *Backpack-type Vacuum:*

Backpack-type vacuums allow cleaning staff to enter the vehicle and get a more intimate clean. Backpack systems work well for agencies who are looking to minimize initial costs of the facility and additional units/backpacks can be purchased as needed for future growth/replacement. Most backpack units require electrical connection and the cord can be difficult to manage when traveling into the vehicles.

#### *Canister-type Vacuum:*

The canister-type vacuum is a small, contained unit located on the service island with a typical maximum hose length of 25 feet and is similar to those found at gas stations.

For the shorter hose models, dust and dirt from the vehicle floor is swept toward the vehicle doors, then the canister vacuum is used to extract the dust and dirt. While relatively inexpensive and requiring only a small amount of space on a service island or housekeeping pad, the small size require the canister to be emptied frequently to a nearby trash receptacle. Also, the short hose length does not allow for full-length vehicle vacuuming for longer vehicles. Although the extraction power is not as effective, some vacuum models include hose lengths up to 50 feet. The canister-type system can be appropriate for smaller fleets with limited service island space and

service budgets. Another advantage is the ability to quickly service and replace an entire canister if necessary.

### 2.11.8 Vehicle Exhaust Systems

Vehicle exhaust systems are required to remove harmful vehicle exhaust (such as diesel, gasoline, or CNG). Even though vehicles are run only a short time indoors and with open doors, the vehicle exhaust can build up within the building. Without appropriate control and removal of the exhaust, fumes can lead to worker illness, increased facility maintenance, and damage to sensitive components and electronics. The most effective method of capturing and removal of vehicle exhaust fumes is to capture them at the source. Capturing these gases at the source provides a safer and more pleasant working environment.

### 2.11.9 Factors in Equipment Selection

There are several factors to be considered in the appropriate vehicle exhaust system selection including (but not limited to):

- Type of vehicle
- Size of vehicle exhaust
- Type of vehicle fuel
- Exhaust location on vehicle(s)
- Facility budget
- Functional bays requiring vehicle exhaust
- Orientation of vehicles in bay

### 2.11.10 Equipment Types

Vehicle exhaust systems will be required at the Paratransit Facility.

#### *Hose Reel Exhaust System:*

These systems are ideal for facilities with high ceiling or roof structure. The compact design is ideal in instances where other equipment, such as overhead cranes, need to be considered or where taller vehicles must pass. The hose reel can either be spring or motor-operated to activate the exhaust fan. Exhaust systems can either be individually exhausted to the exterior or tied into one central system. Vehicle exhaust reels that are individually exhausted promotes energy efficiency because the only air drawn from the duct is from the vehicle with the running engine. A more powerful fan must be used with exhaust reel systems that have connected ductwork due to the extended distance required to exhaust the products of combustion along with the potential of drawing air from the exhaust reels that are not in use. Central systems tend to use more energy as they require larger fans/motors, however, they require fewer penetrations to the exterior of the building. If this system is desired, it is important to consider adding a monitoring system that can help limit energy use by matching the speed and draw of the central fan with the number of reels being used.

### 2.10.11 Vehicle Wash Systems

Wash Systems play an important role in maintaining the entire fleet. Vehicles that are cleaned properly last longer, and create a more enjoyable experience for both the staff maintaining the vehicles and the public.



## DESIGN CRITERIA NARRATIVE

**2.10.12 Factors in Equipment Selection**

Understanding the capabilities of each type of system will ensure that the range of vehicle types are washed thoroughly while being conscience of environmental goals for the project.

There are several factors to be considered in the appropriate vehicle wash system selection including (but not limited to):

- Frequency of Wash
- Desired Wash Time
- Desired or Expected Cleanliness
- Number of Vehicles Washed
- Size of Wash Bay
- Facility Budget
- Type of Vehicle
- Profile of Vehicle
- Water Treatment
- Water Reclamation
- Stormwater Capture & Other Sustainable Practices
- Air Dryers/Wipers
- Climate & Environment/Elements
- Bike Racks on Buses
- Vehicle-mounted Equipment

**2.10.14 Types of Wash Systems**

A Chassis Wash System is recommended for SFMTA Paratransit.

*Chassis Wash:*

Chassis Wash Bays are a great addition to any Wash System. In order to properly clean the underside and chassis of the vehicle, the vehicle can be elevated with a Vertical Rise or Parallelogram Lift in a designated Chassis Wash Bay. This function will also require a High

Pressure Hot Water Heater/Sprayer. This unit as well as the console for the lift may be placed in a designated area away from the majority of the spraying/cleaning operation.

**2.10.18 Compressed Air and Lubrication Distribution Equipment**

The compressed air and lubrication distribution systems are two important aspects of a facility that provide ease of use for the mechanics working in a multi-bay facility. The compressed air and lubrication piping will need to be sized properly to support the shop equipment throughout the facility. The lubrication equipment needs to support the vehicles being serviced in order for the facility to be most efficient.

**2.10.19 Factors in Equipment Selection**

There are several factors to be considered in the appropriate compressed air and lubrication system selection including (but not limited to):

- Number of Bays
- Lubrication Fluids needed at each location
- Length of longest piping run
- Monitoring Technology

**2.10.20 Equipment Types***Rotary Screw Compressors:*

These types of compressors use two rotors or helical screws to compress air to produce compressed air. Rotary screw compressors are quieter than piston units, allowing a quieter work environment while operating relatively energy-efficiently. Operating temperatures are at least 100°F cooler than piston units, resulting in longer life.

Because the moving parts of a screw-type compressor do not produce as much friction as the piston-type compressor, screw-type compressors are about 30% more efficient in producing compressed air with the amount of power that it consumes while in operation.

Rotary screw compressors are most efficient when in constant operation because they require 6 minutes to ramp down from compression duty. During this time, the compressor is not fully loaded but still requires some amount of power input that does not produce any compressed air. However, the amount of time required to ramp down from compression duty will be reduced to about 20 seconds when the unit is operated by a variable frequency drive (VFD).

The maintenance (long-term) cost of a rotary screw compressor is one major drawback because the more complex equipment with electronic components requires more regular maintenance compared to piston-type compressors. However, because screw-type compressors do not operate with as much friction as piston-type compressors, the frequency of maintenance duty is significantly less than piston-type compressors.

*Reciprocating Piston Compressors:*

Piston compressors are typically used for general-purpose applications such as workshop-air, where the air is used for hand-tools, cleaning dust, small paint jobs, etc. It is one of the most commonly used compressor types. Piston compressor are available from 1 HP to about 50 HP. The motors can be duplicated (duplex) in effort to double the power output (horsepower) and can then be



## DESIGN CRITERIA NARRATIVE

configured in a lead-lag operation to ensure equal wear on the motors and to increase the energy efficiency of the compressed air production.

Piston compressors are more economical compared to rotary screw compressors because they require less maintenance and work well in maintenance shops as they are more suitable for high pressure applications.

Piston-type compressors have a simple design and can be more easily fixed by facility maintenance staff compared to a screw-type compressor.

There are a few drawbacks to piston compressors such as excessive noise, high outlet temperature, and high oil content in air piping. These can all be mitigated through engineering a system appropriately.

#### *Refrigerated Air Dryers:*

An air dryer is an integral piece in compressed air treatment system. Air quality can have a significant impact on compressed air tools and equipment. Properly treated compressed air, and the right air dryer, will improve productivity, system efficiency, and product or process quality. Refrigerated air dryers are specifically designed to handle the high discharge temperatures of piston compressors. The purpose of using a refrigerated air dryer is to remove entrained moisture in the air to prevent corrosion in air tools with moving steel parts. Refrigerated dryers typically provide dew points of 40 °F at rated conditions.

A few filters are required to be used in compressed air systems. The filter downstream

of the compressor and upstream of the dryer is the particulate air filter. This type of filter removes any dust or particulates in the air. The second filter located downstream from the dryer is the coalescing air filter. This type of filter removes the excess oil and water left in the air by the compressor and the dryer.

#### *Desiccant Air Dryers:*

These types of air dryers do not require any power to dry the air, as is the case with refrigerated air dryers. These types of dryers utilize a filter that captures the entrained moisture in the compressed air. Desiccant dryers trap so much of the moisture from the air that they typically reduce the dew point temperature to -40°F.

#### *Compressed Air Receivers/Tanks:*

Air receivers are pressure vessels that store treated or untreated compressed air. The air stored in these vessels alleviates the frequency of starts required by the compressor whenever compressed air is used. Some reciprocating and rotary screw compressors can be mounted on an air receiver but some are base/floor-mounted.

#### *Bulk Fluid Storage Tanks:*

Bulk Storage Tanks allow facilities to store large quantities of fluids while meeting required codes with double wall containment. Tanks can be monitored to promote more efficient product inventory control and throughput data. Tanks are available in sizes from 100 gallons to 50,000 gallons based on the frequency that the facility wishes to receive fluid deliveries. These tanks can also be utilized for waste/used fluids such as Used Oil and Used Coolant. Tanks are typically stored

in a central location along an exterior wall for reduced piping lengths and ease of delivery and extraction of bulk fluids.

The amount of waste from empty bottles and jugs, the amount of time it takes to handle each bottle, and the amount of spilled fluid is greatly reduced when using bulk fluid storage tanks. Bulk fluid storage tanks typically hold amounts of liquid greater than 100 gallons for the use of all mechanics within the building. A tank level monitor is an integral component of the storage tank and will signal the low-level condition at which point the lubrication distributor would refill the storage tanks. Storage tanks are also equipped with a leak sensor which signals an alarm to sound in the event of a leak.

Bulk fluid storage tanks are typically double-walled to conform to the code requirement for spill containment. Another method of containing leaks is to provide a recessed concrete pit in the bulk fluid storage room directly underneath the bulk fluid tanks. Whichever method is chosen, 110% of the storage capacity of the tank needs to be contained in the event of a leak, as required by code.

#### *Delivery Pumps:*

Fluids need to be pumped from the bulk fluid storage tanks to the point of application in the maintenance bays area.

#### *Piston Pumps:*

Pneumatically-powered piston pumps are powerful enough to transfer the fluid from the storage tank to the point of application, hundreds of feet away. Piston pumps can be mounted



## DESIGN CRITERIA NARRATIVE

directly on top of the tank in order to dampen vibrations. Piston pumps are loud pieces of equipment [73 - 80 dB(A)]. This is one reason to enclose the lubrication storage area with heavy walls to dampen the noise.

*Diaphragm Pumps:*

Diaphragm pumps can also be used to pump fluid from the bulk fluid storage room to the maintenance bays. These pumps do not offer any mechanical advantage - the pressure of the compressed air supply is equal to the pressure of the fluid at the discharge end of the pump at a low flow condition. Diaphragm pumps are typically used for diesel exhaust fluid and engine coolant but are also capable of transferring engine oil, hydraulic oil, automatic transmission fluid, windshield washer fluid, diesel fuel, and gasoline. Special precaution needs to be taken in pumping diesel exhaust fluid to protect the pump and components against corrosion from this type of fluid. Diesel exhaust fluid pumps have either only plastic parts that contact the pumped fluid or it contains stainless steel components.

Another special case involves the pumping of engine coolant when the coolant is provided as a concentrate. A 30 gallon drum of water with a float valve is typically specified when mixing the concentrated engine coolant with the water. The diaphragm pump handles the mixing duty to supply a mixture of coolant to water at the desired ratio.

*Piping:*

The size of each pipe varies according to the distance that the fluid travels from the storage tank to the point of application. In order to

determine the size of the pipe required to ensure that fluid will transfer from the lubrication storage room to the point of application, the lubrication system designer will need to know how many dispensers stemming from the same pipeline header are requested to be in use at any given time. Generally, the pipe size increases as the demand of fluid flow increases. Pipes with a smaller inside diameter restrict the fluid from flowing more than pipes with a larger inside diameter. Wall thicknesses also need to be considered when selecting the pipe in order to provide the rigidity necessary to keep the pipe from bursting. The fluid pressure within the pipe is typically 1000 psi and even more for chassis grease.

The cross section of a header can be designed to decrease over the length of the run from the storage tank to the maintenance bays. This will help to decrease the cost of materials and will also ensure an acceptable fluid pressure at the point of application. The lubrication system designer calculates the size of pipe based on fluid mechanics equations. The pumps are also sized in this way to ensure that the pipe length and the pumps are paired to dispense fluid at the furthest point of application.

The type of the pipe selection varies according to the type of fluid being transferred. Bulk fluid liquids may flow through carbon steel. Compressed air will be routed through copper to prevent corrosion. Compressed air does not require pipe of a high tensile strength because it operates at a comparatively low pressure than other fluids.

*Lubrication/Commodity Hose Reels and Nozzles:*

Lubrication Hose Reels are stationary units in the bays and piped from Bulk Storage Tanks. These reels are located in areas where maintenance and re-filling of fluids occurs, typically overhead on columns or mounted to nearby walls. Technicians have the ability to quickly dispense and measure fluids being dispensed into vehicles.

Hoses comprise the final length of fluid transfer material before exiting through the point of application, the nozzle. Hose reels offer the convenience of retracting the hose with no significant effort by the user to move the hoses out of the work space. This eliminates tripping hazards and it decreases the amount of time it takes to move the hose from the work area. Multiple hose reels can be grouped in parallel and mounted onto the same bracket. In this case, the reels become a reel bank. Hose reels are typically installed overhead on columns, mounted to nearby walls, or are suspended from the ceiling structure. The fluids that the mechanics will be able to dispense include automatic transmission fluid, engine coolant, two types of oil, chassis grease, gear oil, windshield washer fluid, diesel exhaust fluid, compressed air, and water.

*Fluid Management System:*

The volume of several types of fluids that the mechanics dispense can be tracked by use of the fluid management system. The amount of each type of liquid can be monitored by the Fleet Manager to determine the appropriate time to order more bulk fluid from the distributor. The fluid management system tracks the amount of each dispensed liquid by each individual nozzle.



## DESIGN CRITERIA NARRATIVE

With the fluid management system, the user can enter the amount of fluid that they would like to dispense from the nozzle. The pump air controls will allow the transmission of compressed air to the pumps by the storage tank to allow pumping to commence.

### *Waste Recovery System:*

When mechanics drain fluids such as oil and coolant from the vehicles they maintain, they use a mobile receptacle to collect the used fluid. When the mechanics need to empty the used fluid containers, they can roll the units to nearby diaphragm pumps located in the maintenance area and pump the used fluid into their respective storage tanks in the lubrication storage room. Tank level monitors are typically installed in the tanks to signal an alarm to sound when the tank gets above a certain level. When the tank is full, a used fluid evacuation company can be contacted to remove the used fluid from the storage tanks.

### 2.10.21 Support Shop Equipment

Support equipment is included in many areas of the facility to supplement the functions associated with vehicle maintenance. Items such as workbenches, vises, buffer/grinders, drill presses, hydraulic presses, saws, blast cabinets, parts washers, jacks and stands, etc. are all part of an industry standard recommended equipment package.

### 2.10.22 Storage Equipment

Storage systems play a significant role in the layout and operation of a facility. Storage equipment can help with the organization of a

facility, while promoting efficiency in operation and safety. Appropriately sized and located storage equipment also allows for flexibility of storage and shop spaces.

Parts and tool storage areas may consist of a variety of storage equipment items such as shelving units, drawer units, bulk storage and pallet racks, rack system with forklift/crane or motorized carousel and shuttle units.

### 2.10.23 Factors in Equipment Selection

There are several factors that need to be considered in the appropriate storage equipment selection including (but not limited to):

- Desired quantity of stored materials
- Security of stored materials
- Available square footage
- Available height in space

### 2.10.23 Equipment Types

#### *Small Storage Equipment:*

Small storage equipment is used to store a range of small to medium sized parts, materials, and tools. This storage equipment ranges from modular drawer units, shelves, lockable cabinets, and bulk storage racks. Best practices include a mix of these small storage equipment to increase flexibility for the facility.

#### *Bulk, Palletized, and High Density Storage Equipment:*

Bulk, palletized, and high density storage equipment uses the available vertical height and volume of a space to store the materials vertically as opposed to horizontal shelving like traditional shorter shelving racks. These systems reduce the

overall space utilization for parts storage allowing a reduction in the total building area.

This type of storage equipment includes: parts carousels, vertical lift modules, pallet rack, and adjustable racking system.

One issue to consider is the vertical storage of materials may require additional fire protection/suppression systems.

#### *Parts Carousel:*

Parts carousels are an automated parts retrieval and storage system which use the volume of a space to store large amounts of product in a small footprint. The automated system stores product in bins to maximize the storage capacity resulting in less wasted space compared to traditional shelving units.

The Parts carousel system uses bins of various sizes to store parts, materials, and tools. A digital control allows the operator to input a specific part number and the automated shuttle retrieves the tray with the requested part to an opening located at an ergonomic height. This system reduces the distance traveled by the operator to retrieve a parts, increases retrieval accuracy, and increases parts storage security. They also benefit the shelf life of the parts by controlling the environmental and atmospheric impacts on the stored product. The parts carousel length, width, and height is tailored for the specific facility needs. Unlike a vertical lift module, the parts carousels cannot be added on to in the future for additional storage capacity.



## DESIGN CRITERIA NARRATIVE

*Vertical Lift Module:*

Vertical lift modules (VLMs) are an automated parts retrieval and storage system which use the volume of a space to store large amounts of product in a small footprint. The automated system provides greater flexibility in handling different parts, sizes, weights, and accessibility. The VLMs store the trays to maximize the storage capacity and results in less wasted space compared to traditional shelving units. It is estimated VLMs on average save 70-80% of building square footage compared to traditional shelving racks.

The system uses large trays which hold bins of various sizes used to store parts, materials, and tools. A digital control allows the operator to input a specific part number and the automated shuttle retrieves the tray with the requested part to an opening where the operator is standing. This system reduces the distance traveled by the operator to retrieve a part, increases retrieval accuracy, and increases parts storage security. They also benefit the shelf life of the parts by controlling the environmental and atmospheric impacts on the stored product. Another benefit of VLMs is that they offer a means to track inventory effectively.

The VLM length, width, and height is tailored for the specific facility needs. Unlike the parts carousel, if additional storage is needed, VLM height can be increased or extended to allow for increased storage capacity.

The VLM is a costly system compared to traditional storage shelving and racking, but when

comparing it to the amount of equivalent space required to store the same amount of products on traditional shelving, the cost savings is nearly equal. This is due to the fact that the amount of constructed space decreases significantly.

The true savings are realized after the facility is operating as there will be less storage space to heat/cool over the life of the facility. Additionally, the parts staff does not need to spend a significant amount of time walking to retrieve and deliver parts and components.

*Pallet Rack:*

Pallet racks are the most cost effective high density storage solution. The racks are easy to install in a new, renovated, or existing facility and can easily be relocated. Pallet racks are appropriate for storage of larger materials and components.

Pallet racks require a forklift or pallet jack to access the palletized material stored on the racks. Although the pallet rack itself does not require a significant amount of floor space, the access required by a forklift takes up nearly three times the space of the pallet rack.

*Adjustable Racking System:*

Similar to a pallet rack, the adjustable racking system allows for the storage of larger materials, parts, and drums on removable pallets. Unlike traditional pallet rack the adjustable racking system allows for the pallets to be stored at varying heights based on the volume of palletized product. The adjustable racking systems range from 8- to 25-feet high, with the most common systems being around 13- to 15-feet high.

Pallets are stored in "bays" or sections which are sized according to desired pallet size or sizes. The horizontal bay configuration of these systems lends itself to ease of future expansion to the system if necessary.

Pallets are handled by a rack mounted, gantry-type overhead crane and mast. The crane and mast system allows for narrower aisles compared to traditional pallet racks, which typically requires roughly 50% more clearance for forklift access.

This system provides more consistent and organized product storage compared to traditional pallet racks requiring forklift-based solution.

**4.10.24 Tire Storage Equipment***Fabricated Tire Racks:*

Fabricated racks are an economical, durable and low maintenance tire storage option. They can be custom made to meet specific needs for storage capacity, space availability, and room configuration. They can be built vertically up to three tiers high for increased capacity. However, fabricated tire racks require additional equipment, such as a fork lift or pallet jack, for tire retrieval.

This presents the potential for injuries due to dropped tires during the retrieval process.

Depending on configuration, the racks can take up significant floor space, and racks need to be anchored in place to a wall.



## DESIGN CRITERIA NARRATIVE

*Stacking Tire Racks:*

Stacking tire racks allow for vertical storage of entire racks of tires rather than just individual tires, producing time savings when moving large quantities of tires at one time. The racks can be stacked two to three racks high, taking advantage of the vertical space in a shop, while freeing up valuable floor space. The stacks also make it easy and efficient to move an entire rack of tires for shipment or relocation within the shop, rather than moving tires individually.

A forklift or hoist is necessary for retrieval and relocation of racks. Tire retrieval from higher levels of the stacking racks can pose hazards if the racks are fully stacked, or if there is a lack of room to maneuver. Because of the stacked configuration, bottom tires can get a flat spot if stored for too long.

*Tire Storage Carousels*

Tire Storage Carousel systems are one of the more advanced ways to store and organize unmounted tires only. They can be operated with minimal effort by one person for easy tire retrieval. The technician simply rotates the carrier frames, locates the desired set of tires, stops at the proper position, and then, removes the tires safely and efficiently at ground level, all at the touch of a button. In addition to increased efficiency, the system reduces the risk of injuries by letting the machine do the lifting.

Tire Storage Carousels are an automated tire storage system which use the volume of a space to store large quantities of tires in a small footprint. The systems store tires on a series of horizontal beams to maximize the storage

capacity, resulting in less wasted space compared to traditional tire storage racks.

Unlike multi-tier tire racks, tire storage carousels bring the tire to the operator without the aid of a hoist or crane. This results in fewer accidents associated with lifting heavy tires. Tire storage carousels are, however, limited to unmounted rubber tires only. Mounted wheels and tires must be stored on conventional tire storage (floor mounted or multi-level shelving).

The tire storage carousel length, width, and height is tailored for the specific facility needs, including the size of tires to be stored. They are also available in lockable, weatherproof models for placement outside. The tire carousel enables the agency to keep an accurate count of inventory, since all tires are visible and are in one place.

There are a few downsides to tire carousels. As an automated piece of equipment, they require periodic maintenance. This means that tires are not accessible during repairs. The system also becomes inaccessible if an when the power is out. As with any equipment with moving parts, safety protocol is necessary to prevent injuries while the machine is in motion.

**2.10.25 Fall Protection**

Fall protection systems are necessary any time routine maintenance is being performed on the roof of the vehicle and operation of a facility. It is important to note that when fall protection systems are properly integrated into the overall design of the facility it is more likely they will be used on a regular basis.

**2.10.26 Factors in Equipment Selection**

There are several factors that go into the appropriate storage equipment selection including (but not limited to):

- Other Overhead Systems and/or Equipment
- Facility Budget

**2.10.27 Equipment Types***Portable Fall Protection Systems:*

A variety of portable systems are available that allow flexibility among the various bays and are typically less expensive and less impactful on the structure of the facility.

Possibly one of the greatest benefits to the portable fall protection systems is that they do not require any infrastructure such as special beams or bracing. They are a cost-effective solution to a facility renovation or upgrade. Additionally, they can be used anywhere in a facility, even areas with overhead crane equipment.

While these systems may seem like a viable option, one of the drawbacks to these systems is the effort required to move these into position to access the vehicle roof.

*Overhead Fall Arrest Systems:*

Overhead Fall Arrest systems are engineered systems designed into the structural building system. These systems typically operate along a mono-directional path to allow personally to travel the length of the vehicle roof.

The two main options for structurally integrated fall arrest systems are I-beam or track systems. Each option offers a variety of designs that can be



## DESIGN CRITERIA NARRATIVE

tailored to the specific vehicle and condition fall arrest condition.

*I-Beam Fall Arrest System:*

The I-Beam Fall Arrest System is integral to the structure of the building attached to the I-Beam above.

*Track Fall Arrest System:*

Track Fall Arrest System is a separate track that is provided by a manufacturer

*Pit Protection Systems:*

Lower Level Work Areas/Pits require a system to eliminate a potential fall into an open pit. The two main systems are removable steel pit covers and movable nets suspended from cables. Each design allows the technician working in the pit to access the area which they are performing maintenance or inspection work while protecting the opening above.

*Steel Pit Covers:*

The steel pit covers are customized to fit the width and length of the pit opening. The pit covers are positioned on an embedded angle in the pit opening and are typically flush with the finish floor to lessen the chances of personnel tripping while near the opening. The small openings prevent most tools and parts falling through the pit.

The pit covers are removable and allow the mechanic to remove one or multiple adjacent sections to access the underside of a vehicle. The pit covers simply stack on the adjacent cover and when the work is complete, the mechanic slides the section back into place.

Typical lengths of pit covers range from three- to four-feet and must weigh less than 50 pounds per OSHA requirements. Another advantage of the steel pit covers is that they are easy to clean off any oils and grease.

*Pit Safety Netting:*

The pit safety netting is a convenient solution to cover a pit opening. The netting allows a mechanic to enter a pit and easily drag the net the desired length of the opening to inspect the underside of a vehicle. Unlike the pit covers, if work is performed under the center of the vehicle or opening, the mechanic is required to drag the net to the required work position. Whereas the pit covers can be removed a section at a time. Once work on the vehicle is complete, the mechanic must drag the netting to effectively 'close' the opening. If this is forgotten or not performed, the mechanic may drive the vehicle out of the bay and expose the pit opening resulting in a safety hazard.

One advantage of the pit netting is a low installation costs. However, there are significant drawbacks of nets including they will sag over time and should be replaced as recommended by the manufacturer, effectively offsetting the lower initial installation costs. Unlike the pit covers, the netting openings do not prevent small tools and parts from falling through the pit opening. These openings can also be a hazard for personnel who may trip and fall into the pit netting.



## INTRODUCTION

This document presents the Design Criteria for the proposed Hatch San Francisco SFMTA facilities, by providing both micro and macro level design requirements. The Design Criteria format found in this section consists of Functional Area Modules. The Functional Area Module represents a detailed description of specific design issues for each of the areas listed in the Space Needs Program. Reference Space Needs Program for specific Scenarios. All Modules and related equipment are for representation purposes only and do not necessarily depict strict design conformance.

### 3.0 Sustainable Design

There are several sustainable design opportunities which can be approached at the new San Francisco SFTMTA facilities. Regardless of whether San Francisco Metropolitan Transportation Authority chooses to achieve LEED rating or not, these are good design practices. The Sustainable Design section outlines potential sustainable design opportunities appropriate for this type of facility. These options are broken into site features, Building Design and Materials, Mechanical Systems, Electrical Systems, and Plumbing Systems.

### 3.1 Utilities Design

The utilities for the maintenance facility are numerous and require close attention to detail. The coordination of the HVAC, electrical, and plumbing systems are critical to the proper function of the Shop and the heart of the facility. Providing an organized installation and design of these systems will make them easier to maintain in the future.

### 3.2 Abbreviations

A	=	Amperes	ICC	=	International Code Council
ADA	=	American Disabilities Act	IDF	=	intermediate distribution frame
AFF	=	Above Finished Floor	IES	=	Illuminating Engineering Society
AHJ	=	Authority Having Jurisdiction	K	=	1,000 Pounds
ASHRAE	=	American Society of Heating and Refrigeration Association of Engineers	lb	=	Pound
			LED	=	Light Emitting Diode
ATF	=	Automatic Transmission Fluid	LEED	=	Leadership in Energy and Environmental Design
BICSI	=	Building Industry Consulting Service International	LEL	=	Lower Limit Explosive Limit
BRBF	=	Buckling Restrained Brace Frame	LLWA	=	Lower Level Work Area
CA	=	Compressed Air	Max	=	Maximum
CBC	=	California Building Code	MDF	=	Main Distribution Frame
CE	=	Computer Equipment	Mech	=	Mechanical
CEC	=	California Energy Code	Min	=	Minimum
CFC	=	California Fire Code	MPOE	=	Main Point of Entry
CFM	=	Cubic Feet Per Minute	MTC	=	Main Telecommunication Center
CG	=	Chassis Grease	MUD	=	Mixed Use Development
Circ	=	Circulation	NEC	=	National Electric Code
CMC	=	California Mechanical Code	NFPA	=	National Fire Protection Association
CNG	=	Compressed Natural Gas	NG	=	Natural Gas
CO	=	Carbon Monoxide	NO2	=	Nitrogen Dioxide
CO2	=	Carbon Dioxide	OC	=	Overhead Cabinet
CPC	=	California Plumbing Code	OSHA	=	Occupational Safety and Health
CWA	=	Common Work Area	PA	=	Public Address
dB(A)	=	Decibels, A-Weighted	PDI	=	Plumbing and Drainage Institute
DEF	=	Diesel Exhaust Fluid	PDR	=	Production Distribution Repair
Demo	=	Demolition	PES	=	Portable Equipment Storage
Div	=	Division	PSI	=	Pounds Per Square Inch
DX	=	Direct Expansion	RFID	=	Radio-Frequency Identification
EC	=	Engine Coolant	RLWP	=	Roof Level Work Platform
Elec	=	Electrical	SF	=	Square Feet
EO	=	Engine Oil	Struc	=	Structural
fc	=	Foot Candle	TBD	=	To Be Determined
FPS	=	Feet Per Second	TBS	=	ToolBox Storage
GFI	=	Ground Fault Interrupter	TC	=	Task Chair
GO	=	Gear Oil	Typ	=	Typical
GPF	=	Gallons Per Flush	UC	=	Used Coolant
GPM	=	Gallons Per Minute	UO	=	Used Oil
GSF	=	Gross Square Feet	UPS	=	Uninterruptible Power Supply
H2	=	Hydrogen	USGBC	=	United States Green Building Council
HFHC	=	Hydrochlorofluorocarbons	VAC	=	Volts AC
HO	=	Hydraulic Oil	VCT	=	Vinyl Composite Tile
HVAC	=	Heating, Ventilation and Air Conditioning	VLM	=	Vehicle Lift Module
			VOC	=	Volatile Organic Compound
			VSS	=	Video Surveillance System
			W	=	Water
			WWF	=	Windshield Washer Fluid



## SUSTAINABLE DESIGN

### 3.3 Creating Sustainable Facilities

Sustainability is an essential and fundamental component of the facility. The key sustainability issues that should be explored in the planning and development of the facility include, but are not limited to, the following key points.

### 3.4 Balance Between Economic and Environmental Needs

To balance both economic and environmental needs that minimize environmental impacts, the facility design should maximize employee health, safety, and operation efficiencies. This priority objective should be considered at all stages of development of the facility.

### 3.5 Efficient Use of Resource Materials

Material resources are valuable and an efficient use should be encouraged in the development and operations of the facility. This can be implemented through the use of reusable, recyclable, and biodegradable materials as well as mandating the use of products that are extracted, harvested, and manufactured locally.

### 3.6 Efficient Use of Water Resources

The facility plan should encourage efficient use of water resources by sustaining habitats and ecosystems through resourceful planning. Examples could include the implementation of an effective storm water management plan and the use of environmentally compliant wash bays to service all vehicles.

### 3.7 Energy Efficiency/Renewable Energy Systems

Explore and promote opportunities to increase energy savings at the facility through the use of high-performance systems combined with utilizing renewable energy sources like solar, wind, and daylight harvesting.

### 3.8 Construction Methods

Methods of construction of the facility play a significant role in sustaining the environment. Utilizing strategies that minimize transportation costs by utilizing local resources and recycling procedures during construction to divert material from landfills will conserve energy and minimize pollution.

### 3.9 Sustainable Criteria

The following is a list of potential strategies to achieve sustainable building design.

- Operable windows/natural ventilation
- Lighting controls: Occupancy sensors, vacancy sensors
- Lighting designed to meet targeted LEED points
- Utilize daylighting strategies and daylight harvesting
- Provide user-adjustable comfort and lighting controls
- Underfloor ventilation
- In-floor radiant heating and cooling
- Water reclamation system
- Use of reclaimed water for vehicle washing

### 3.10 LEED Certifications

LEED, or Leadership in Energy & Environmental Design, is a green building certification program that recognizes best-in-class building strategies and practices. To receive LEED certification, building projects satisfy prerequisites and earn points to achieve different levels of certification. Prerequisites and credits differ for each rating system, and teams choose the best fit for their project.

Each rating system groups requirements that address the unique needs of building and project types on their path towards LEED certification. Once a project team chooses a rating system, they'll use the appropriate credits to guide design and operational decisions.

SFMTA guidelines are to meet LEED Gold Certification.

- |             |                 |
|-------------|-----------------|
| ▪ Platinum  | 80+ points      |
| ▪ Gold      | 60 to 79 points |
| ▪ Silver    | 50 to 59 points |
| ▪ Certified | 40 to 49 points |

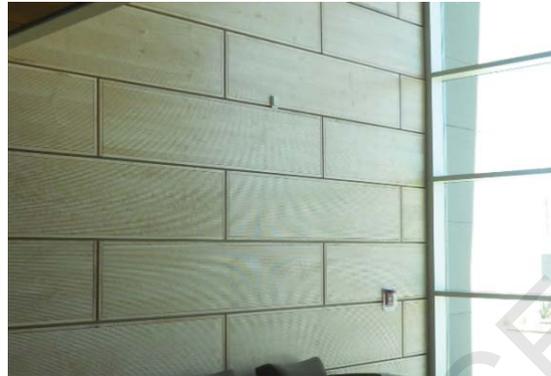


## SUSTAINABLE DESIGN

## 3.11 Building Design and Materials

Design and materials that facilitate sustainability include, but are not limited to:

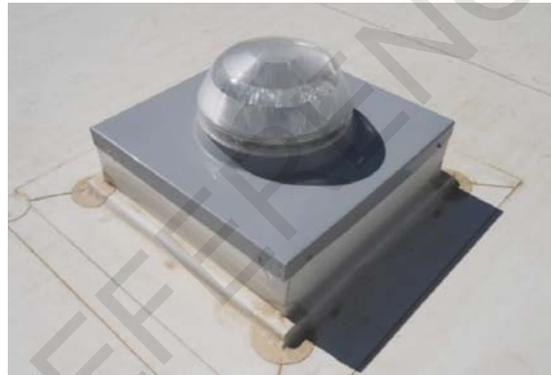
- Use durable long lasting building materials
- Natural light
  - ✓ Skylights
  - ✓ Clerestory
  - ✓ Roof monitors
  - ✓ Windows in bay doors
- Operable windows for natural ventilation
- Low Volatile Organic Compound (VOC) finish materials
- Use of local building products
- Use of recycled content of materials
- High R-Value roof and wall insulation
- Insulated value bay doors
- Low U-value windows and skylights
- Cleanable and maintainable light colored reflective floors, walls, and ceilings



Translucent clerestory windows natural light



Insulated translucent sectional door



Solar tube day lighting strategy



Light reflective floor

## SUSTAINABLE DESIGN

## 3.12 Mechanical Systems

Mechanical systems that facilitate sustainability include, but are not limited to:

- Additional cost alternative: Radiant floor slab heating
- Variable air volume air handling units
- Variable frequency drive motors
- High efficiency motors for air handling units and DX compressors
- Economizers for free cooling with 100% outside air at air handling units
- Demand control ventilation with CO2 and occupancy sensors for reducing ventilation requirements during unoccupied periods



Destratification fan



Heat recovery piping

## 3.13 Additional Cost Alternatives

- Radiant floor slab heating
- Thermal solar heating for domestic water heater
- High efficiency boiler for hydronic heating loop
- Ground source heat pumps
- Destratification fans



Underfloor air distribution vent



Radiant floor system

**SUSTAINABLE DESIGN**

**3.14 Electrical Systems**

Electrical systems that facilitate sustainability include, but are not limited to:

- Provision for photovoltaic panels to be installed on the roof
- Provision for future photovoltaic panels to be installed on shade structures located in the parking lot
- Maximize lighting controls with daylight harvesting and occupancy and vacancy sensors
- LED lighting systems
- Task lighting in Repair Bays
- Efficient process equipment



LED lighting



Photovoltaic panels on roof

**3.15 Plumbing Systems**

Plumbing systems that facilitate sustainability include, but are not limited to:

- Rainwater harvesting for irrigation
- Vehicle wash water reclaim
- Low flow plumbing fixtures
- Sensor operated faucets
- Grey water (purple pipe) for water closets
- Tankless water heaters



Dual flush toilet



Low-flow plumbing fixtures



Wash water reclaim system



Rainwater harvesting

## UTILITIES DESIGN

**4.0 Architectural/Structural**

- Coordinate routing, support systems, and clearances for mechanical ductwork, plumbing piping and electrical conduit
- Routing shall run above forklift and walk aisles
- Group wherever possible

**4.1 Mechanical Systems**

- Route main ventilation ductwork above walk/forklift aisles
- Use mezzanines for mechanical units

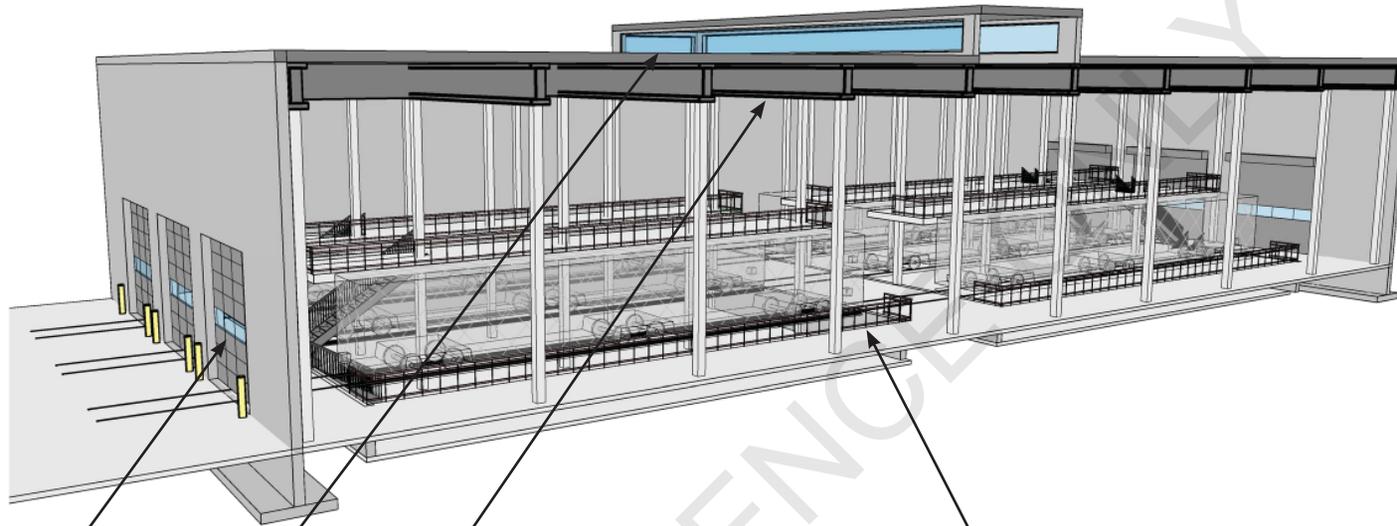
**4.2 Plumbing Systems**

- Route water, gas, service equipment piping above ground and above walk/forklift aisles

**4.3 Electrical Systems**

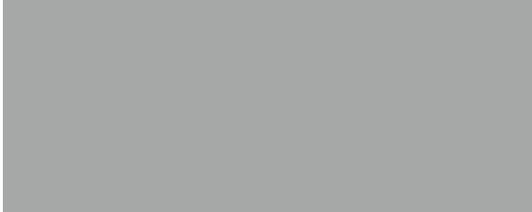
- Route main conduit runs above ground and above walk/forklift aisles.
- Communication systems
- Route branch circuits, equipment feeds above ground to facilitate future renovations

UTILITIES DESIGN



- Geothermal
- Daylighting through skylights/clearstories/roof/monitors/windows in bay doors
- Low VOC finishes
- Operable windows/natural ventilation
- Use of recycled content of materials
- Destratification fans in high bay areas

- Radiant floor slab heating
- Air quality sensors for exhaust fan controls
- Use of durable, long-lasting buildign materials
- Occupancy sensors
- View windows in overhead doors
- Use of local building products

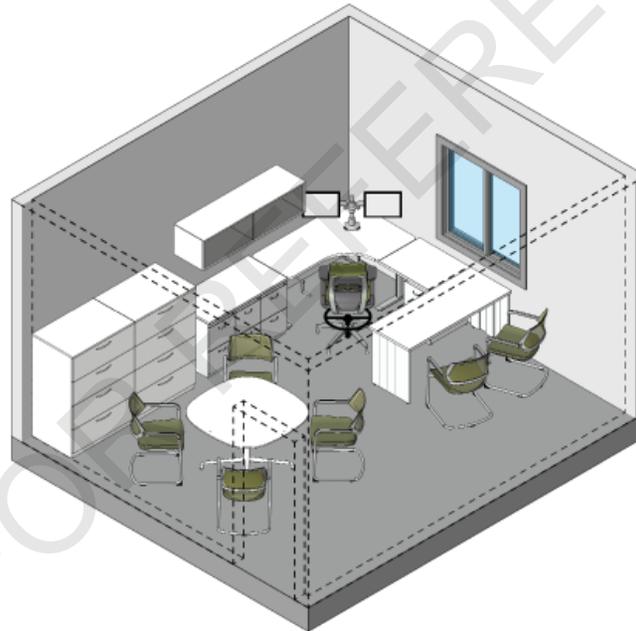
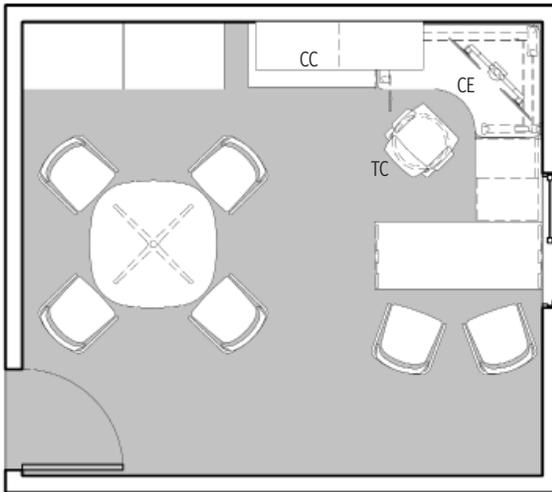


OFFICE MODULES

FOR REFERENCE ONLY



## PRIVATE OFFICE - 224 SF



## FUNCTION

Private office for completing work tasks and holding small meetings.

## RELATIONSHIP TO OTHER AREAS

- Case specific; reference general module: office areas specific to each group

## RECOMMENDED CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

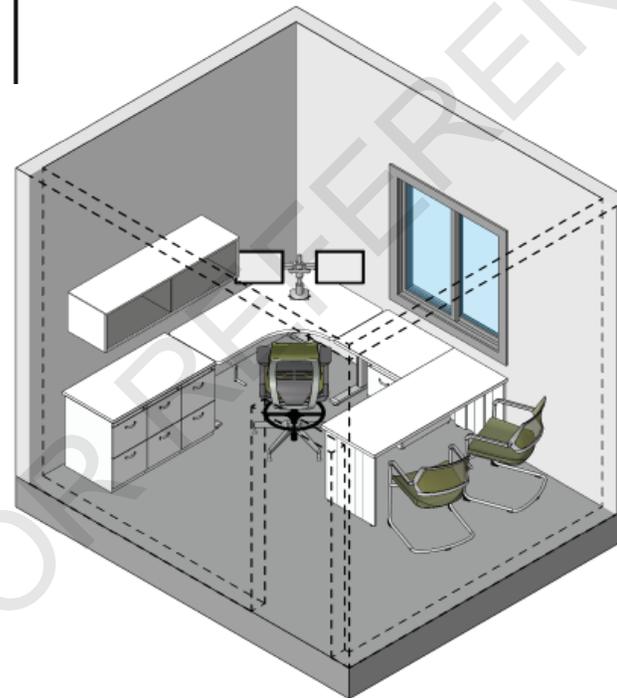
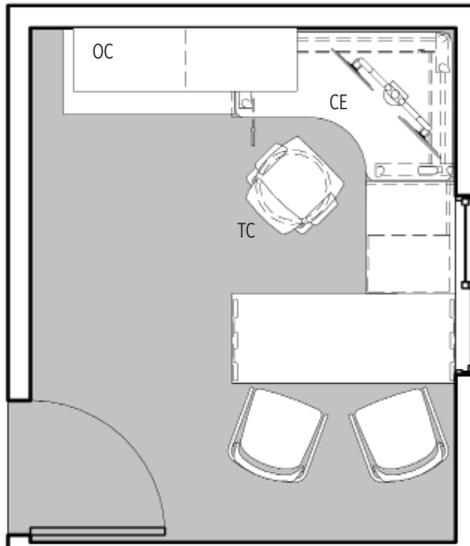
## TYPICAL EQUIPMENT/FURNISHINGS

- Task chair
- Sit/stand workstation
- Under surface vertical files
- Cabinets
- Table & Chairs

## TYPICAL DESIGN FEATURES

- Furniture: Use owner furniture standards (if applicable)
- Flooring:
  - ✓ Carpet tile floor with rubber base for Administration or Operations areas (recommended)
  - ✓ Resilient floor covering with base for maintenance areas (recommended).
- Walls:
  - ✓ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile (recommended)
- Doors: Single leaf 3'-0" door with loadable lever set hardware (recommended)
  - ✓ Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degree Fahrenheit
  - ✓ Cooling set point: 74 degree Fahrenheit
- Electrical:
  - ✓ LED Lighting in accordance with IES recommendation (35 foot candles average)
  - ✓ Provide (four minimum) general purpose duplex receptacles and a quad receptacle at each workstation
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and conduit rough-ins to three other locations in room
- Lighting Control:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

## PRIVATE OFFICE - 120 SF

**FUNCTION**

Private office for completing work tasks and holding one on one meetings.

**RELATIONSHIP TO OTHER AREAS**

- Case specific; reference general module: office areas specific to each group

**RECOMMENDED CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

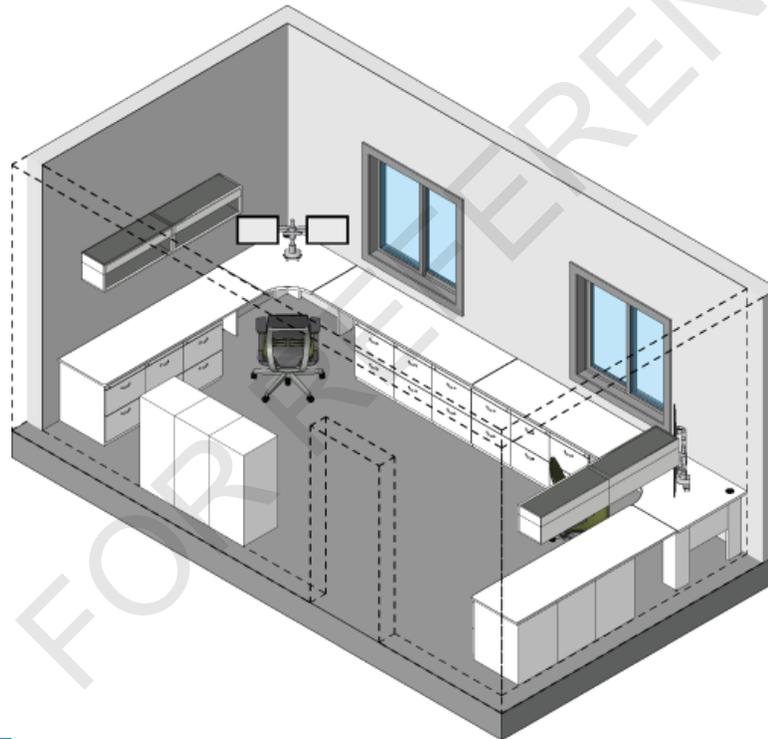
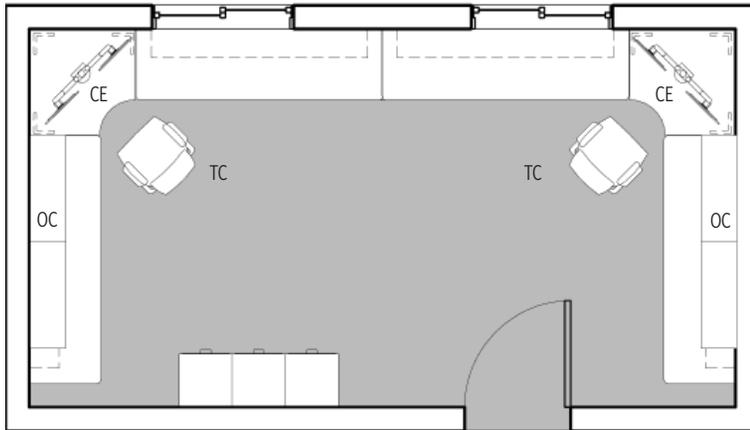
**TYPICAL EQUIPMENT/FURNISHINGS**

- Task chair
- Sit/stand workstation
- Under surface vertical files
- Cabinets
- Guest chairs

**TYPICAL DESIGN FEATURES**

- Furniture: Use owner furniture standards (if applicable)
- Flooring:
  - ✓ Carpet tile floor with rubber base for Administration or Operations areas (recommended)
  - ✓ Resilient floor covering with base for maintenance areas (recommended).
- Walls:
  - ✓ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile (recommended)
- Doors: Single leaf 3'-0" door with loadable lever set hardware (recommended)
  - ✓ Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degree Fahrenheit
  - ✓ Cooling set point: 74 degree Fahrenheit
- Electrical:
  - ✓ LED Lighting in accordance with IES recommendation (35 foot candles average)
  - ✓ Provide (four minimum) general purpose duplex receptacles and a quad receptacle at each workstation
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and conduit rough-ins to three other locations in room
- Lighting Control:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

## SHARED OFFICE - 120 SF



## FUNCTION

Enclosed shared office with separate workstations for each occupant to complete work tasks.

## RELATIONSHIP TO OTHER AREAS

- Case specific; reference office general module: office areas specific to each group

## RECOMMENDED CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

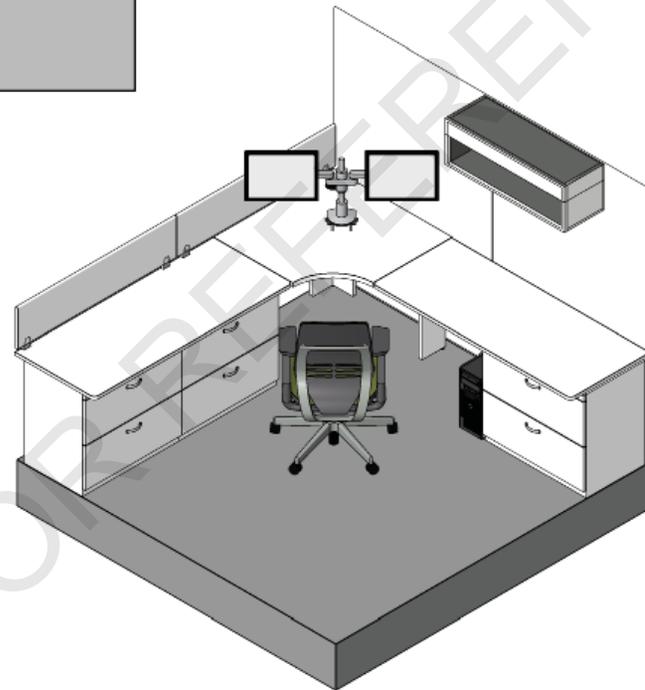
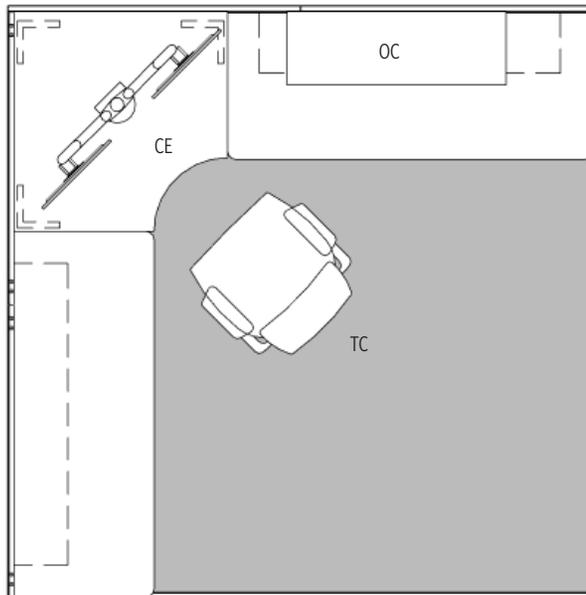
## TYPICAL EQUIPMENT/FURNISHINGS

- Task chair
- Sit/stand workstations
- Under surface vertical files
- Cabinets

## TYPICAL DESIGN FEATURES

- Furniture: Use owner furniture standards (if applicable)
- Flooring:
  - ✓ Carpet tile floor with rubber base for Administration or Operations areas (recommended)
  - ✓ Resilient floor covering with base for maintenance areas (recommended).
- Walls:
  - ✓ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile (recommended)
- Doors: Single leaf 3'-0" door with loadable lever set hardware (recommended)
  - ✓ Electronically secured entry (as required)
- Daylighting: Exterior window or vision glass desired
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degree Fahrenheit
  - ✓ Cooling set point: 74 degree Fahrenheit
- Electrical:
  - ✓ LED Lighting in accordance with IES recommendation (35 foot candles average)
  - ✓ Provide (four minimum) general purpose duplex receptacles and a quad receptacle at each workstation
  - ✓ Provide one data outlet with four data ports at each workstation
  - ✓ Provide box and conduit rough-ins to three other locations in room
- Lighting Control:
  - ✓ Dimmable, indirect lighting with vacancy sensor
  - ✓ Task lighting (recommended)

## WORKSTATION - 64 SF



## FUNCTION

Open office workstation to complete work tasks.

## RELATIONSHIP TO OTHER AREAS

- Case specific; reference office general module: office areas specific to each group

## RECOMMENDED CRITICAL DIMENSIONS

- 9'-0" vertical clearance (minimum)

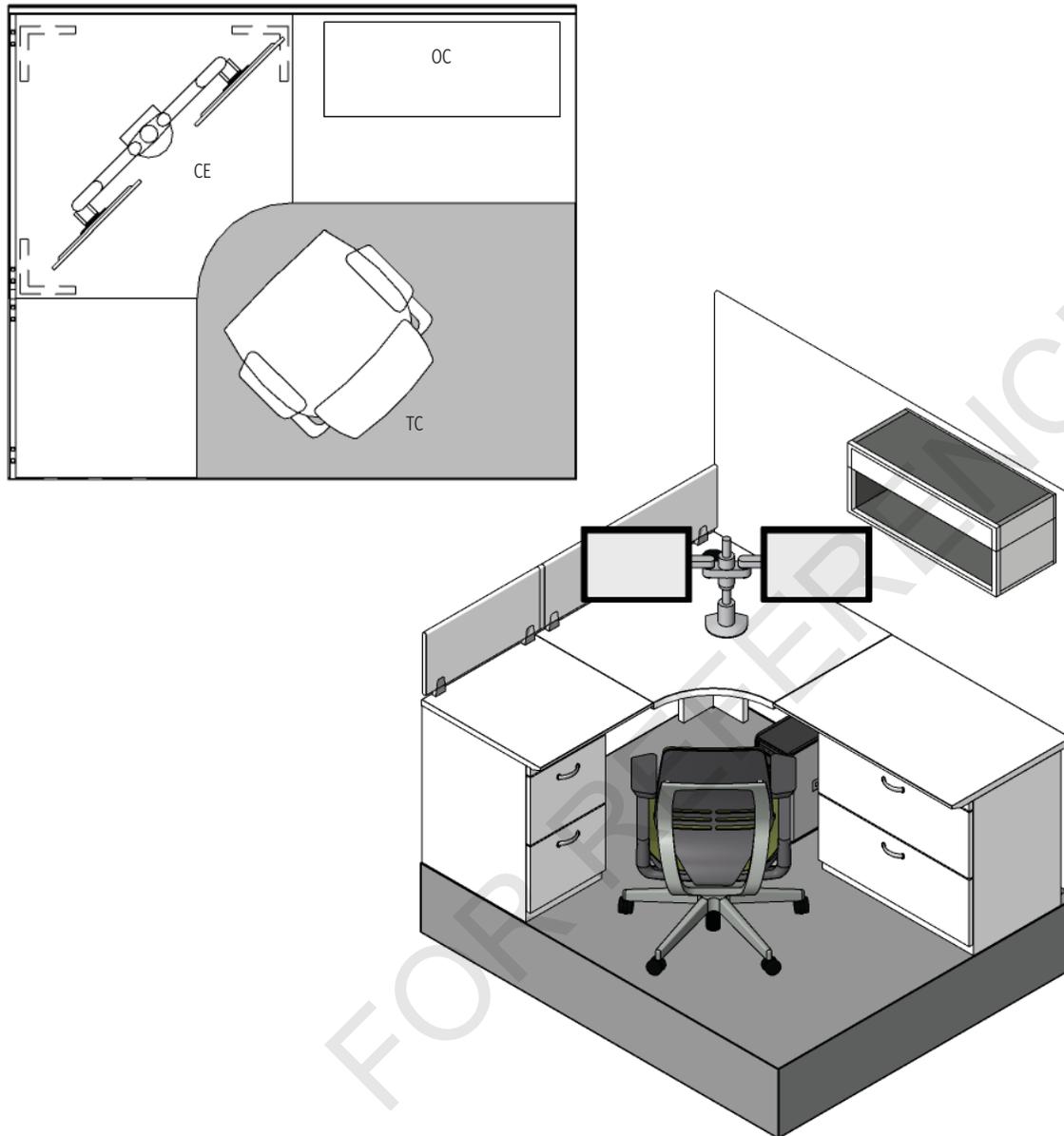
## TYPICAL EQUIPMENT/FURNISHINGS

- Task chair
- Workstation
- Under surface vertical files

## TYPICAL DESIGN FEATURES

- Furniture: Use owner furniture standards (if applicable)
- Flooring:
  - ✓ Carpet tile floor with rubber base for Administration or Operations areas (recommended)
  - ✓ Resilient floor covering with base for maintenance areas (recommended).
- Ceiling: Acoustical ceiling tile (recommended)
- Daylighting: Access to natural light
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Electrical:
  - ✓ LED lighting in accordance with IES recommendation (35 foot candles average)
  - ✓ Provide (three minimum) general purpose duplex receptacles and a quad receptacle at workstation
  - ✓ Provide one data outlet with four data ports at workstation
- Lighting Control:
  - ✓ Verify feasibility of providing individual control of selected luminaires.
  - ✓ Task lighting (recommended as required)

## WORKSTATION - 36 SF



## FUNCTION

Open office workstation to complete work tasks .

## RELATIONSHIP TO OTHER AREAS

- Case specific; reference office general module: office areas specific to each group

## RECOMMENDED CRITICAL DIMENSIONS

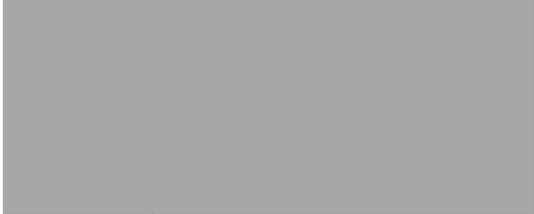
- 9'-0" vertical clearance (minimum)

## TYPICAL EQUIPMENT/FURNISHINGS

- Task chair
- Workstation
- Under surface vertical files
- Cabinets

## TYPICAL DESIGN FEATURES

- Furniture: Use owner furniture standards (if applicable)
- Flooring:
  - ✓ Carpet tile floor with rubber base for Administration or Operations areas (recommended)
  - ✓ Resilient floor covering with base for maintenance areas (recommended).
- Ceiling: Acoustical ceiling tile (recommended)
- Daylighting: Access to natural light
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Electrical:
  - ✓ LED lighting in accordance with IES recommendation (35 foot candles average)
  - ✓ Provide (three minimum) general purpose duplex receptacles and a quad receptacle at workstation
  - ✓ Provide one data outlet with four data ports at workstation
- Lighting Control:
  - ✓ Verify feasibility of providing individual control of selected luminaires.
  - ✓ Task lighting (recommended as required)

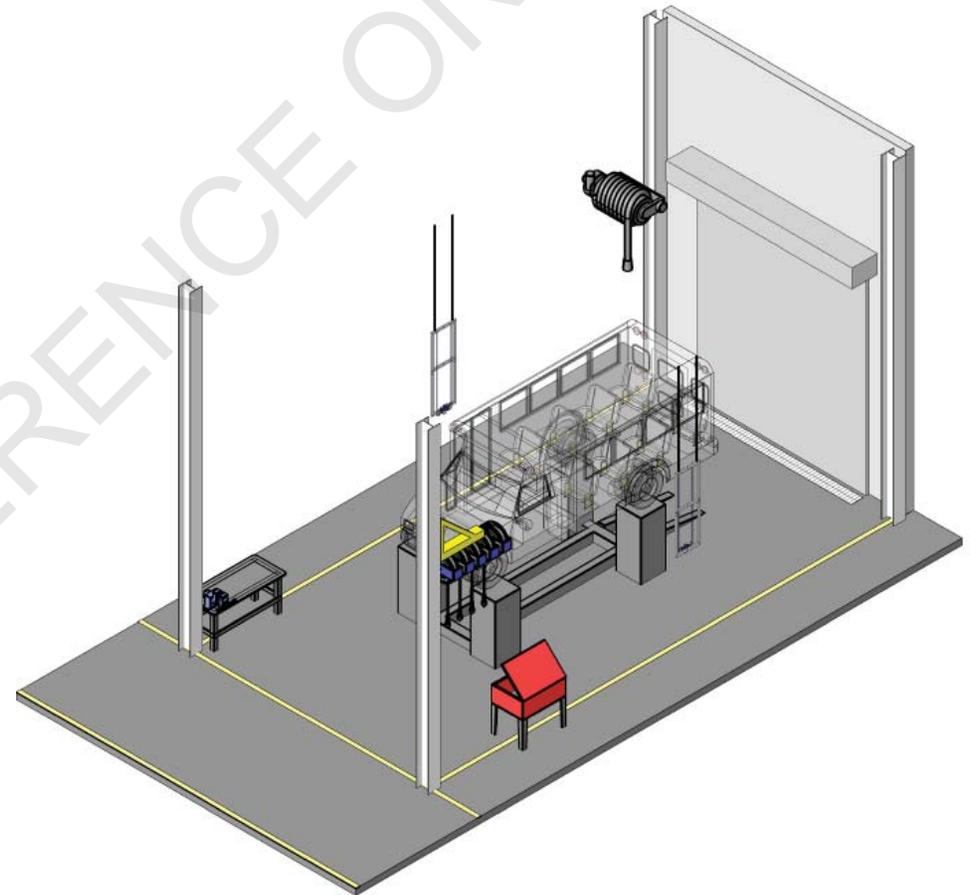
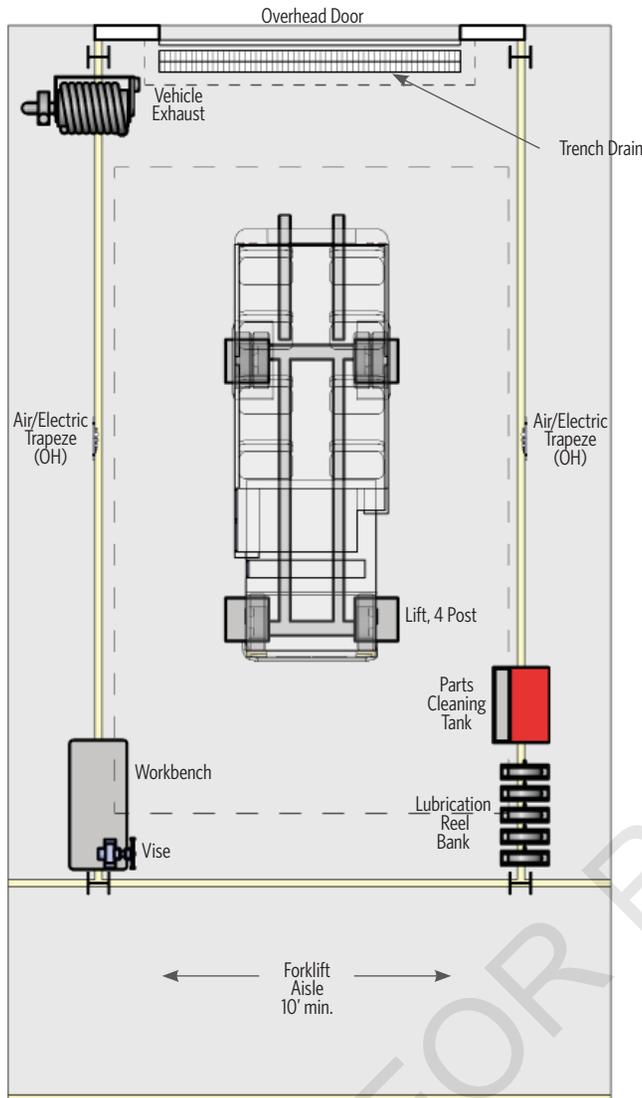


BAYS, SHOPS, & PARTS

FOR REFERENCE ONLY



MAINTENANCE BAYS



**MAINTENANCE BAYS**

**FUNCTION**

Perform general repair and maintenance on paratransit vehicles.

**RELATIONSHIP TO OTHER AREAS**

- Access to Common Work Area, Portable Equipment Storage, Tire and Brake Shop, Parts Room, and Office areas

**RECOMMENDED CRITICAL DIMENSIONS**

- 19'-0" vertical clearance to structure and fixtures
- 20'-0" wide x 40'-0" long

**TYPICAL EQUIPMENT/FURNISHINGS**

- Severe use workbench with vise (one per bay)
- Parts cleaning tank (shared)
- Lubrication reel bank (shared one per two bays)
- Vehicle exhaust (one per bay)
- Air/electric trapese

**TYPICAL DESIGN FEATURES**

- Forklift access
- Blend of lifts and flat floor bays
- Natural Daylighting desired

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities with light colored finish
- Doors:
  - ✓ Personnel door with view panel to meet applicable code exit requirements
  - ✓ Exterior overhead doors: High-lifting sectional, steel, insulated, 14'-0" x 14'-0" with view panels, automatic operator, interior and exterior push button controls with lockout on exterior
  - ✓ Bollards on exterior at jambs of overhead door (two each)

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)
- Floor slab designed to accommodate forklift access

**MECHANICAL CONSIDERATIONS**

- Wall mounted or overhead vehicle exhaust system with exhaust hose on a motorized reel with integral exhaust fan and automatic fan switch
- As required by equipment
- Ventilation:
  - ✓ Four air changes per hour continuous exhaust to clear any hazardous gas accumulation
- No heating devices with open flame or heaters with temperatures greater than 800 degrees Fahrenheit in Class 1 Division 2 rated areas (used for alternative fuels only)
- Heating set point: 65 degrees Fahrenheit
- In-floor radiant heat (if desired)

**PLUMBING CONSIDERATIONS**

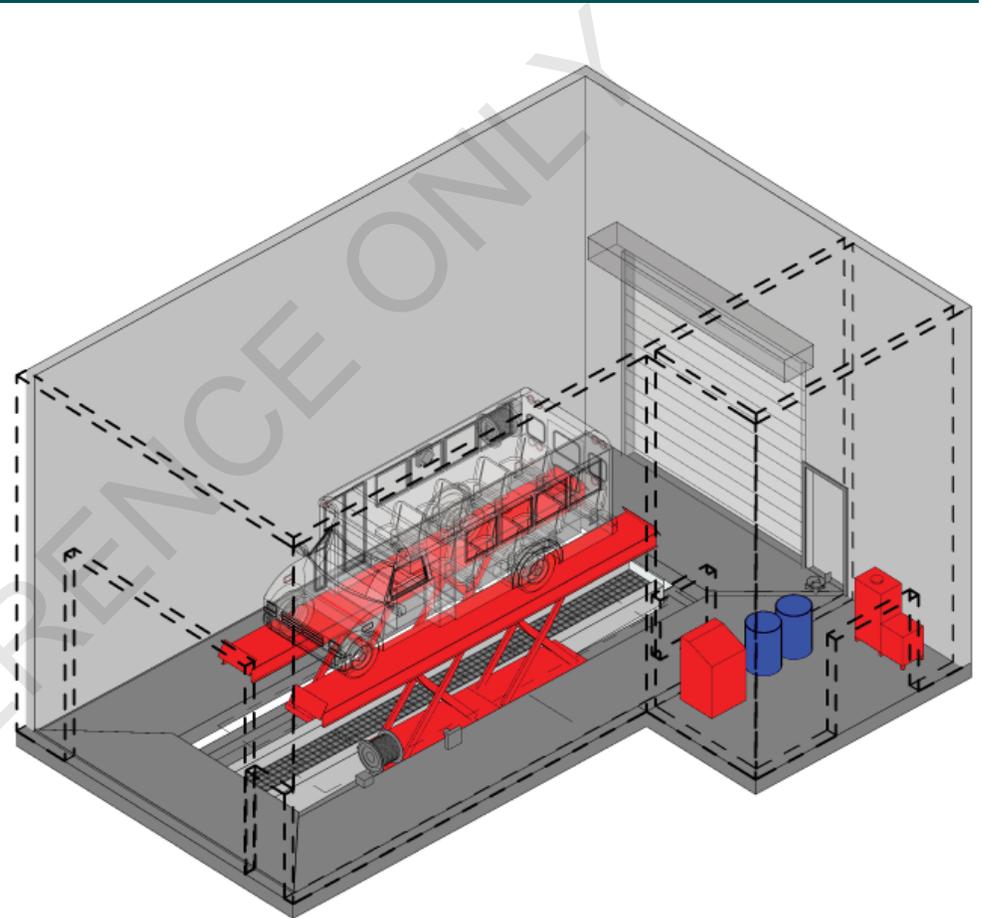
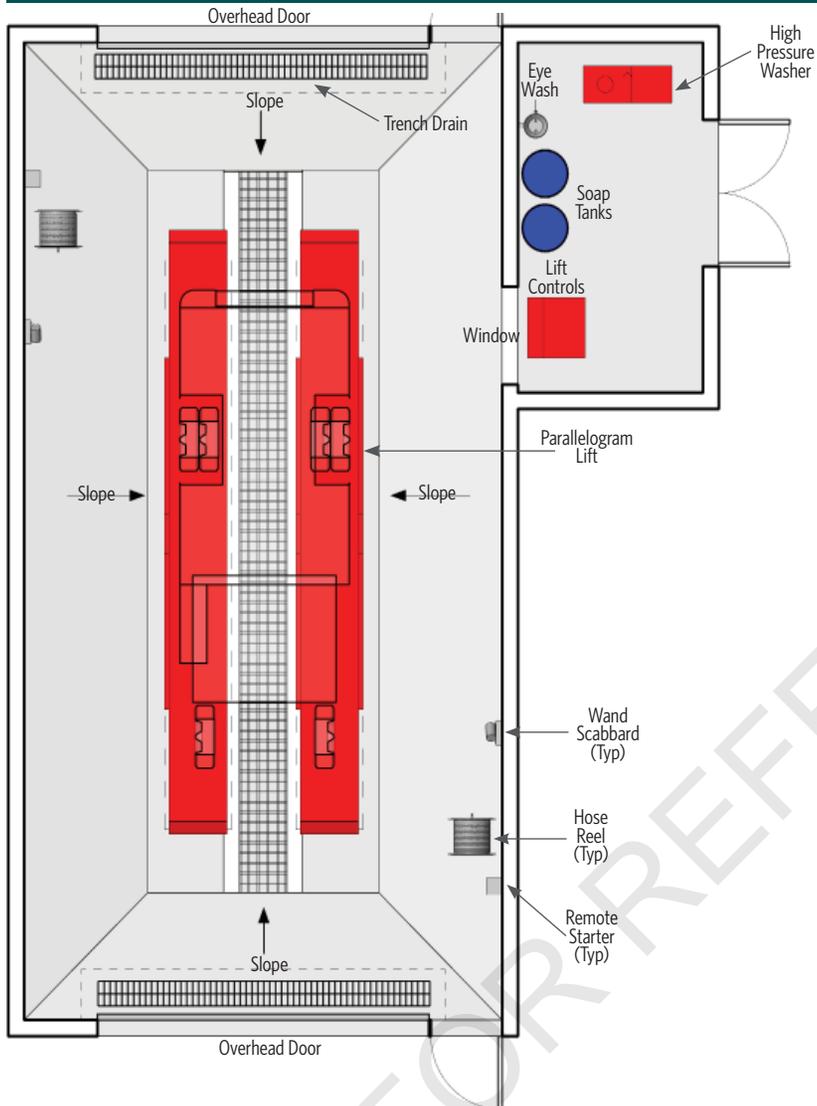
- Trench drain at overhead door with removable cover to central sediment and oil interceptor
- Lubrication reel bank (shared one per two bays)
- 3/4" water hose bibb with standard faucet at rear of bay 2'-0" AFF (one per three bays)
- Compressed air:
  - ✓ 2" compressed air piping loop (minimum)
  - ✓ Compressed air drops with cut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - ✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design
  - ✓ As required by equipment
- As required by equipment

**ELECTRICAL CONSIDERATIONS**

- Lighting: LED lighting in accordance with IES recommendation minimum, 75 fc average, fixtures located to illuminate work spaces and around the vehicles
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide (four minimum) general purpose duplex receptacles on walls, columns, and between overhead doors
  - ✓ Dedicated computer receptacle, adjacent to data conduit on column adjacent to workbench
  - ✓ As required by equipment
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns at each bay



**CHASSIS WASH BAY**



**CHASSIS WASH BAY**

**FUNCTION**

Enclosed bay for washing of underside of paratransit vehicles before bringing into repair bays. Wash Equipment Room: A room adjacent to the Wash Bay for high pressure washer and soap drums

**RELATIONSHIP TO OTHER AREAS**

- Access to all other shop areas

**RECOMMENDED CRITICAL DIMENSIONS**

- 19'-0" vertical clearance
- 25'-0" wide x 40'-0" long

**TYPICAL EQUIPMENT/FURNISHINGS**

- Wand scabbard, wash controls, 50'-0" hose with reel
- Wash Equipment Room: High pressure washer and soap drum

**TYPICAL DESIGN FEATURES**

- Forklift access
- Natural Daylighting desired

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete with chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry with polyurea coatings treatment for wet and moisture protection
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities with light colored finish
- Doors:
  - ✓ Personnel doors with view panels to meet applicable code exit requirements
  - ✓ Exterior overhead door: Air operated, high lifting sectional, polycarbonate, 14'-0" x 14'-0", with view panels, automatic operator, interior and exterior push button controls and lockout on exterior
- Bollards on exterior jambs of overhead door (two each)

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structural grating over sump pit to accommodate H-20 loading
- Large grated sump with side drain for overflow
- Slope floor to trench drain and sump pit
- Structure as needed to support equipment

**MECHANICAL CONSIDERATIONS**

- Special ventilation to remove moisture, low air supply to eliminate steam
- Water resistant heating system
- In-floor radiant heating (if desired)
- As required by equipment
- Exhaust: Minimum 10 air changes per hour when wash equipment is activated. Minimum one air change per hour when wash equipment is inactive
- Heating set point: 55 degrees Fahrenheit

**PLUMBING CONSIDERATIONS**

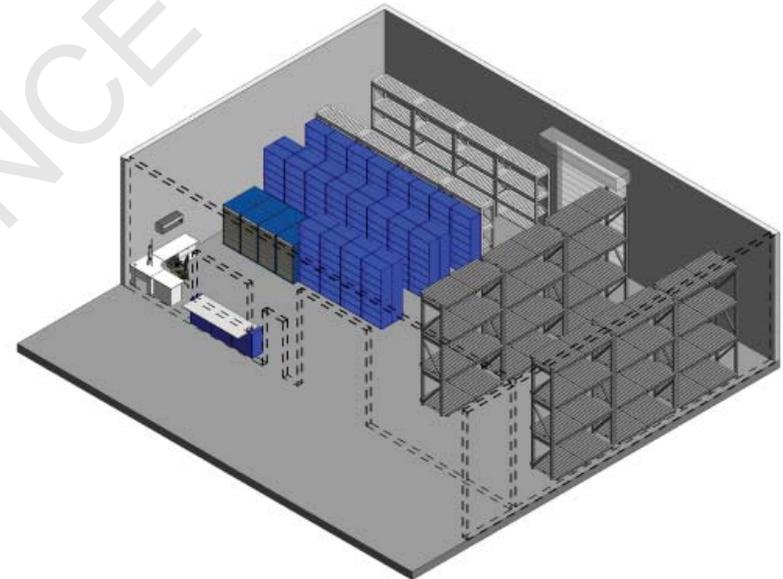
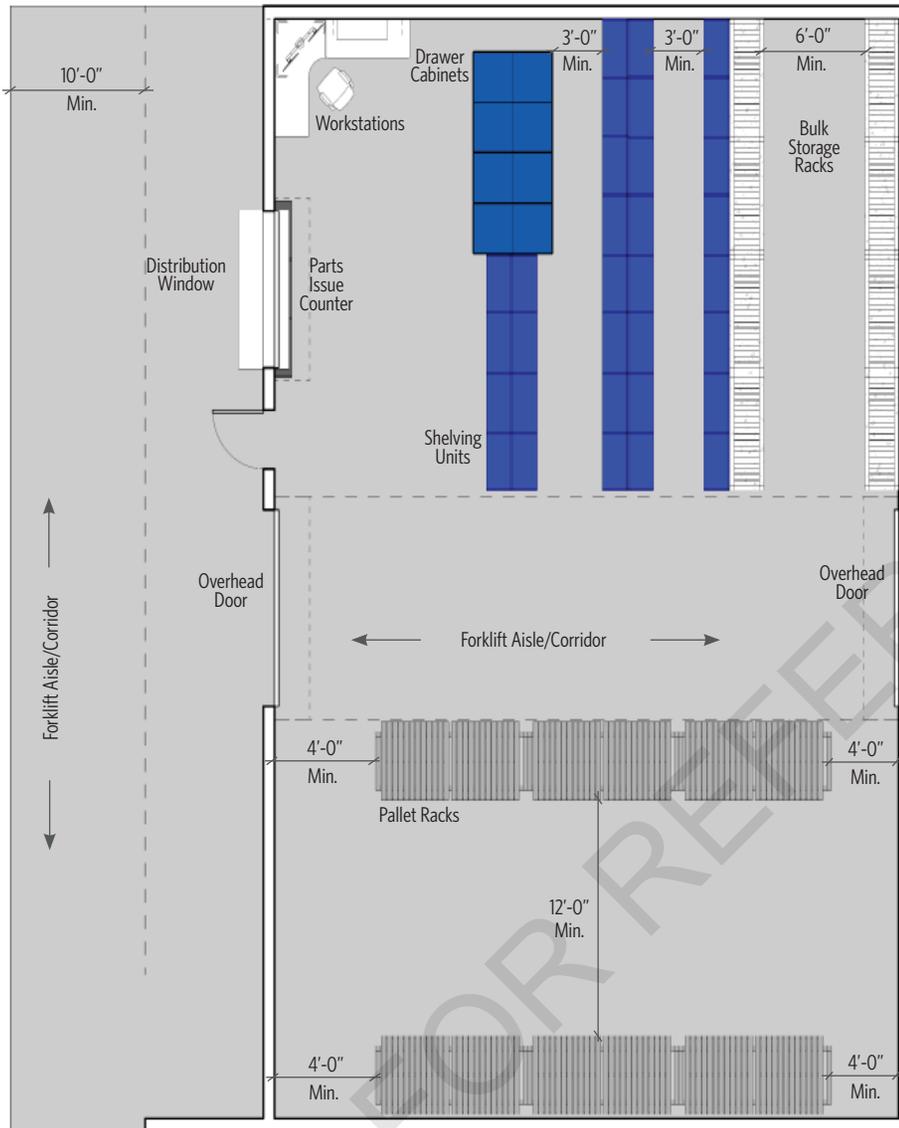
- Compressed air:
  - ✓ 2" compressed air piping loop (minimum)
  - ✓ As required by equipment
- Wash connections from high pressure washer to wand scabbard on both sides of bay
- Water connection to emergency eye wash/shower station
- Trench drain area (with removable cover) to central sediment and oil inceptor
- Large grated sump with side drain overflow to central sediment and oil inceptor
- As required by equipment

**ELECTRICAL CONSIDERATIONS**

- Lighting: Sealed LED water tight lighting fixtures with no external reset device on walls, 20 fc average, fixtures located to illuminate work space and around vehicles
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide (four minimum) waterproof duplex receptacles on walls
- Communications: Paging/intercom system speakers



**PARTS ROOM**



**PARTS ROOM**

**FUNCTION**

Dedicated secure area for receiving, storage, and issuing of parts, material, and specialized tools

**RELATIONSHIP TO OTHER AREAS**

- Access to exterior for deliveries
- Access from Repair Bays and Shops

**RECOMMENDED CRITICAL DIMENSIONS**

- 12'-0" vertical clearance below mezzanine (min.)(if desired)
- 15'-0" vertical clearance above Mezzanine (min.)(if desired)
- 20'-0" clear for high bay pallet storage (min.)

**TYPICAL EQUIPMENT/FURNISHINGS**

- Shelves
- Bulk racks
- Pallet racks
- Cabinets
- High Density Drawer Units

**TYPICAL DESIGN FEATURES**

- Exterior access for deliveries
- Provide Issue Counter with stainless steel top and fire rated rolling overhead door
- Provide staging area for shipping/receiving with an overhead door to exterior of building
- Forklift access

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities with light colored finish
- Doors:
  - ✓ Personnel door with view panel to meet applicable code exit requirements
  - ✓ Exterior overhead door: High-lifting sectional, steel, insulated 10'-0" by 12'-0" with view panels, automatic operator, interior and exterior push button controls with lockout on exterior
  - ✓ Overhead door at Issue Window
  - ✓ Interior overhead door: coiling steel, 10'-0" by 12'-0", automatic operator, push controls, lockable

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)
- Floor slab designed to accommodate forklift access

**MECHANICAL CONSIDERATIONS**

- Cooling set point: 75 degrees Fahrenheit
- Heating set point: 65 degrees Fahrenheit
- General ventilation (per code)
- In-floor radiant heat (if desired)
- As required by equipment

**PLUMBING CONSIDERATIONS**

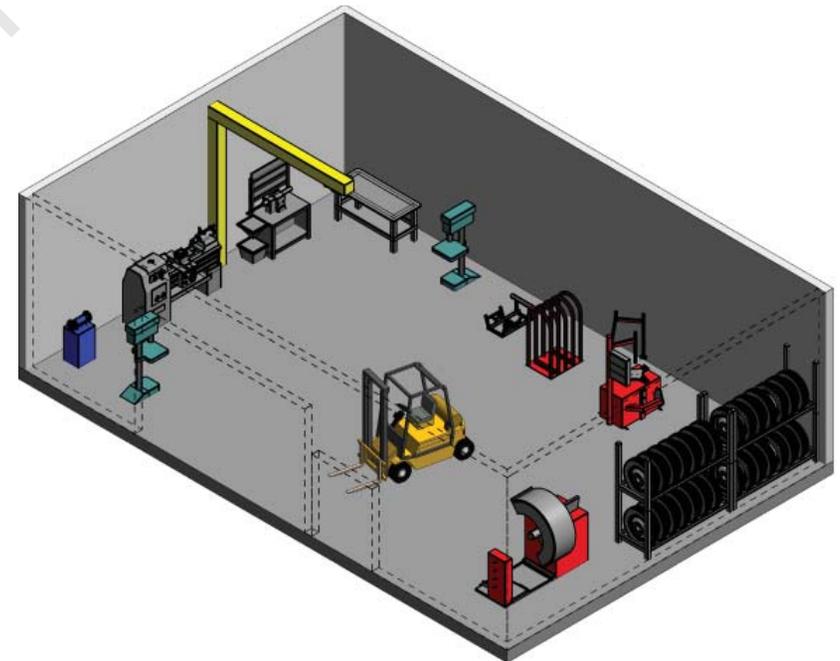
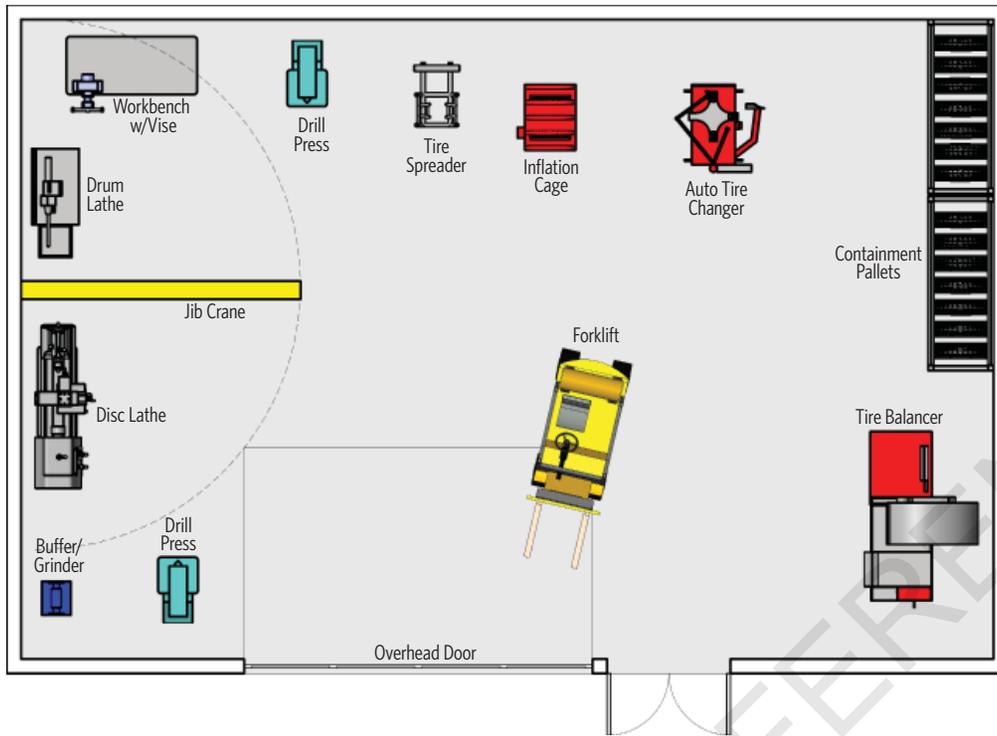
- Water: 3/4" water hose bibb with standard hose bibb at 2'-0" AFF
- As required by equipment

**ELECTRICAL CONSIDERATIONS**

- Lighting: LED lighting in accordance with IES recommended lighting levels for Parts Window, Shipping/Receiving, and shopkeeper 35 fc average, Storage Area 20 fc average, fixtures located to illuminate work spaces
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide general purpose duplex receptacles on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns and/or walls



TIRE & BRAKE SHOP



**TIRE & BRAKE SHOP**

**FUNCTION**

Designated shop for repair of brake components, minor machining tasks and for turning brake drums. As well as repair, changing, balancing, and storage of tires.

**RELATIONSHIP TO OTHER AREAS**

- Access to Parts Room and Office areas
- Adjacent to Maintenance Bay

**RECOMMENDED CRITICAL DIMENSIONS**

- 12'-0" vertical clearance to structure and fixtures

**TYPICAL EQUIPMENT/FURNISHINGS**

- Severe use workbench with vise
- Brake lathes with dust collection system
- Jib crane
- Tire balancer
- Auto tire changer
- Tire spreader
- Drill press
- Buffer/grinder
- Disc lathes
- Containment pallets
- Inflatable chamber

**TYPICAL DESIGN FEATURES**

- Forklift access
- Physically separated from other areas to prevent migration of noise, dirt and fumes, if possible
- Electronically secure entry
- Natural Daylighting desired

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry Ceiling: Painted exposed structure, ductwork, conduit and utilities with light colored finish
- Doors:
  - ✓ Personnel doors with view panels to meet applicable code exit requirements
  - ✓ Overhead door (if desired): High-lifting sectional, steel, insulated, 10'-0" by 10'-0" with view panels, automatic operator, interior and exterior push button controls with lock out on exterior

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)
- Floor slab designed to accommodate forklift access

**MECHANICAL CONSIDERATIONS**

- Mechanical: In-floor radiant heat (if desired)
  - ✓ Heating set point: 65 degrees Fahrenheit
  - ✓ General ventilation (per code)
  - ✓ Exhaust and makeup air for dust collection system
  - ✓ As required by equipment

**PLUMBING CONSIDERATIONS**

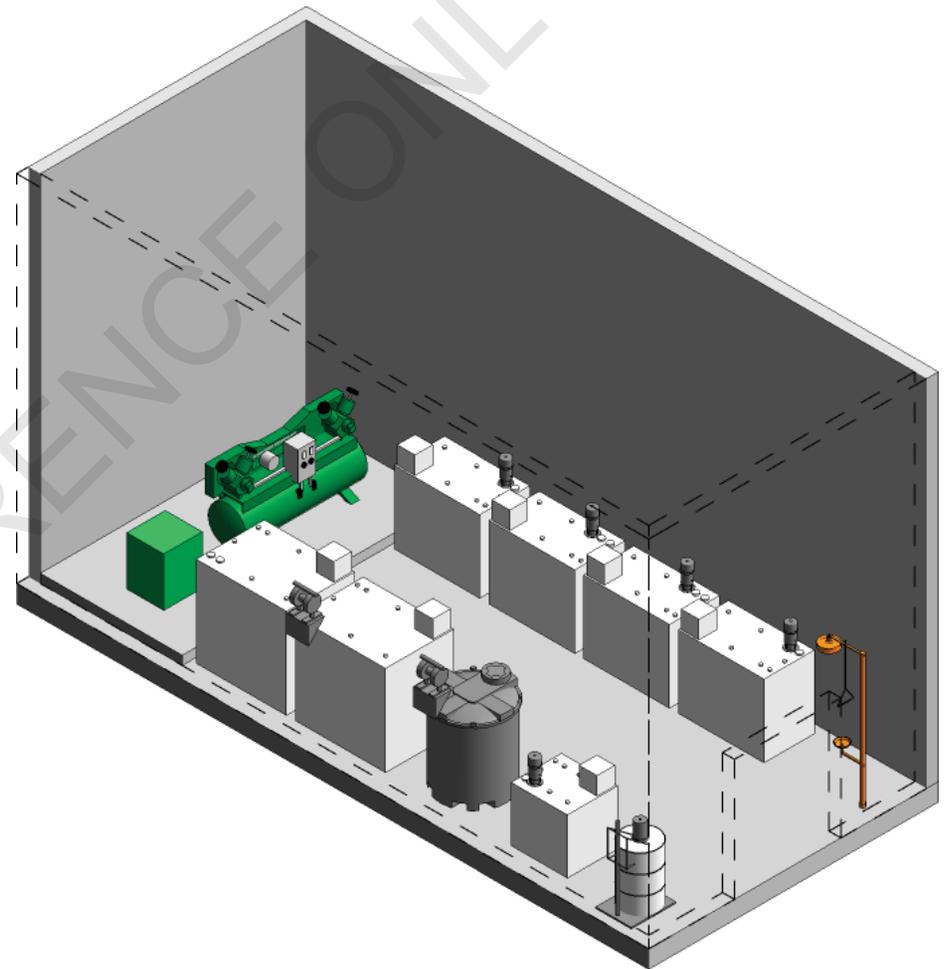
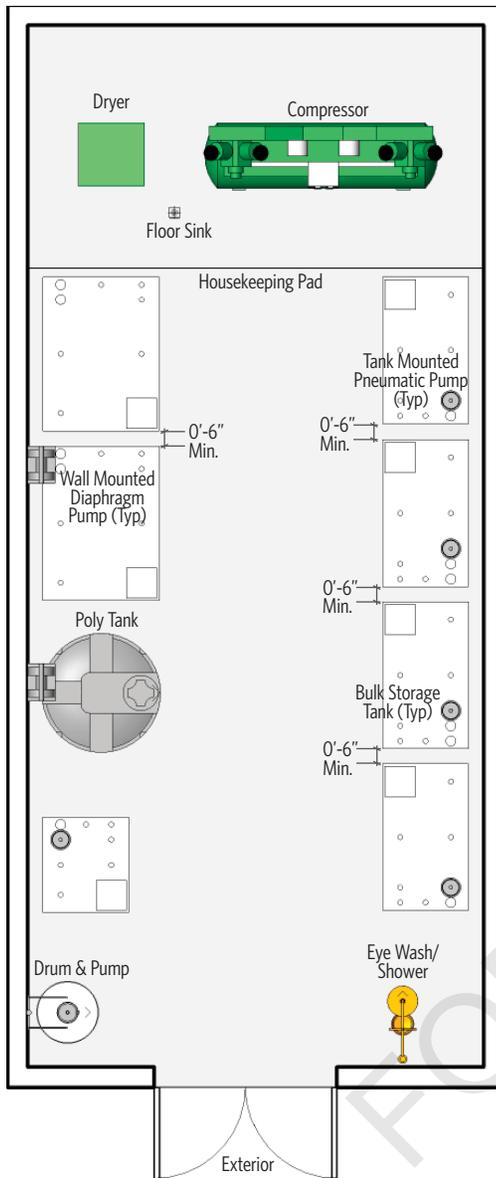
- Compressed air drop:
  - ✓ 2" compressed air piping loop (minimum)
  - ✓ Compressed air drops with cut-off valve, union separator, regulator with gauge, and quick disconnects on 4'-0" AFF
  - ✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design
  - ✓ As required by equipment
- Water: 3/4" water hose bibb with standard hose bibb at 2'-0" AFF
- As required by equipment

**ELECTRICAL CONSIDERATIONS**

- Lighting: LED lighting in accordance with IES recommendation minimum, 50 fc average, fixtures located to illuminate work spaces and around the vehicles
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide (four minimum) general purpose duplex receptacles on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns and/or walls



FLUID & COMPRESSOR



**FLUID & COMPRESSOR**

**FUNCTION**

Enclosed room for storage and central distribution of lubricants. Space shall include a compressor(s) and refrigerated air dryer(s).

**RELATIONSHIP TO OTHER AREAS**

- Access to exterior for deliveries

**RECOMMENDED CRITICAL DIMENSIONS**

- 12'-0" vertical clearance to structure and fixtures

**TYPICAL EQUIPMENT/FURNISHINGS**

- Above grade fluid storage tanks, air piston and diaphragm pumps, drums, and a poly tank
- Air compressor
- Refrigerated air dryer

**TYPICAL DESIGN FEATURES**

- Exterior access for deliveries
- Acoustically and physically separated from other areas to prevent migration of noise, dirt, and fumes

**ARCHITECTURAL CONSIDERATIONS**

- Finishes:
  - ✓ Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry sound absorption material
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities, light colored finish sound absorption material
- Doors:
  - ✓ Personnel door with view panel to meet applicable code exit requirements
  - ✓ Double 6'-0" wide door with interior exit device
  - ✓ No thresholds
- Acoustics: Determine based on equipment and location of adjacent spaces

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- 6" housekeeping pad for both the air compressor and refrigerated air dryer
- Structure as needed to support equipment
- Containment pit for 110% of largest tank (per local code)

**MECHANICAL CONSIDERATIONS**

- Mechanical:
  - ✓ Heating set point: 55 degrees Fahrenheit
  - ✓ Exhaust: Minimum 1.0 CFM per square foot
  - ✓ Negative pressurization
  - ✓ As required by equipment

**PLUMBING CONSIDERATIONS**

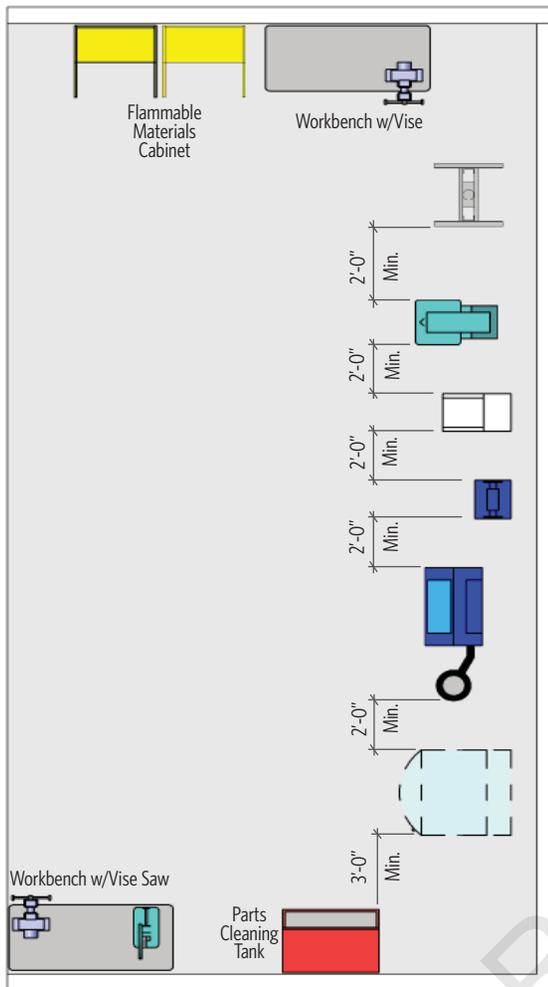
- Compressed air:
  - ✓ Duplex air compressor, air dryer, and air receiver
  - ✓ Floor sink between air compressor and dryer. Plumb to central sediment and oil interceptor
  - ✓ 2" compressed air piping loop (minimum) started in the Lube/Compressor Room
  - ✓ Compressed air line with 3/8" and 1/2" cut-off valve, separator, regulator with gauge, lubricator, and quick disconnect on wall at 4'-0" AFF
  - ✓ Connect to lubricant pumps
- Tank mount all piston lubricant pump(s)
- Wall mount all diaphragm pump(s)
- CG pump mounted to an air operated hoist (if required)
- Plumb tanks to corresponding lube reel banks located in the Repair Bays
- Plumb UO and UC tanks to corresponding pumps located in the Repair Bays (if required)
- 3/4" water hose bib with standard faucet 2'-0" AFF
- Emergency eyewash

**ELECTRICAL CONSIDERATIONS**

- Lighting: LED lighting in accordance with IES recommendation minimum, 25 fc average, fixtures located to illuminate work spaces
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide (four minimum) general purpose duplex receptacles on walls
  - ✓ Lube/Compressor: 25 fc
  - ✓ As required by equipment



EQUIPMENT & SUPPORT



Hydraulic Press

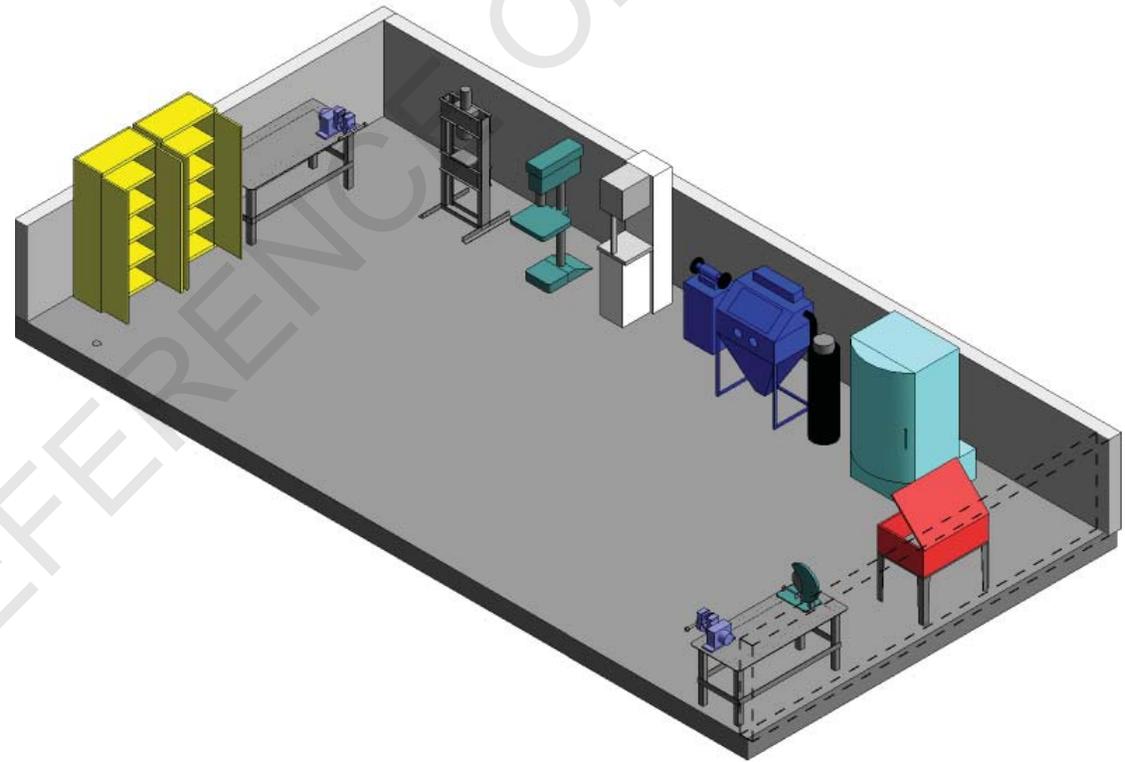
Drill Press

Bandsaw

Buffer/Grinder

Cabinet w/  
Dust Collector

Parts Washer



**EQUIPMENT & SUPPORT**

**FUNCTION**

Designated area for common fixed shop equipment which supports all repair bays and associated shop areas

**RELATIONSHIP TO OTHER AREAS**

- Access from Maintenance office areas
- Adjacent to Repair Bays, Parts Room, and Portable Equipment Storage

**RECOMMENDED CRITICAL DIMENSIONS**

- 12'-0" to vertical clearance to structure and fixtures

**TYPICAL EQUIPMENT/FURNISHINGS**

- Severe use workbench(es) with vise
- Buffer grinder with dust collector
- Hydraulic press
- Drill press
- Abrasive blast cabinet
- Horizontal bandsaw
- Cut-off saw
- Parts washer

**TYPICAL DESIGN FEATURES**

- Half-height 54" walls on 3 sides for utilities and to prevent blocking vision of shop from office areas and repair bays
- Forklift access
- Natural Daylighting desired

**ARCHITECTURAL CONSIDERATIONS**

- Finishes
  - ✓ Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - ✓ Walls: Soil and grease resistant, light colored finished concrete or masonry
  - ✓ Ceiling: Painted exposed structure, ductwork, conduit and utilities, light colored finish
- Doors: None

**STRUCTURAL CONSIDERATIONS**

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Floor slab designed to accommodate in-floor radiant heat (if desired)
- Floor slab designed to accommodate forklift access

**MECHANICAL CONSIDERATIONS**

- Heating set point: 65 degrees Fahrenheit
- General ventilation (per code)
- In-floor radiant heat (if desired)
- As required by equipment

**PLUMBING CONSIDERATIONS**

- Compressed air drop:
  - ✓ 2" compressed air piping loop (minimum)
  - ✓ Compressed air drops with cut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - ✓ Provide disconnects for 3/8" and 1/2" impact tools at locations to be determined during detailed design
  - ✓ As required by equipment
- Water: 3/4" water hose bibb with standard hose bibb at 2'-0" AFF
- As required by equipment

**ELECTRICAL CONSIDERATIONS**

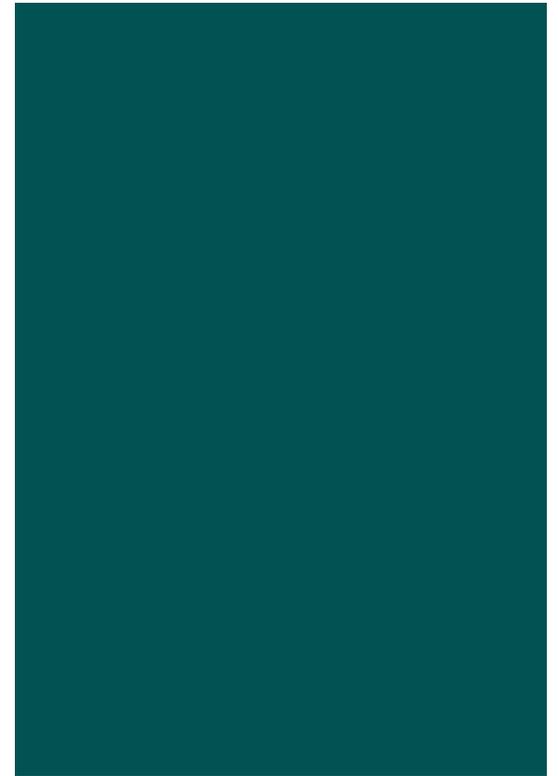
- Lighting: LED lighting in accordance with IES recommendation minimum, 50 fc average, fixtures located to illuminate work spaces
- Power:
  - ✓ All receptacles and outlets at 3'-6" AFF
  - ✓ Provide (ten minimum) general purpose duplex receptacles on walls and columns
  - ✓ Dedicated computer receptacle, adjacent to data conduit on wall or column
  - ✓ As required by equipment
- Communications:
  - ✓ Paging/intercom system speakers
  - ✓ Data conduit on columns and/or walls



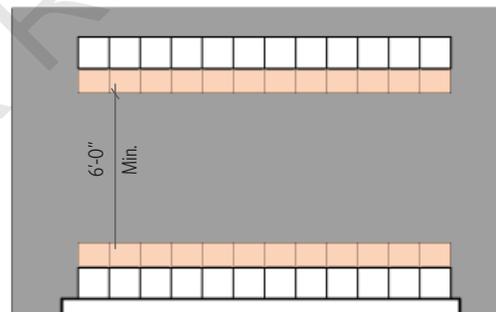
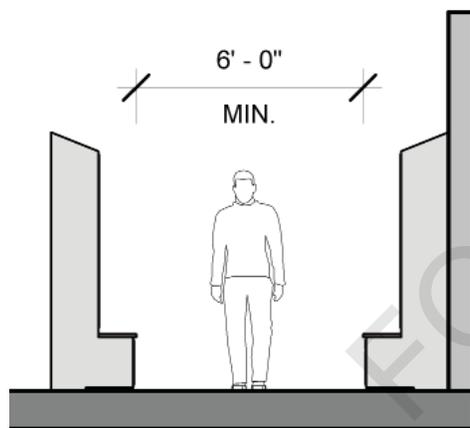


MAINTENANCE

FOR REFERENCE ONLY



**MEN'S & WOMEN'S LOCKERS**



**FUNCTION**

Locker area for each male and female Bus Maintenance employee.

**RELATIONSHIP TO OTHER AREAS**

- Access by Repair and Shop Areas
- Located within each Men and Women Restrooms

**RECOMMENDED CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

**TYPICAL EQUIPMENT/FURNISHINGS**

- 6-foot high gear, well-ventilated lockers with built-in bench

**TYPICAL DESIGN FEATURES**

- Flooring: Tile covering or finished concrete (recommended)
- Walls: Tile covering or painted masonry (recommended)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
- Doors: Single leaf 3'-0" door
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating, ventilation, and exhaust (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Electrical:
  - ✓ LED Lighting in accordance with IES recommendation (15 fc average)
  - ✓ Provide (six minimum) general purpose duplex receptacles
- Lighting Control:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)





OPERATIONS

FOR REFERENCE ONLY



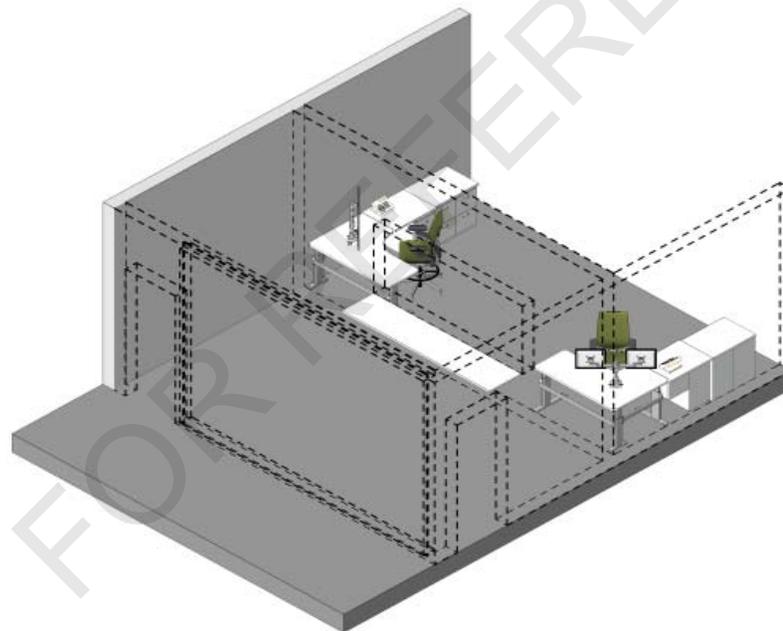
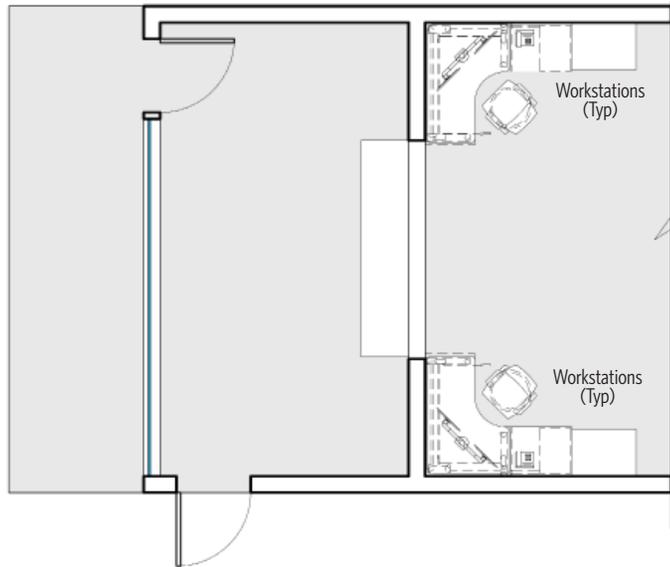
GENERAL OFFICE MODULES			
<p><b>General Manager</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Private Office - 224 SF</li> <li>Adjacent to Assistant General Manager</li> </ul>	<p><b>Assistant General Manager</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Private Office - 120 SF</li> <li>Adjacent to General Manager</li> </ul>	<p><b>HR Manager</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Private Office - 120 SF</li> <li>Access to Copy/Supply</li> </ul>	<p><b>Administrative Assistant</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Workstation - 48 SF</li> <li>Adjacent to General Manager and Assistant General Manager</li> </ul>
<p><b>Safety Manager</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Private Office - 120 SF</li> <li>Access to Copy/Supply</li> </ul>	<p><b>FTA or SFMTA Monitor</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Shared Office - 120 SF</li> <li>Access to Copy/File</li> </ul>	<p><b>Counting &amp; Payroll</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Shared Office - 120 SF</li> <li>Access to Copy/File</li> </ul>	<p><b>Group Van Dispatch</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Workstation - 64 SF</li> <li>Located within Open Office Space for Dispatch</li> </ul>



GENERAL OFFICE MODULES			
<p><b>Scheduling, Group Van, &amp; Administration</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Workstation - 64 SF</li> <li>Located within Open Office Space for Dispatch</li> </ul>	<p><b>Field Supervisor</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Workstation - 64 SF</li> <li>Located within Open Office Space</li> </ul>	<p><b>Trainers</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Workstation - 64 SF</li> <li>Located within Open Office Space</li> </ul>	<p><b>Dispatch Supervisor</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Private Office - 120 SF</li> <li>Adjacent to Dispatch</li> </ul>
<p><b>Dispatch</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Workstation - 64 SF</li> <li>Located within Open Office Space for Dispatch</li> </ul>		<p><b>Call Center</b></p> <ul style="list-style-type: none"> <li>Reference Office Module Workstation - 36 SF</li> <li>Located within Open Office Space for Dispatch</li> </ul>	



**DISPATCH WINDOW**



**FUNCTION**

Area for Operators to report, receive information, and write reports

**RELATIONSHIP TO OTHER AREAS**

- Adjacent to Driver Ready Room
- Adjacent to Dispatch

**RECOMMENDED CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

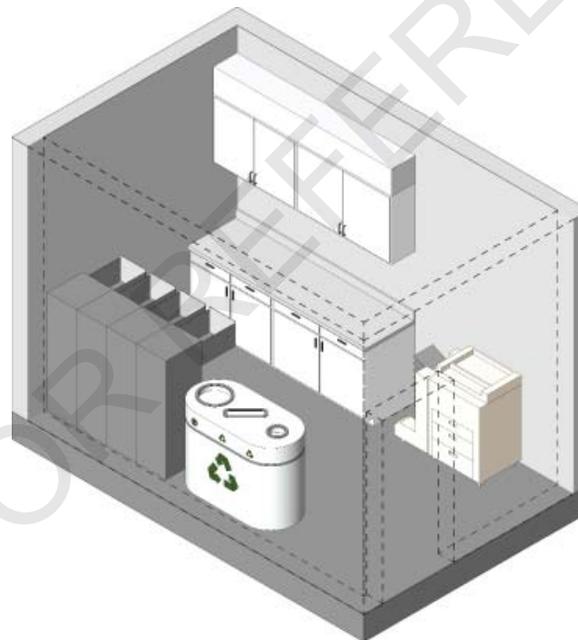
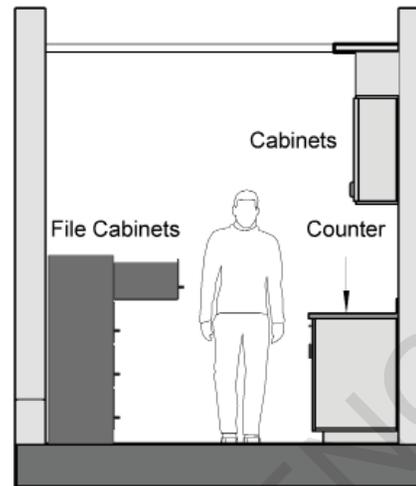
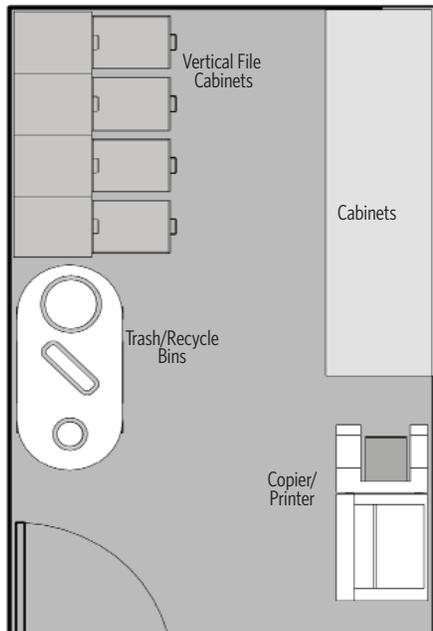
**TYPICAL EQUIPMENT/FURNISHINGS**

- Computer workstations
- Bulletin board
- Counter

**TYPICAL DESIGN FEATURES**

- Flooring:
  - ✓ Resilient floor covering with base or finished concrete (recommended)
- Walls:
  - ✓ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile (recommended)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Electrical:
  - ✓ LED lighting in accordance with IES recommendation (20 fc of indirect lighting average) (no glare)
  - ✓ Provide (three minimum) general purpose duplex receptacles
- Lighting Control:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**COPY/SUPPLY**



**FUNCTION**

Dedicated alcove or room for copier/printer/scanner/fax machine, storage for office supplies, and work surface

**RELATIONSHIP TO OTHER AREAS**

- Access to all office areas

**RECOMMENDED CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

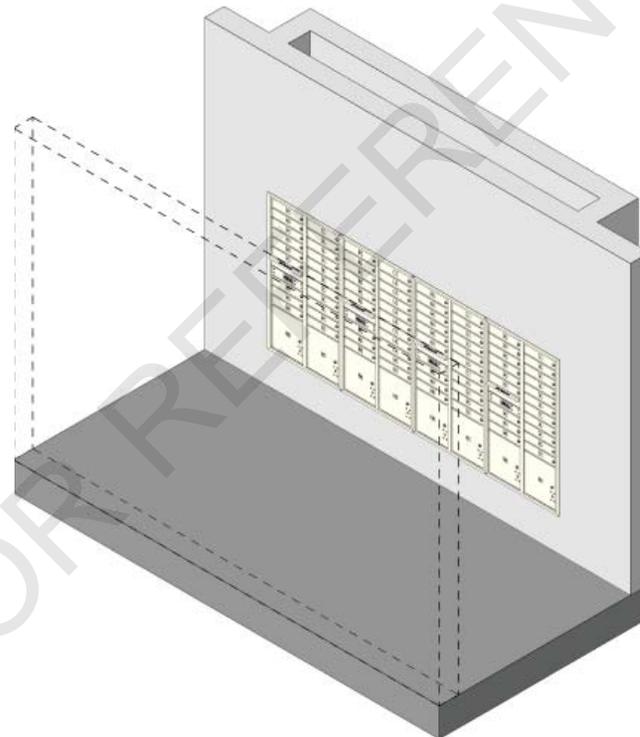
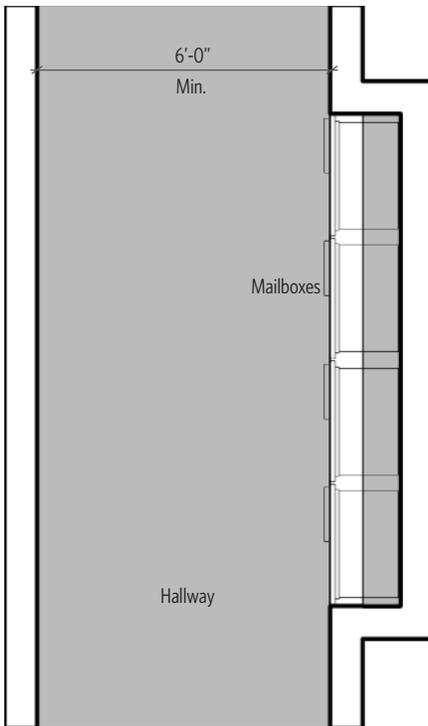
**TYPICAL EQUIPMENT/FURNISHINGS**

- Copier/printer/scanner/fax machine
- Work surface with cabinets below and above
- Filing cabinets

**TYPICAL DESIGN FEATURES**

- Flooring: Resilant floor covering with base or finished concrete
- Walls:
  - ✓ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile (recommended)
- Doors: Single leaf 3'-0" door with lockable lever set hardware (recommended)
  - ✓ Electronically secured entry (as required)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Electrical:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide (six minimum) general purpose duplex receptacles
  - ✓ Provide one data outlet with four data ports
  - ✓ Provide box conduit rough-ins to three other locations in the room
- Lighting Control:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**MAILBOX ALCOVE**



**FUNCTION**

Alcove area for staff and Post Man to drop off and pick up mail.

**RELATIONSHIP TO OTHER AREAS**

- Access to all office areas

**RECOMMENDED CRITICAL DIMENSIONS**

- 9' -0" vertical clearance (minimum)

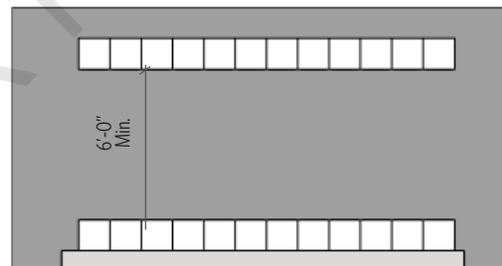
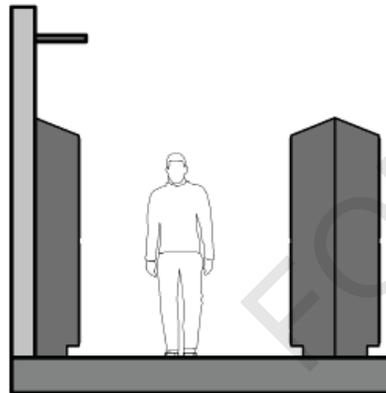
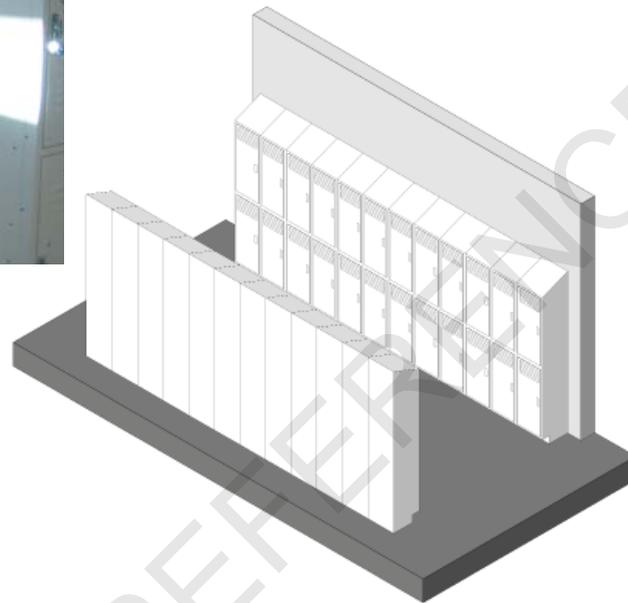
**TYPICAL EQUIPMENT/FURNISHINGS**

- Mailboxes

**TYPICAL DESIGN FEATURES**

- Flooring: Resilant floor covering with base or finished concrete
- Walls:
  - ✓ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile (recommended)
- Doors: Single leaf 3'-0" door with lockable lever set hardware (recommended)
  - ✓ Electronically secured entry (as required)
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Electrical:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide (six minimum) general purpose duplex receptacles
  - ✓ Provide one data outlet with four data ports
  - ✓ Provide box conduit rough-ins to three other locations in the room
- Lighting Control:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**DISPATCH/CALL CENTER LOCKER ALCOVE**



**FUNCTION**

Alcove for the Operators to store personal gear and clothing in half-height lockers. Co-ed locker area, changing area in respective restrooms.

**RELATIONSHIP TO OTHER AREAS**

- Connected to Gilley Room
- Adjacent to Restroom/Showers

**RECOMMENDED CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

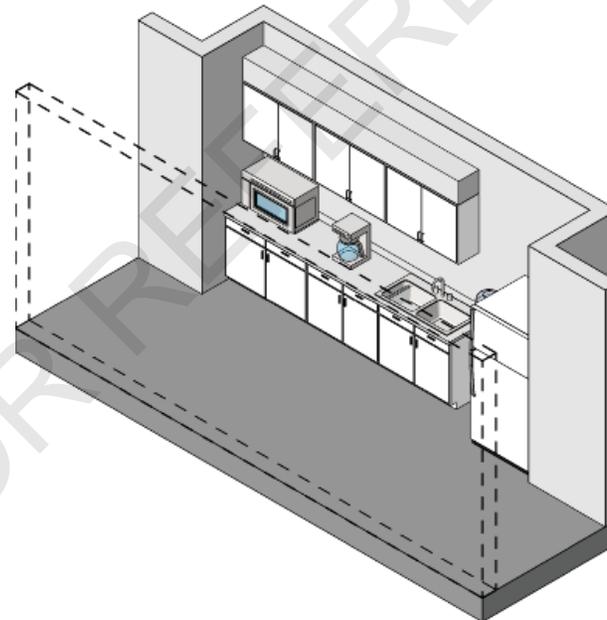
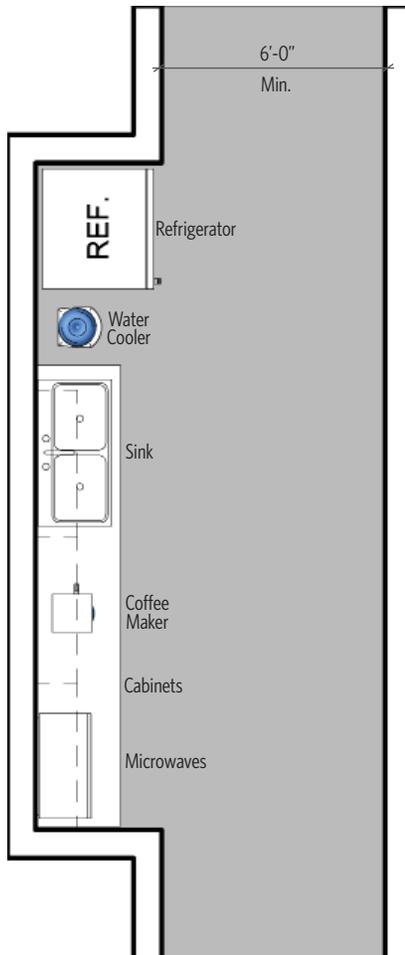
**TYPICAL EQUIPMENT/FURNISHINGS**

- Heavy duty, two tier, 3-foot, well-ventilated, half-height lockers; one each per Operator assigned to the facility

**TYPICAL DESIGN FEATURES**

- Flooring:
  - ✓ Tile covering or finished concrete (recommended)
- Walls: Tile covering or painted masonry (recommended)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
- Doors: Single leaf 3'-0" door
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating, ventilation, and exhaust (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Electrical:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide (six minimum) general purpose duplex receptacles
- Lighting Control:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**OFFICE COFFEE ALCOVE**



**FUNCTION**

Alcove for coffee to be stored

**RELATIONSHIP TO OTHER AREAS**

- Centrally located
- Access to all office areas, repair areas, and Restrooms

**RECOMMENDED CRITICAL DIMENSIONS**

- 9' -0" vertical clearance (minimum)

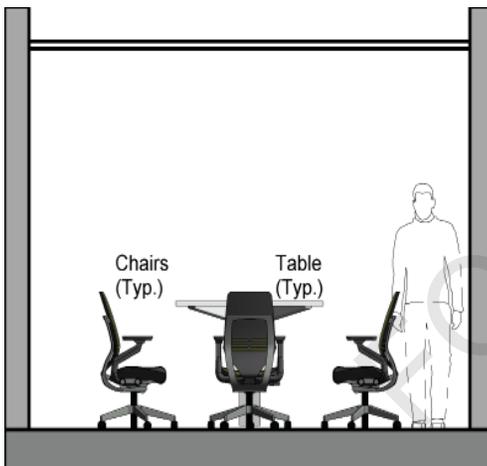
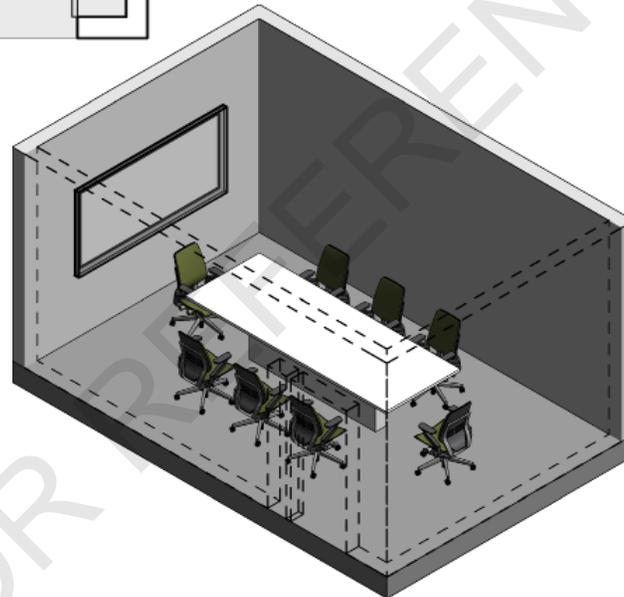
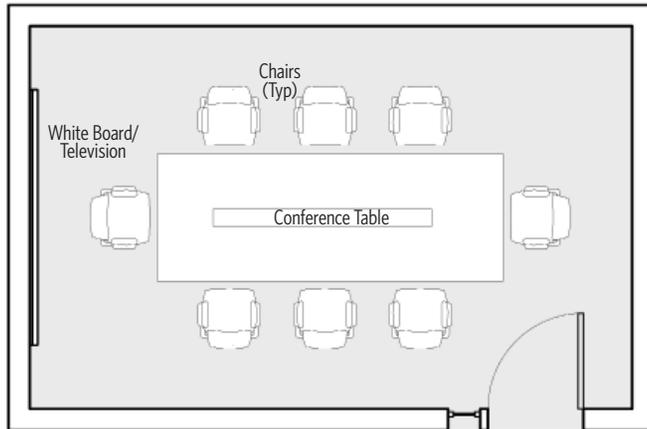
**TYPICAL EQUIPMENT/FURNISHINGS**

- Counter space, upper and lower cabinets, sink, microwaves, refrigerator, coffee maker, water filter, and water cooler

**TYPICAL DESIGN FEATURES**

- Furniture: Use owner furniture standards (if applicable)
- Flooring:
  - ✓ Resilient floor covering with base or finished concrete (recommended)
- Walls:
  - ✓ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile (recommended)
- Doors: Single leaf 3'-0" doors (two minimum) with lockable lever set hardware (recommended)
  - ✓ Electronically secured entry (as required)
- Daylighting: Exterior window desired
- Plumbing: rough in for equipment
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Provide CO2 detection
- Electrical:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide (six minimum) general purpose duplex receptacles
  - ✓ Provide data outlets with four data ports (two minimum)
- Lighting Control:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

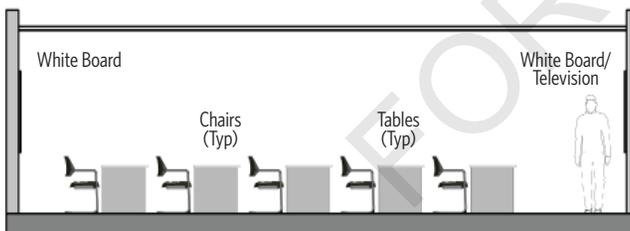
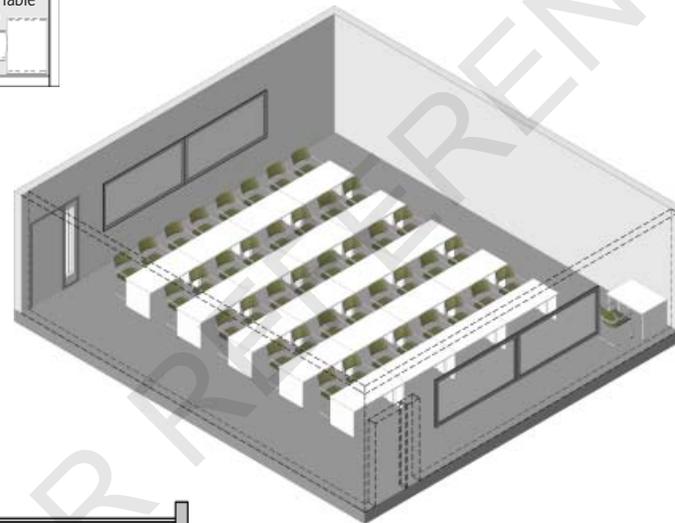
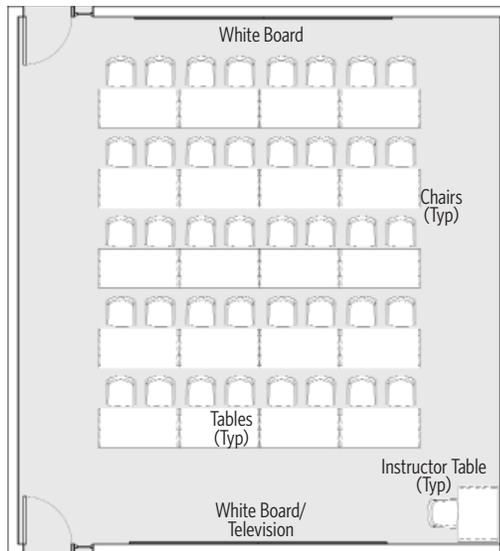
**CONFERENCE ROOM**



FUNCTION	
Room for up to a ten person meeting.	
RELATIONSHIP TO OTHER AREAS	
<ul style="list-style-type: none"> <li>Accessible from all departments in the building</li> </ul>	
RECOMMENDED CRITICAL DIMENSIONS	
<ul style="list-style-type: none"> <li>9'-0" vertical clearance (minimum)</li> </ul>	
TYPICAL EQUIPMENT/FURNISHINGS	
<ul style="list-style-type: none"> <li>Table</li> <li>Chairs</li> </ul>	<ul style="list-style-type: none"> <li>White board/Television</li> </ul>
TYPICAL DESIGN FEATURES	
<ul style="list-style-type: none"> <li>Furniture: Use owner furniture standards (if applicable)</li> <li>Flooring:                             <ul style="list-style-type: none"> <li>✓ Carpet tile floor with rubber base or resilient floor covering with base (recommended)</li> </ul> </li> <li>Walls:                             <ul style="list-style-type: none"> <li>✓ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)</li> <li>✓ Wall protection as needed</li> </ul> </li> <li>Ceiling: Acoustical ceiling tile (recommended)</li> <li>Doors: Single leaf 3'-0" door with lockable lever set hardware (recommended)                             <ul style="list-style-type: none"> <li>✓ Electronically secured entry (as required)</li> </ul> </li> <li>Daylighting: Exterior window or vision glass desired</li> <li>Mechanical:                             <ul style="list-style-type: none"> <li>✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)</li> <li>✓ Heating set point: 68 degrees Fahrenheit</li> <li>✓ Cooling set point: 74 degrees Fahrenheit</li> </ul> </li> <li>Electrical:                             <ul style="list-style-type: none"> <li>✓ LED lighting in accordance with IES recommendations (30 fc average)</li> <li>✓ Provide (four minimum) general purpose duplex receptacles and a guard receptacle in the floor under the middle of the table</li> <li>✓ Provide one data outlet with four data ports in the floor under the middle of the table</li> <li>✓ Provide box and conduit rough-ins to three other locations in the room</li> </ul> </li> <li>Lighting Control:                             <ul style="list-style-type: none"> <li>✓ Dimmable, indirect lighting with vacancy sensor</li> <li>✓ Task lighting (recommended)</li> </ul> </li> </ul>	



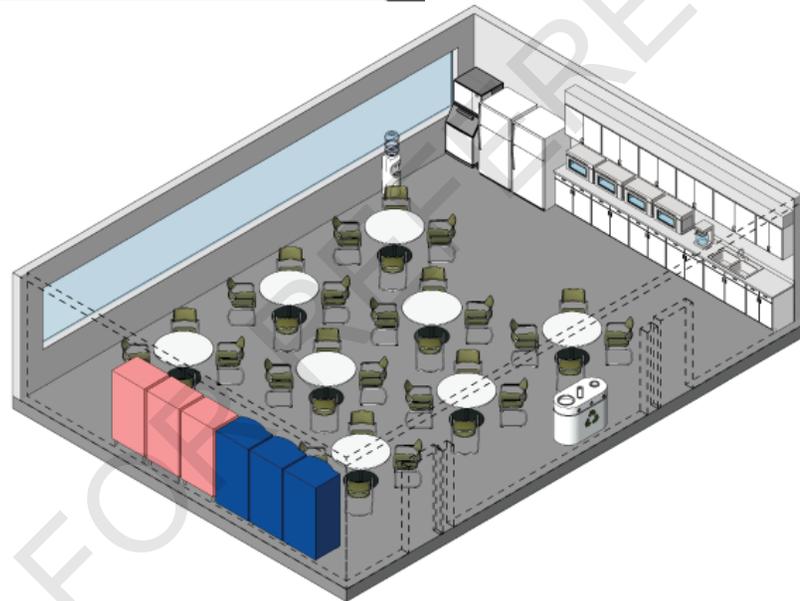
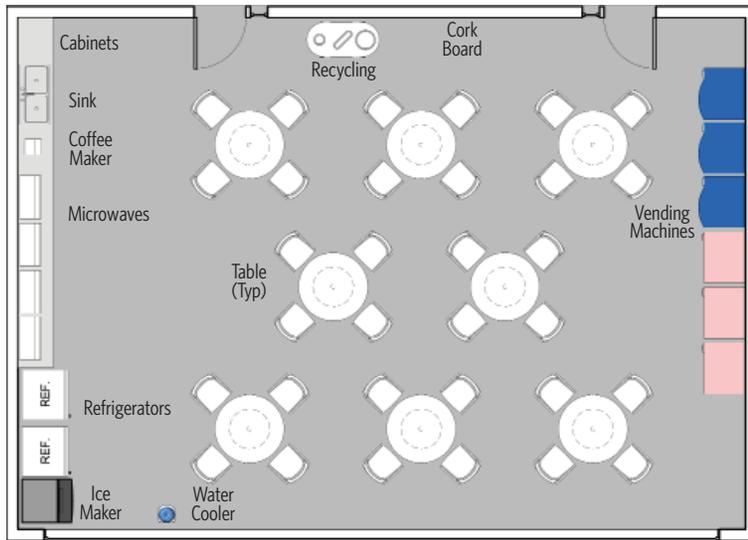
**TRAINING ROOM**



FUNCTION
Room for up to a 40 person meeting or training
RELATIONSHIP TO OTHER AREAS
<ul style="list-style-type: none"> <li>Accessible from all departments in the building</li> </ul>
RECOMMENDED CRITICAL DIMENSIONS
<ul style="list-style-type: none"> <li>9'-0" vertical clearance (minimum)</li> </ul>
TYPICAL EQUIPMENT/FURNISHINGS
<ul style="list-style-type: none"> <li>Mayline Cohere Flip/nest table 60" by 30" laminate</li> <li>Cool mesh nesting chairs</li> <li>White board/Television</li> </ul>
TYPICAL DESIGN FEATURES
<ul style="list-style-type: none"> <li>Furniture: Use owner furniture standards (if applicable)</li> <li>Flooring:                             <ul style="list-style-type: none"> <li>✓ Carpet tile floor with rubber base or resilient floor covering with base (recommended)</li> </ul> </li> <li>Walls:                             <ul style="list-style-type: none"> <li>✓ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)</li> <li>✓ Wall protection as needed</li> </ul> </li> <li>Ceiling: Acoustical ceiling tile (recommended)</li> <li>Doors: Single leaf 3'-0" doors with lockable lever set hardware (recommended)                             <ul style="list-style-type: none"> <li>✓ Electronically secured entry (as required)</li> </ul> </li> <li>Daylighting: Exterior window or vision glass desired</li> <li>Mechanical:                             <ul style="list-style-type: none"> <li>✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)</li> <li>✓ Heating set point: 68 degrees Fahrenheit</li> <li>✓ Cooling set point: 74 degrees Fahrenheit</li> </ul> </li> <li>Electrical:                             <ul style="list-style-type: none"> <li>✓ LED lighting in accordance with IES recommendations (30 fc average)</li> <li>✓ Provide (four minimum) general purpose duplex receptacles and a guard receptacle in the floor under the middle of the table</li> <li>✓ Provide one data outlet with four data ports in the floor under the middle of the table</li> <li>✓ Provide box and conduit rough-ins to three other locations in the room</li> </ul> </li> <li>Lighting Control:                             <ul style="list-style-type: none"> <li>✓ Dimmable, indirect lighting with vacancy sensor</li> <li>✓ Task lighting (recommended)</li> </ul> </li> </ul>

• White bo

**DRIVER READY ROOM/KITCHENETTE**



**FUNCTION**

Enclosed room used as a break area for staff.

**RELATIONSHIP TO OTHER AREAS**

- Centrally located
- Access to all office areas, repair areas, and Restrooms

**RECOMMENDED CRITICAL DIMENSIONS**

- 9' -0" vertical clearance (minimum)

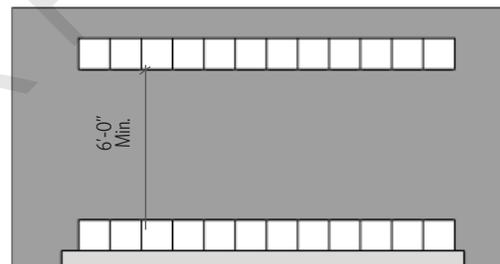
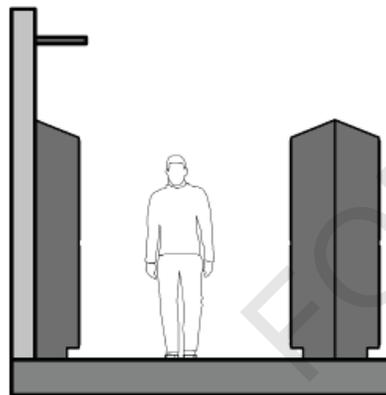
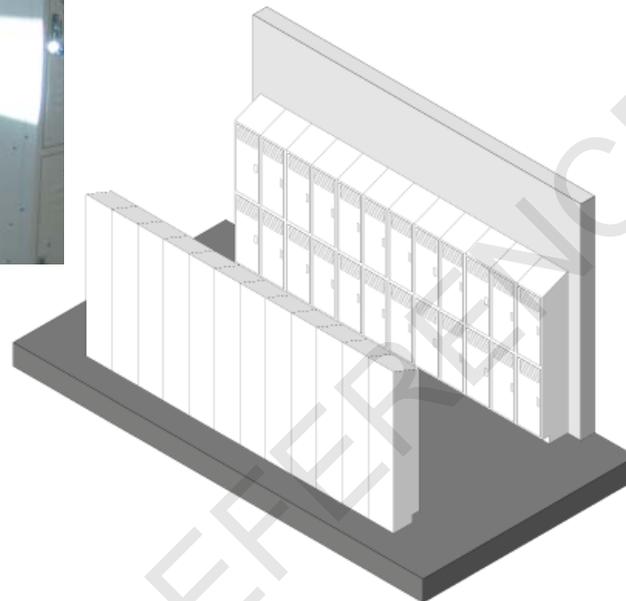
**TYPICAL EQUIPMENT/FURNISHINGS**

- Counter space, upper and lower cabinets, sink, microwave, refrigerators, coffee maker, ice maker, water filter, vending machines, water coolers, tables, chairs, trash/recycling/compost bins

**TYPICAL DESIGN FEATURES**

- Furniture: Use owner furniture standards (if applicable)
- Flooring:
  - ✓ Resilient floor covering with base or finished concrete (recommended)
- Walls:
  - ✓ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile (recommended)
- Doors: Single leaf 3'-0" doors (two minimum) with lockable lever set hardware (recommended)
  - ✓ Electronically secured entry (as required)
- Daylighting: Exterior window desired
- Plumbing: rough in for equipment
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
  - ✓ Provide CO2 detection
- Electrical:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide (six minimum) general purpose duplex receptacles
  - ✓ Provide data outlets with four data ports (two minimum)
- Lighting Control:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)

**DRIVER MEN'S & WOMEN'S LOCKERS**



**FUNCTION**

Alcove for the Operators to store personal gear and clothing in half-height lockers. Co-ed locker area, changing area in respective restrooms.

**RELATIONSHIP TO OTHER AREAS**

- Connected to Gilley Room
- Adjacent to Restroom/Showers

**RECOMMENDED CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

**TYPICAL EQUIPMENT/FURNISHINGS**

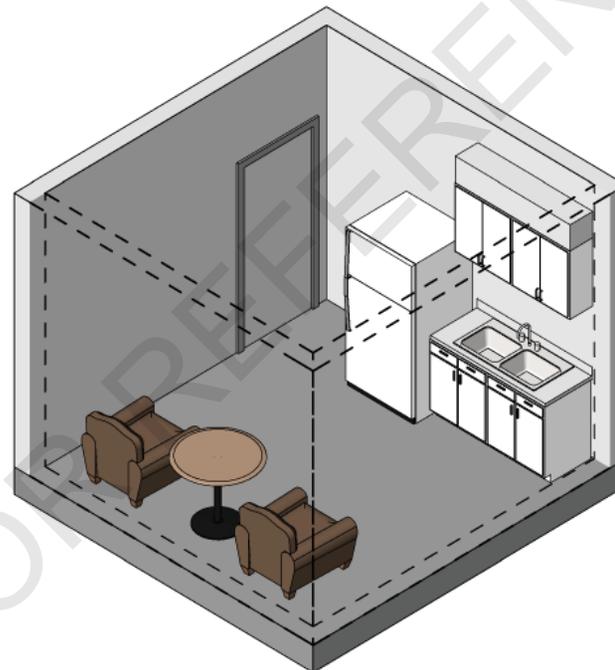
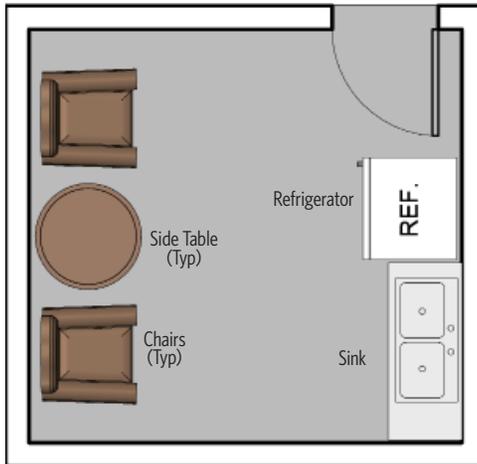
- Heavy duty, two tier, 3-foot, well-ventilated, half-height lockers; one each per Operator assigned to the facility

**TYPICAL DESIGN FEATURES**

- Flooring:
  - ✓ Tile covering or finished concrete (recommended)
- Walls: Tile covering or painted masonry (recommended)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile or painted exposed structure (recommended)
- Doors: Single leaf 3'-0" door
- Mechanical:
  - ✓ Provide appropriate balanced cooling, heating, ventilation, and exhaust (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Electrical:
  - ✓ LED Lighting in accordance with IES recommendation (20 fc average)
  - ✓ Provide (six minimum) general purpose duplex receptacles
- Lighting Control:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)



**LACTATION ROOM**



**FUNCTION**

Dedicated room for privacy to take care of personal matter and storage of first aid supplies.

**RELATIONSHIP TO OTHER AREAS**

- Accessible from department office areas

**RECOMMENDED CRITICAL DIMENSIONS**

- 9'-0" vertical clearance (minimum)

**TYPICAL EQUIPMENT/FURNISHINGS**

- Chairs
- Sink with countertops and cabinets
- Secure storage for equipment and supplies
- Side tables
- Refrigerator

**TYPICAL DESIGN FEATURES**

- Flooring:
  - ✓ Resilient floor covering with base or finished concrete (recommended)
- Walls:
  - ✓ Gypsum board on metal studs (typical) with wall finishes or painted masonry (optional gypsum board furring)
  - ✓ Wall protection as needed
- Ceiling: Acoustical ceiling tile (recommended)
- Doors: Single leaf 3'-0" door with lockable lever set hardware (recommended)
  - ✓ Electronically secured entry (as required)
- Plumbing: Rough-in for fixtures
- Mechanical:
  - ✓ Provide appropriate, balanced cooling, heating, and ventilation (per code)
  - ✓ Heating set point: 68 degrees Fahrenheit
  - ✓ Cooling set point: 74 degrees Fahrenheit
- Electrical:
  - ✓ LED lighting in accordance with IES recommendation (20 fc indirect lighting average)
  - ✓ Provide (three minimum) general purpose duplex receptacles
- Lighting Control:
  - ✓ Dimmable, indirect lighting with occupancy sensor
  - ✓ Task lighting (recommended)



APPENDIX H:  
PG&E SYSTEM IMPACT STUDY REPORT FOR  
MIXED USE SERVICE APPLICATION  
(FOR REFERENCE)



# System Impact Study Report

Load Interconnection

---

**WDT – City & County of San Francisco**

2500 Mariposa St (Mix), San Francisco, CA 94110



*Pacific Gas and  
Electric Company*<sup>®</sup>

---

February 6, 2023

## Table of Contents

Introduction.....	1
Project and Interconnection Information.....	1
Study Assumptions .....	3
Evaluation of Distribution Interconnection.....	4
Cost Estimates .....	9
Ownership of Facilities.....	9
Technical Requirements.....	9
1. Metering .....	9
2. Voltage Regulation .....	9
3. Power Factor .....	9
Study Updates.....	10

## Introduction

SFPUC has submitted a request to Pacific Gas & Electric Co for a new primary electric service located on 2500 Mariposa St (Mix), San Francisco. The requested maximum net three phase electrical load demand for this service is estimated to be 7.8 MW. The customer’s proposed Commercial Operation Date (COD) is Q3 2023.

The System Impact Study (SIS) will analyze the:

1. Request by SFPUC to interconnect a new electrical load demand of 7.8 MW.
2. System reinforcements necessary to mitigate the adverse impacts of the new load.
3. Facilities required for system reinforcements with a non-binding good faith estimate of cost responsibility and a non-binding good faith estimated time to construct.

This SIS will form the basis by defining the scope, content, assumptions, and terms of reference.

The SIS assumes no additional generation, renewables or otherwise, will be installed at the site. Should SFPUC wish to install generation, renewable or otherwise, at the site in the future, an application is required pursuant to the WDT.

## Project and Interconnection Information

Table 1 below lists the general information about the Project as provided by the Customer.

Table 1: Project General Information

Project Location	2500 Mariposa St (Mix)
PG&E Planning Area	San Francisco
Maximum Load	7.80 MW
Power Factor	The Distribution Provider’s initially required corrected Power Factor (Section 20.4 of Tariff and Section 13.3 of this Service Agreement) will be as follows. Peak Load PF 95% @ 12:00 PM to 6:00 PM: ± 0.01 Minimum Load PF 95% @ 6:01 PM to 11:59 AM: ±0.02
Connection Voltage	12 kV
Primary Service Entrance	PG&E approved Phase and Ground protection

Figure 1: Location of Facility

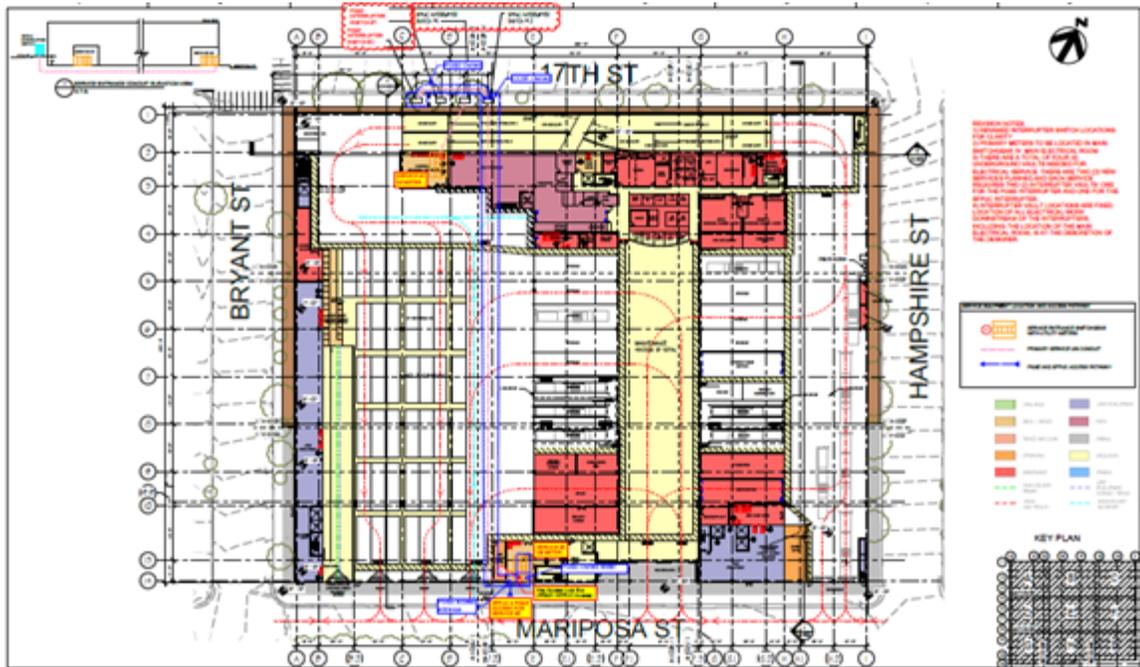
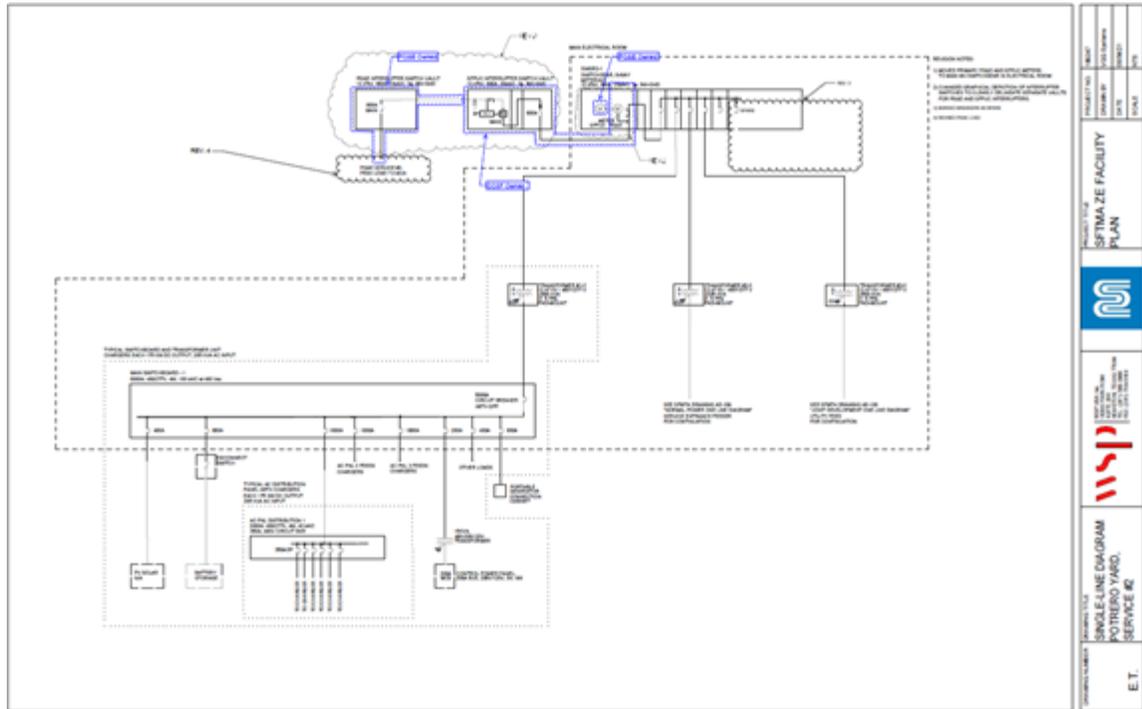


Table 2: Estimated Demand Profile of Facility

**FEEDER 2 / MIXED USE**

Winter	Residential	Commercial	BEB	Total (kW)
12:00 AM	1749.4	1975.1	2550.0	6274.4
1:00 AM	1582.2	1649.6	2281.0	5512.8
2:00 AM	1634.4	1581.6	2328.8	5544.9
3:00 AM	1737.0	1548.0	2121.2	5406.2
4:00 AM	1924.8	1732.1	1755.7	5412.7
5:00 AM	2167.0	2173.3	1496.2	5836.4
6:00 AM	2628.2	2707.0	1276.3	6611.5
7:00 AM	3010.6	2701.7	1012.7	6725.0
8:00 AM	2920.2	2704.5	750.4	6375.2
9:00 AM	2679.9	2606.2	424.1	5710.2
10:00 AM	2421.1	2542.7	240.7	5204.5
11:00 AM	2410.7	2840.4	182.0	5433.2
12:00 PM	2347.9	3003.7	107.9	5459.5
1:00 PM	2325.5	3316.2	19.6	5661.2
2:00 PM	2286.9	3631.5	0.0	5918.4
3:00 PM	2249.6	3778.8	0.0	6028.4
4:00 PM	2494.4	4329.2	0.0	6823.6
5:00 PM	2825.0	4823.7	0.0	7648.7
6:00 PM	2952.2	4900.0	0.0	7852.2
7:00 PM	3000.0	4799.3	0.0	7799.3
8:00 PM	2944.6	4611.1	64.1	7619.8
9:00 PM	2677.2	3979.9	681.0	7338.0
10:00 PM	2355.6	3361.0	1645.8	7362.4
11:00 PM	2066.5	2606.2	2461.0	7133.7
		4900.0		7852.2

Figure 2: Electrical Single Line Diagram of Facility



## Study Assumptions

The infrastructure and protection evaluation will identify any new PG&E substation facilities or distribution upgrades necessary to interconnect the Customer's facility using the following assumptions:

1. The maximum net electrical load demand to be served at 2500 Mariposa St (Mix) is 7.80 MW.
2. The customer will engineer, procure, construct, own, and maintain its project facilities up to the intervening facility.
3. The study will consider all PG&E distribution projects in the Project vicinity.

PG&E has estimated a study fee of \$25,000 for performing the SIS based upon the scope of this study plan. The final cost to complete the SIS will be based on actual cost.

PG&E will provide the SFPUC a record of actual costs for performing this SIS roughly two months after the SIS is completed. PG&E will bill the SFPUC the remaining balance if the actual cost is higher than the estimated \$25,000. If the actual cost is less than the estimated study fee, PG&E will return the balance to the SFPUC within thirty (30) days of such determination.

**Evaluation of Distribution Interconnection**

PG&E's Distribution Planning Department evaluated the capability of the existing distribution system to serve the maximum load at 2500 Mariposa St (Mix).

**Infrastructure Scope and Feasibility:** To mitigate forecasted overloads triggered by the new primary service load, it is required to install and extend a new 12 kV distribution feeder from Potrero Substation. The scope is the following: installing a new 12 kV breaker and IPAC relay package at Potrero Substation, extending new mainline cable from the breaker to an existing 6" conduit system on Illinois St and 23<sup>rd</sup> St, installing ~9,500 ft of 1100 AL EPR in existing 6" conduits up to 17<sup>th</sup> St and Arkansas St, and trenching and installing additional 1100 AL EPR up to 17<sup>th</sup> and Hampshire St. Additional 1100 AL EPR will be installed along 6" conduits to land on a new 600 Amp switch – interrupter – switch in a #7 box. 600 AL EPR will be installed from the PG&E interrupter to the SFPUC interrupter to feed 2500 Mariposa St (Mix). A tie will be installed between each PG&E switch-interrupter-switch serving 2500 Mariposa loads.

Distribution reinforcement details are as follows:

<u>Install New Feeder at SF A Substation and Line Extension</u>	<u>\$ Cost</u>
<b><u>Direct Assignment Facilities:</u></b>	
<b>Tie-in Electric Service to New Feeder (12 months)</b>	
Install 600 Amp switch-interrupter-switch in #7 box	\$120,000
Trench and install ~20 ft of 600 AL EPR in 6" conduit + 6" spare	\$15,600
<b><u>Distribution Upgrades:</u></b>	
<b>Install New Substation Transformer (48 months)</b>	
Install 75 MVA 115/12 kV transformer and switchgear at SF A Substation (Ongoing)	\$0
Install new 12 kV bus section and switchgear at SF A Substation (Ongoing)	\$0
<b>Install New Feeder at SF A Substation and Line Extension (36 months)</b>	
Install new feeder breaker and associated IPAC relay package	\$950,000
Install 600 Amp 3-way 3-way switch	\$80,000
Trench and install ~300 ft of 1100 CU LSZH + 3 6" spare conduits	\$330,000
Trench and install ~200 ft of 1100 AL EPR in 6" conduit + 3 6" spares	\$156,000
Install ~9,500 ft of 1100 AL EPR in existing 6" conduit	\$5,700,000
Trench and install ~2,900 ft of 1100 AL EPR in 6" conduit + 6" spare	\$2,262,000
Install ~600 ft of 1100 AL EPR in 6" conduit	\$360,000
Estimated Cost	<b>\$9,973,600</b>

Figure 3: Proposed Distribution Scope

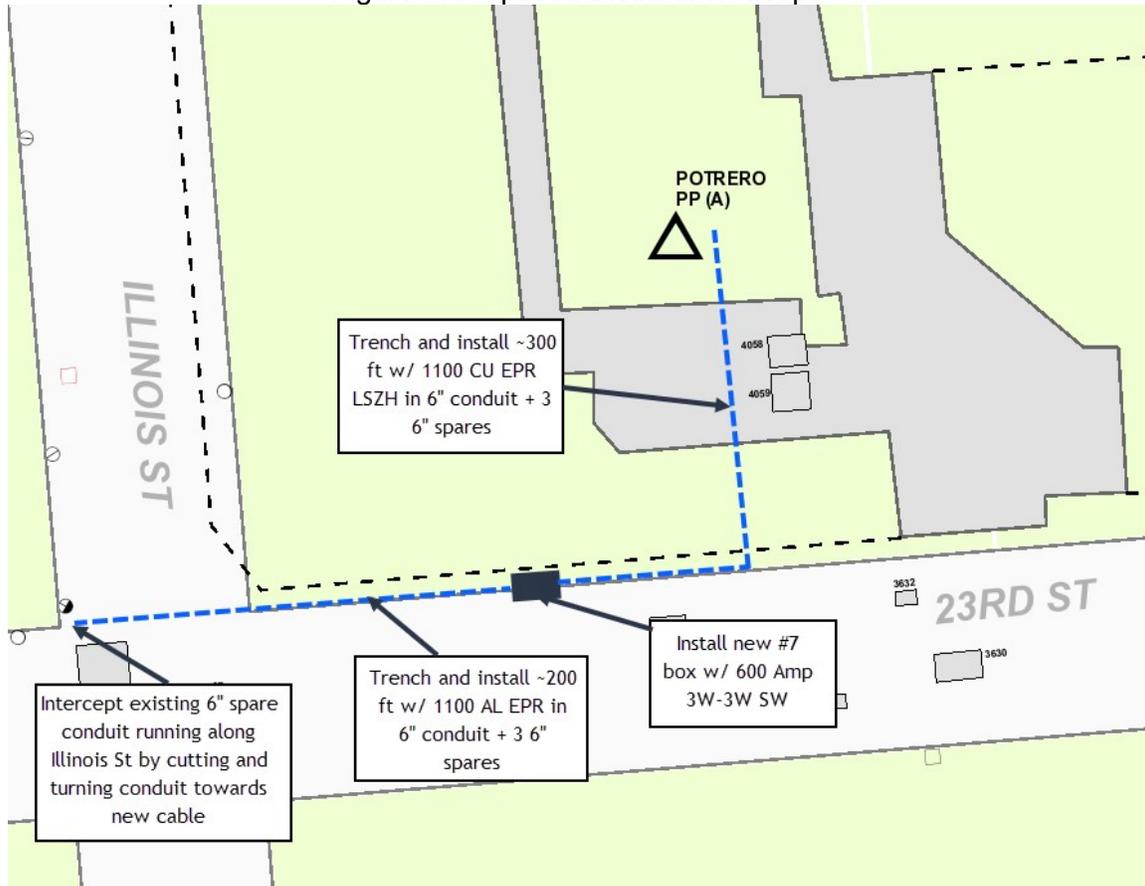


Figure 4: Proposed Distribution Scope

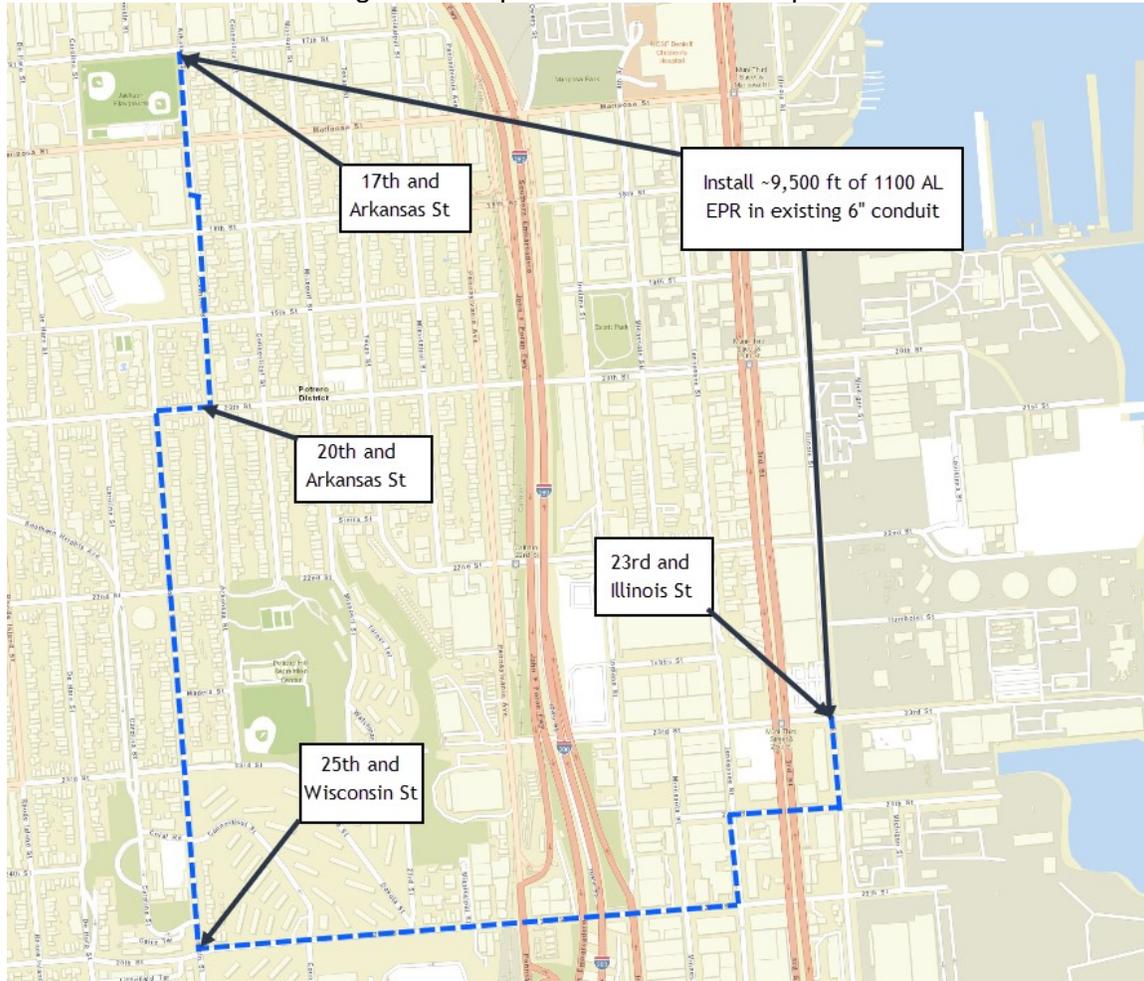


Figure 5: Proposed Distribution Scope

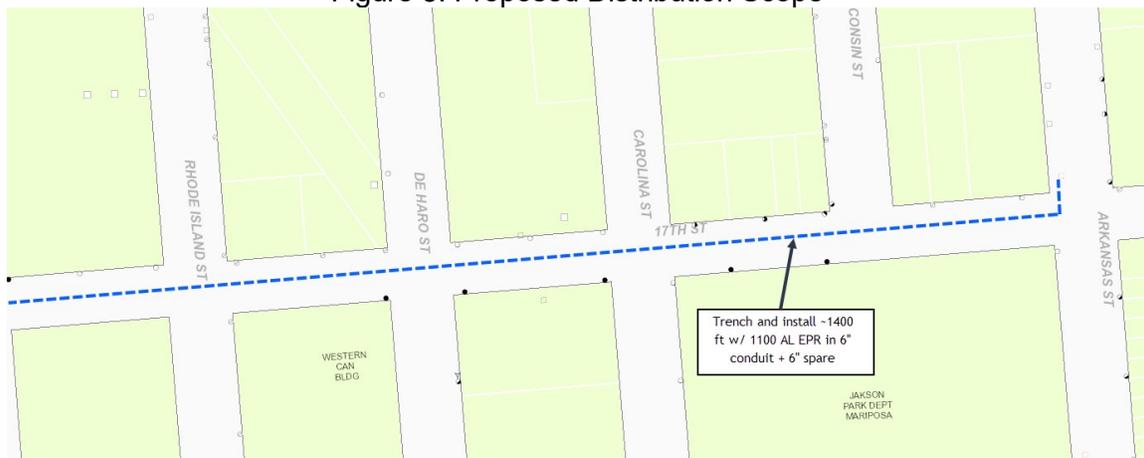


Figure 6: Proposed Distribution Scope

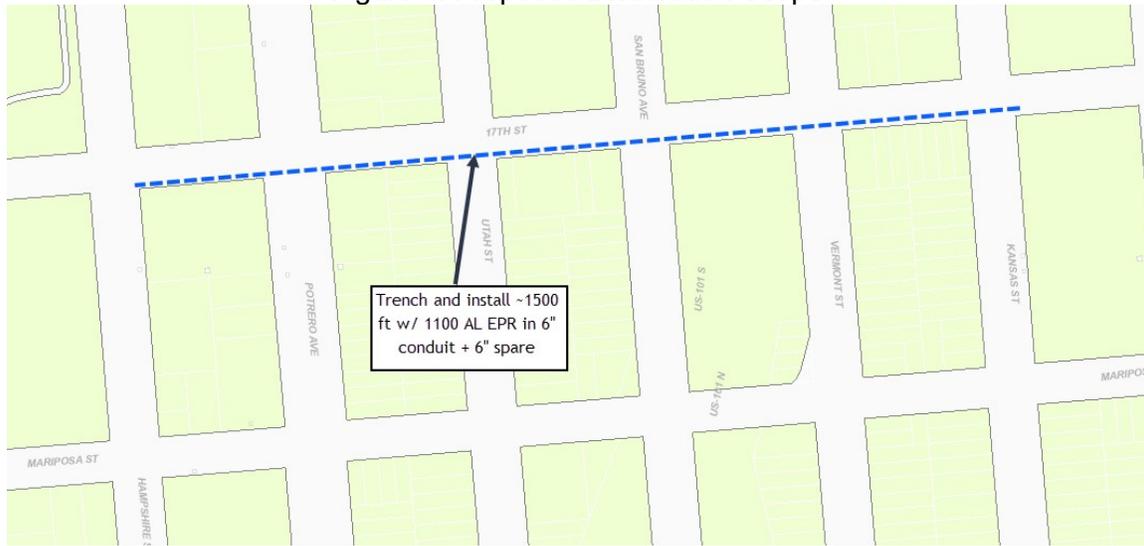


Figure 7: Proposed Distribution Scope

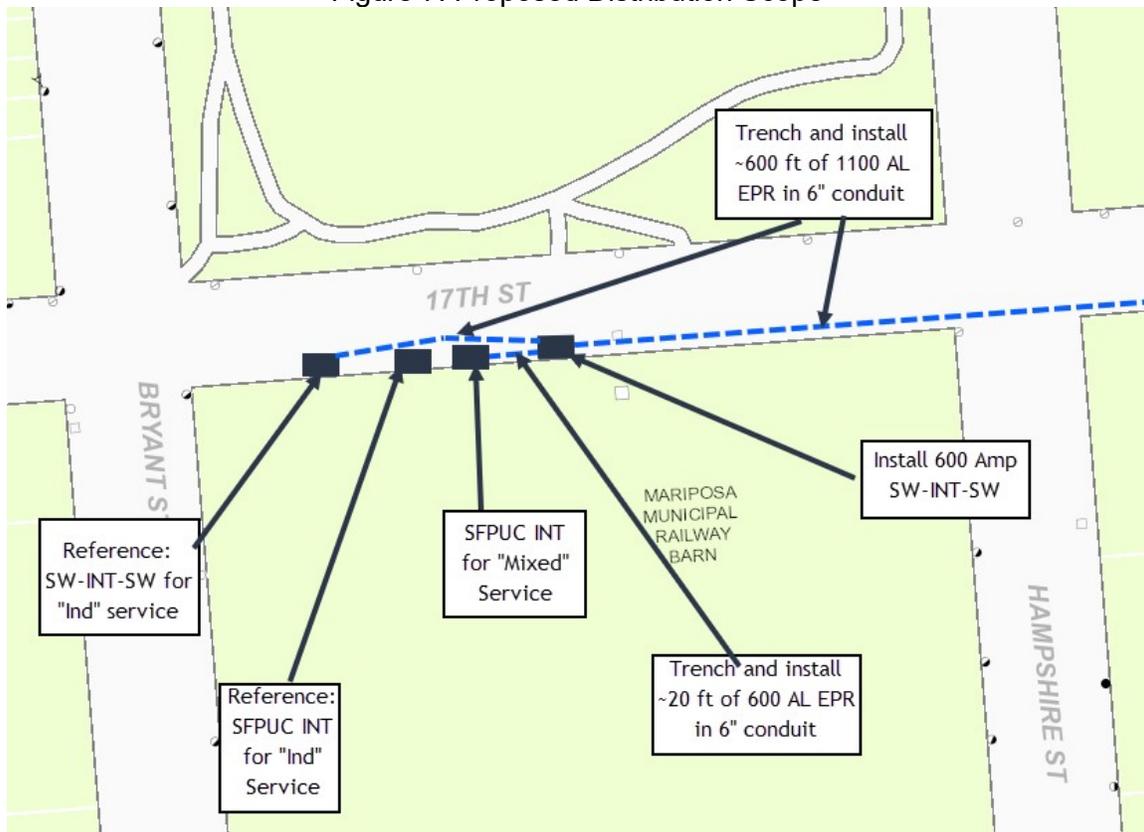
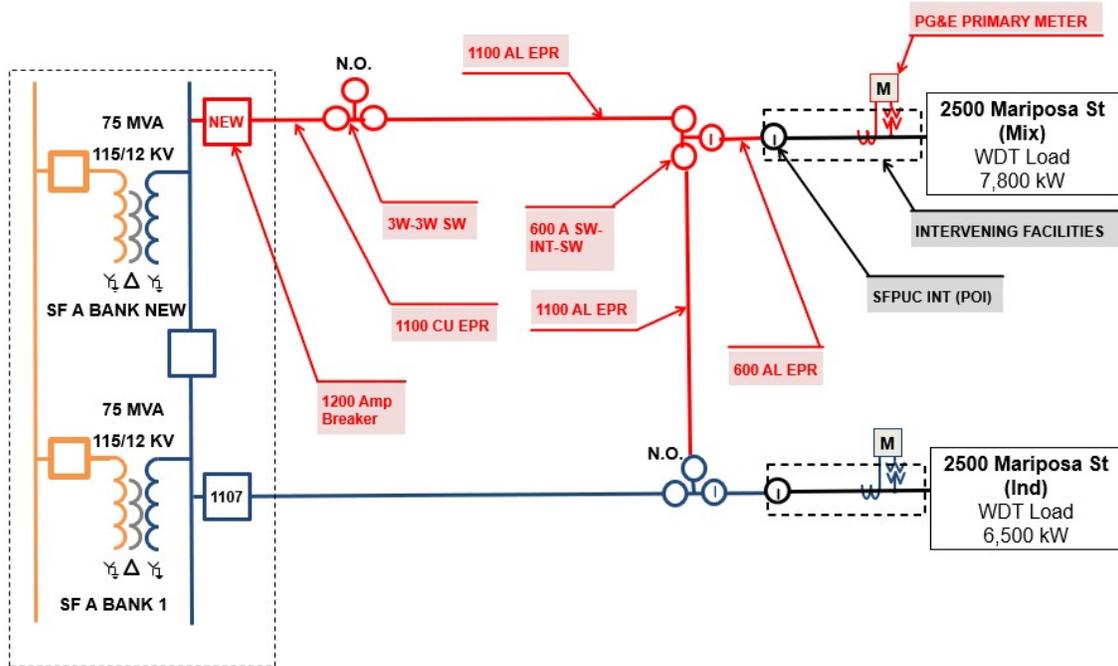


Figure 8: Single Line Diagram



**LEGEND**

- CUSTOMER FACILITIES
- PG&E TRANSMISSION
- PG&E DISTRIBUTION
- WORK REQUIRED

## Cost Estimates

Costs provided in this report are non-bMixing good faith cost estimates only. These costs have little degree of accuracy and are provided for informational purposes only.

Cost estimates will be provided, if applicable, when the Project progresses to the Facilities Study. Charges for implementing these interconnections and facility modifications, if the SFPUC decides to proceed, will be made based upon the actual costs incurred.

## Ownership of Facilities

If this SIS determines that equipment needs to be installed in SFPUC's facilities, such installation will be the responsibility of SFPUC. Any equipment found to be required within PG&E's facilities will be the responsibility of PG&E, and the terms of the WDT will determine who is financially responsible to pay for such equipment.

## Technical Requirements

In addition to interconnection requirements listed in this SIS, the electric and gas service requirements, and policies for establishing electric or gas service for new or remodeled customer installation are detailed in PG&E's Greenbook. The PG&E Greenbook provides detailed connection requirements for grounding and safety, among other requirements. A copy of the PG&E Greenbook can be downloaded under the following website: <http://www.pge.com/greenbook/>

### 1. Metering

Metering will be measured at the "change in ownership" point. It is the responsibility of SFPUC to provide the necessary structures, substructures, foundations, and disconnect switches for mounting and connection of the metering transformer. The meter location and grounding must meet all the requirements of IEEE80 for equipment safety and touch and step potential protection. Specific design details should be presented for review and approval prior to construction.

### 2. Voltage Regulation

SFPUC should specify tap ratios for its transformers to support appropriate low-side voltage.

### 3. Power Factor

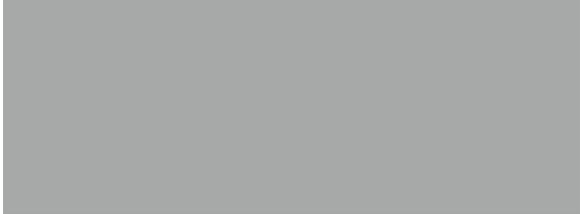
SFPUC will be obligated to meet its power factor requirements as outlined in WDT.

## **Study Updates**

The SIS will be performed in accordance with the assumptions listed in the Section titled “Study Assumptions”. If these assumptions become invalid, an updated study may be required to re-evaluate SFPUC’s interconnection impact on PG&E’s electric distribution system. Changes that might prompt an updated study are:

1. Change in the interconnection date or the timing of subsequent load additions.
2. Change in the projected amount of initial load or subsequent loads.
3. Change in the interconnection plan.

The SFPUC would be responsible for paying for any such updating study.



APPENDIX I:  
SDAT REVIEW LETTER 1.19.2023  
(FOR REFERENCE)





# SDAT REVIEW LETTER

Date: 1/19/2023

*Project Address:* 2500 Mariposa Street  
*Planning Record Number:* 2019-021884PRJ  
*Assigned Planners:* Mat Snyder, Gabriela Pantoja, Jennifer McKellar, Trent Greenan, Patrick Race

The Street Design Advisory Team (SDAT) provides design review and guidance to projects working within the City’s public right-of-way. SDAT is composed of representatives from the San Francisco Planning Department (SF Planning), the San Francisco Fire Department (Fire), San Francisco Public Works (Public Works), the San Francisco Municipal Transportation Agency (SFMTA), and the San Francisco Public Utilities Commission (SFPUC).

### SDAT REVIEW HISTORY:

1st Review	2nd Review	3rd Review
May 11, 2020	November 15, 2022	

Below are the SDAT comments from the 2nd SDAT review.

### PROJECT DESCRIPTION:

The proposal is to rebuild, expand, and modernize the Potrero Yard Muni Bus Maintenance Facility located at 2500 Mariposa Street, (bounded by Mariposa Street, Hampshire Street, Bryant Street and 17th Street), and replace it with an approximately 145-foot, mixed-use building with a four-story bus garage and eight levels of residential for a total area of 1,300,000 square feet. Of the 1,300,000 square feet, 723,000 square feet will be dedicated to the public facility, 544,000 square feet for the residential use (575 dwelling units), and 33,000 square feet of commercial space at the ground floor. The proposal includes two new curb cuts along Mariposa Street, new ADA ramps at all four intersections, 42 street trees, 37 Class 2 bicycle parking spaces, and three new bulbouts.

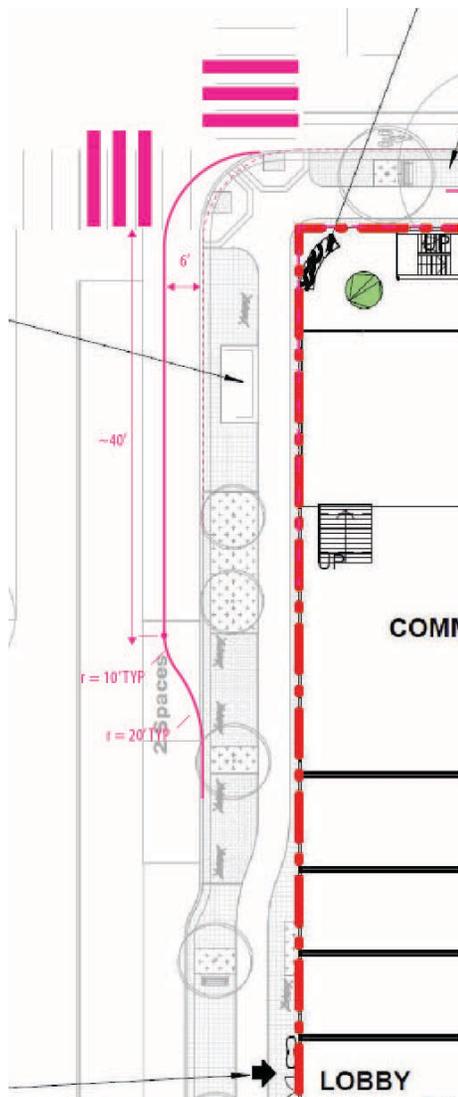
### CONDITIONS REQUIRING STREET DESIGN REVIEW:

- Planning Code [138.1](#) (required streetscape improvements per the [Better Streets Plan](#))
- Vision Zero
- Other:

**SDAT COMMENTS**

**1. Bulbout (required per Planning Code Sec. 138.1)**

- SDAT appreciates the addition of bulb-outs projecting into Bryant Street and Hampshire Street at the Mariposa Street intersection, and projecting into Hampshire Street at the 17<sup>th</sup> Street intersection, per May 11, 2020, SDAT comments. Given the high volume of bus movements to/from the project site, it is critical that all bulbs are analyzed for bus turning movements – particularly right turns from southbound Hampshire Street to westbound Mariposa Street (and into bus yard entry), from westbound Mariposa Street to northbound Bryant Street and from eastbound 17<sup>th</sup> Street to southbound Hampshire Street.
- SDAT recommends coordinating with SFMTA to confirm future plans for the bus stop at this intersection and installing a transit bulb out projecting into Bryant Street at the 17<sup>th</sup> Street intersection if the bus stop will remain. This may require the shifting of loading south of the transit bulb. Please coordinate with SFMTA on the layout and provision for a transit shelter, if applicable.



*Transit Bulb into Bryant Street at SE corner of 17th Street*

- The project is responsible for any utility work associated the construction of the bulb-out including potential work related to the relocation of the high-pressure fire hydrant shut-off valve if needed.
- Turn Templates: With your next submission to SDAT, please submit the following turn templates for all bulbouts and intersections. Note that turn templates must be approved by SDAT prior to Planning entitlement.
  - AASHTO 2011 WB-40
  - AASHTO Bus 45
  - Custom SFMTA 60’ Bus
  - Custom SFFD Engine
  - Custom SFFD Ladder

<b>Follow-up for Bulbouts</b>	Pre-entitlement/Next SDAT <ul style="list-style-type: none"> <li>• Sponsor to submit revised plans to SDAT showing required bulbout(s) as any relevant turn templates</li> <li>• Bulbout curb returns shall conform to SF Public Works’ Standard Plan for Curb Bulbs. See: <a href="http://sfpublicworks.org/sites/default/files/87%2C175.pdf">http://sfpublicworks.org/sites/default/files/87%2C175.pdf</a></li> </ul>
	Pre- or Post-entitlement <ul style="list-style-type: none"> <li>• Obtain relevant permits from BSM <a href="http://www.sfpublicworks.org/services/permits">www.sfpublicworks.org/services/permits</a></li> </ul>

**2. 17<sup>th</sup> St Street Frontage**

- SDAT has significant concerns about the pedestrian and bicycle experience and safety along the 17<sup>th</sup> Street frontage, given how the building is designed now with a blank wall and inactive frontage. This is especially concerning given that this is the frontage facing onto the park, and given how unsafe and unpleasant blank frontages on existing MTA facilities already have proven to be today (e.g., 15<sup>th</sup>, 16<sup>th</sup>, and Folsom Street frontages of the nearby Flynn Division, the Masonic Ave frontage of Presidio Yard, the Indiana St frontages of Woods Yard, and the San Jose and Ocean Ave frontages of Cameron Beach Yard).
- Given that this project is both a major and a public development project, its streetscape design should lead by example and be a model of the most up-to-date street design best practice. SDAT draws your attention to the following from the Better Streets Plan’s governing Admin Code 98.1(d)(10): “Major new developments, both public and private, often include the rebuilding of portions of public right-of-ways and should serve as models of the Better Streets Policy. Special efforts should be made to ensure that such new developments lead by example. *Public projects should establish model street and open space designs and private projects should incorporate stronger street design and landscaping standards.*” If an inactive façade on 17<sup>th</sup> Street is unavoidable, the sidewalk and building façade design of 17<sup>th</sup> Street should be a model for how to design an important street with an inactive façade.
- We strongly encourage exploring all avenues for targeted building program and design modifications that could enable more active use of the 17<sup>th</sup> Street ground-floor. If the bus ramps are the primary barrier standing in the way of activation of 17<sup>th</sup> Street as currently designed, any feasible way to shift them inward should be explored, if it has not been already. Shifting them ~30’ to the next structural bay would be ideal, if at all possible, and could even allow another liner of housing.
- At minimum, we request that you clearly describe and illustrate the design intent for the 17th Street frontage if active uses are not practical for the entirety of the frontage given the various requirements of the Project.

**3. Accessible Curb Ramps (Required per Public Works Order No: 185854 ) and Accessibility Requirements**

- The project is required to upgrade/install accessible pedestrian ramps at all street corners with existing curb ramps that do not comply with current City Standards, including the midblock crossing along Mariposa at York Street.
- See exhibit below for which illustrates red circles at curb ramp locations triggered by the project. Submit Existing Curb Ramp Inspections and corresponding photographs for all existing curb ramps proposed to remain as part of Street Improvement Permit.
- Construct new SE-R and NE-L curb ramps at York and Mariposa as part of this project. Revise site plan to show 6 directional curb ramps at this intersection. The midblock crosswalk(s) at York should be marked on the project plans.
- Public Works Order 184,350 requires sponsors installing ADA-compliant curb ramps at crosswalks to install receiving ramps at the opposite end of the crosswalk if none exist or if an existing ramp does not comply with current City standards. In addition to the ramps required along the project frontage, the project sponsor will be required to install new ramps on the receiving end of each crossing, if the existing receiving ramps do not comply with current City Standards.



**Sidewalk Encroachments and Standard Paving Materials**

- Set back elements from private plazas including benches so they do not encroach into the Public ROW. Revise design of the Bryant Street sidewalk accordingly to remove encroachments.
- Revise design to provide SF City Standard Sidewalk Paving Material from back of walk to the furnishing zone of the sidewalk. Eliminate proposed change in material at frontage zone. If the planned need is sidewalk tables and chairs, that can be handled with an approved BSM Tables and Chairs permit and movable pedestrian diverters.
- Remove proposed building frontage zones from sidewalk adjacent to bus stops and passenger loading zones. Building frontage zones may be problematic at these areas due to higher pedestrian use and potential for congestion.

Follow-up	Pre-entitlement/Next SDAT <ul style="list-style-type: none"> <li>• Show conceptual ramp locations in future SDAT submittal.</li> </ul>
	Pre- or Post-entitlement <ul style="list-style-type: none"> <li>• Meet with the Public Works Disability Access Coordinator’s Office to ensure ramp designs meet City standards. (Public Works Standard Curb Ramp Plans)</li> <li>• Obtain relevant permits from BSM</li> </ul>
Contacts	Karina Lairet ( <a href="mailto:karina.lairet@sfdpw.org">karina.lairet@sfdpw.org</a> ), Public Works Disability Access Coordinator’s Office

**4. Curb Cuts (Required by Public Works and SFMTA)**

- City policy prohibits curb cuts the sole purpose of which are used to transfer trash bin to and from the curb. Remove the proposed curb cut for waste collection on Hampshire Street.

**5. Driveways & Garage Access**

- Turn Templates: With your next submission to SDAT, please submit the following turn templates for all access points for buses into and out of the bus yard from Mariposa Street. Note that turn templates must be approved by SDAT prior to Planning entitlement.
  - AASHTO Bus 45
  - Custom SFMTA 60’ Bus
  - Other expected design vehicle

Follow-up for curb cuts, driveways & garage access	Pre-entitlement/Next SDAT submittal <ul style="list-style-type: none"> <li>• Submit loading demand analysis and loading operations plan</li> <li>• Submit turn templates for design vehicle</li> </ul>
Contacts	Coordinate with your assigned Planner

**6. On-street Loading**

- It is unclear to SDAT who the on-street commercial loading is for on the south side of Mariposa Street and the east side of Hampshire Street.
- Commercial Loading: please detail commercial loading space lengths and intended design vehicle in next plan submittal.

- Passenger loading zones shall comply with accessibility requirements. Revise site plan to show proposed passenger loading zones (white curb) and revise layout to comply with Standard Accessible Passenger Loading Zone Drawings at the link below:  
[https://sfgov.org/mod/sites/default/files/Documents/Bulletin10\\_PassengerLoadingZones.pdf](https://sfgov.org/mod/sites/default/files/Documents/Bulletin10_PassengerLoadingZones.pdf)
- On-site passenger loading requires a vertical clearance of not less than 114 inches and room to maneuver paratransit size vans in and out with turn around. Any planned valet parking requires an accessible passenger loading zone within the parcel.
- Bike racks are not permitted on sidewalk adjacent to passenger loading zones. Relocate bike racks accordingly.
- The project shall come back to SDAT prior to finalizing the project description for environmental review and the sponsor shall submit the project’s loading needs analysis and a loading operations plan regarding both off-street and on-street loading operations. While developing the project description, the sponsor shall work with the project’s environmental/transportation planner and with Paul Kniha (paul.kniha@sfmta.com), SFMTA Color Curb Program Manager, and Karina Lairret (karina.lairret@sfdpw.org), Associate Engineer with the Public Works Disability Access Coordinator, to discuss and revise the project’s loading needs and corresponding accessibility requirements.

<p><b>Follow-up</b></p>	<p>Pre-entitlement/Next SDAT</p> <ul style="list-style-type: none"> <li>• Sponsor to submit written statement to Planning expressing intention to follow-up on this item</li> <li>• Submit the project’s loading needs analysis and a loading operations plan regarding both off-street and on-street loading operations</li> <li>• The project shall come back to SDAT prior to finalizing the project description for environmental review and the sponsor shall submit the project’s loading needs analysis and a loading operations plan regarding both off-street and on-street loading operations.</li> <li>• If it has not happened already, meet with both SFMTA Loading Team &amp; Public Works Accessibility Coordinator to coordinate design of loading zone(s) .</li> </ul> <p>Post-entitlement (Post-Certificate of Occupancy)</p> <ul style="list-style-type: none"> <li>• Sponsor to apply for on-street loading zones from the SFMTA permits from SFMTA <a href="https://www.sfmta.com/online-color-curb-application">https://www.sfmta.com/online-color-curb-application</a>)</li> </ul>
<p><b>Contacts</b></p>	<p>Karina Lairret (<a href="mailto:karina.lairret@sfdpw.org">karina.lairret@sfdpw.org</a>), Associate Engineer with the Public Works Disability Access Coordinator                  Paul Kniha (<a href="mailto:paul.kniha@sfmta.com">paul.kniha@sfmta.com</a>), SFMTA Color Curb Program Manager                  Jennifer McKellar (<a href="mailto:Jennifer.mckellar@sfgov.org">Jennifer.mckellar@sfgov.org</a>), Senior Environmental Planner, SF Planning</p>

**7. Street Trees**

- The project is required to install street trees along all frontages. Please coordinate with SF Public Works Bureau of Urban Forestry for guidance on spacing of tree basins.
- Per SFMTA standards, trees are not allowed within 25 feet of the corner property line on approach, but trees can be placed closer to the intersection on exit, to enhance pedestrian visibility and safety. One tree proposed along 17<sup>th</sup> Street approaching Hampshire should be verified it’s not within 25 feet of the corner property line.

- Trees are generally not permitted at T-intersections with pedestrian mid-block crossings as is present at Mariposa and York. This is due to limited sightlines between pedestrians, bicyclists and vehicles approaching the crosswalk. Please coordinate with SF Public Works Bureau of Urban Forestry for guidance.
- The existing trees along all frontages shall remain unless determined otherwise by SF Public Works Bureau of Urban Forestry (BUF). Any proposed new, removed, or relocated street trees and/or landscaping within the public sidewalk may require a permit from SF Public Works Bureau of Urban Forestry (BUF).

Follow-up	<p>Pre-entitlement/Next SDAT</p> <ul style="list-style-type: none"> <li>• Sponsor to submit written statement to Planning expressing intention to follow-up on this item</li> <li>• Submit plans that differentiate existing trees from new trees</li> <li>• Submit revised plans that address tree placement comments above</li> </ul> <p>Post-entitlement</p> <ul style="list-style-type: none"> <li>• Sponsor to obtain any required permits from Public Works Bureau of Urban Forestry (BUF)</li> </ul>
Contacts	Public Works Bureau of Urban Forestry, <a href="mailto:urbanforestry@sfdpw.org">urbanforestry@sfdpw.org</a> , 628-652-8733

**8. Street Lighting**

- If existing lighting conditions on fronting the project site do not meet City standards, the project will be required to upgrade street lighting and/or pedestrian lighting. To determine if lighting improvements are required, the sponsor will need to provide photometric studies for street lighting plans to the SFPUC.
- Please coordinate with the SFPUC Streetlights Division on this item at [Streetlights@sfwater.org](mailto:Streetlights@sfwater.org). The sponsor shall submit written statement to SDAT expressing intention to follow-up on this item.

**9. Transformer**

- SDAT supports the proposed location of a transformer room. Confirm all location and access requirements with PG&E prior to submitting the final building designs to the Planning Department.

Follow-up	<p>Pre-entitlement/Next SDAT</p> <ul style="list-style-type: none"> <li>• Sponsor to show proposed transformer locations on plans to be submitted and approved by SDAT</li> <li>• Coordinate with SFPUC or PG&amp;E to ensure proposed transformer location meets relevant standards.</li> </ul>
Contacts	<ul style="list-style-type: none"> <li>• Transformer Location: Coordinate with your assigned Current Planner on this item</li> <li>• Transformer Location Technical Feasibility: Coordinate with electrical power utility (SFPUC or PG&amp;E) and Public works BSM.</li> </ul>

**10. Waste Collection**

- Please provide trash loading and removal strategy explaining how trash bins will be moved between the trash storage area and the street on pickup days.
- Provision for trash removal should not be in the public right-of-way as is indicated on the plans. Please update plans to reflect no incursion into the public right-of-way.

- See item #3. City policy prohibits curb cuts the sole purpose of which are used to transfer trash bin to and from the curb. Remove the proposed curb cut for waste collection on Hampshire Street.

Follow-up	Pre-entitlement/Next SDAT <ul style="list-style-type: none"> <li>• Sponsor to submit trash loading and removal strategy to SDAT</li> </ul>
Contacts	Coordinate with Recology to ensure proposed trash strategy is feasible

#### 11. Outswing Doors

- Out-swinging doors on all project frontages shall be recessed from the plane of the exterior wall to prevent pedestrian traveling on the sidewalk from being struck by opening doors.

### ADDITIONAL STREET DESIGN CONSIDERATIONS

#### 12. Related City Projects – Area Plans/Public Realm Plans

- The project is located within the Eastern Neighborhoods Plan (Mission) and the Mission District Streetscape Plan. The project sponsor is encouraged to read both plans and integrate planning work done to date.
  - Eastern Neighborhoods Plan: <https://generalplan.sfplanning.org/Mission.htm>
  - Mission District Streetscape Plan: [https://sfplanning.org/sites/default/files/archives/CDG/docs/missionstreets/MDSP\\_FINAL\\_DRAFT\\_OCT2010.pdf](https://sfplanning.org/sites/default/files/archives/CDG/docs/missionstreets/MDSP_FINAL_DRAFT_OCT2010.pdf)

#### 13. 17<sup>th</sup> Street Bikeway

- SDAT encourages the project to consider a raised cycle track along the 17<sup>th</sup> Street frontage rather than an at-grade facility.

#### 14. Hampshire Street Sidewalk

- 90-degree curb returns cannot be cleaned by Public Works mechanical street sweepers. Please revise curb returns to meet SF Public Works' Standard Plan for Curb Bulbs or confirm plans for street sweeping.

### ADDITIONAL INFORMATION REQUIRED FOR NEXT SDAT REVIEW

- Existing/proposed curb cuts and curb cuts to be removed
- Street names
- Dimensions of existing and proposed sidewalk and curb extensions on plans
- Dimensions of existing and proposed curb cuts on plans
- Dimensions of existing and proposed transit stops
- Site plan with streetscape features (e.g., bulbouts, trees, transit shelters, benches, bike racks)
- Proposed street tree locations
- Adjacent ROW widths
- Locations of existing utility poles and hydrants
- Turn templates for bus yard access
- Curb-to-curb section, including dimensions of tree wells and path of travel
- Proposed transformer vault location
- A written statement clarifying that Standard SDAT Comments have been reviewed

**STANDARD SDAT COMMENTS**

For your next SDAT submittal, please review the “Standard SDAT Comments” which can be found on the SDAT website (<https://sfplanning.org/project/street-design-advisory-team>), and include a written statement clarifying that this task has been completed and that all plans are consistent with guidelines/standards enumerated in the “Standard SDAT Comments”.

SDAT Members:

**SF Public Works:** Chris Buck, Berhane Gaime, Kevin Jensen, Jung Johnson, Karina Lairer, Eric Lam, Debra Lutske, Denny Phan, Suzanne Suskind, John Thomas, Michelle Woo, John Kwong, Jennifer Cooper

**SFMTA:** Paul Kniha, Westley Myles, Francesca Napolitan, Ricardo Olea, Mike Sallaberry, Norman Wong, Dustin White, Adam Smith

**SF Planning:** Kimberly Durandet, Nicholas Foster, Ryan Shum, Jessica Look, Ilaria Salvadori, Patrick Race, Ben Caldwell

**SFPUC:** Derek Adams, Mira Chokshi, Hieu Doan, Molly Petrick, Joan Ryan, Sam Young

**SFFD:** Ramon Flores



APPENDIX J:  
GEOTECHNICAL BASELINE REPORT



---

# GEOTECHNICAL BASELINE REPORT

## SFMTA Potrero Facility Rebuild

### San Francisco, California

*Prepared For:*

**Plenary Americas**  
555 W. Fifth Street, Suite 3150  
Los Angeles, California 9001

*Prepared By:*

**Langan CA, Inc.**  
1 Almaden Boulevard, Suite 590  
San Jose, California 95113

---

**Serena T. Jang, GE #2702**  
Principal/Vice President

---

**John Gouchon, GE #2282**  
Principal/Vice President

**5 June 2024**  
**770691701**

# **LANGAN**

## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2.0</b>	<b>PROJECT DESCRIPTION.....</b>	<b>2</b>
<b>3.0</b>	<b>MANMADE FEATURES .....</b>	<b>3</b>
<b>4.0</b>	<b>SOURCES OF GEOLOGIC AND GEOTECHNICAL INFORMATION .....</b>	<b>5</b>
<b>5.0</b>	<b>GEOLOGIC SETTING .....</b>	<b>5</b>
<b>6.0</b>	<b>GROUND CHARACTERIZATION .....</b>	<b>6</b>
<b>6.1</b>	<b>Subsurface Conditions .....</b>	<b>6</b>
<b>6.2</b>	<b>Soil Corrosivity .....</b>	<b>7</b>
<b>6.3</b>	<b>Naturally Occurring Asbestos (NOA).....</b>	<b>8</b>
<b>7.0</b>	<b>CONSTRUCTION CONSIDERATIONS.....</b>	<b>10</b>
<b>7.1</b>	<b>Foundation and Settlement .....</b>	<b>10</b>
<b>7.2</b>	<b>Groundwater Considerations.....</b>	<b>11</b>
<b>7.3</b>	<b>Excavation and Dewatering .....</b>	<b>11</b>
<b>7.4</b>	<b>Shoring .....</b>	<b>13</b>
<b>7.5</b>	<b>Site Preparation and Earthwork .....</b>	<b>14</b>
<b>8.0</b>	<b>INSTRUMENTATION AND MONITORING.....</b>	<b>16</b>
<b>8.1</b>	<b>Ground Movement Monitoring.....</b>	<b>16</b>
<b>8.2</b>	<b>NOA .....</b>	<b>17</b>

### REFERENCES

### FIGURES

### APPENDICES

### DISTRIBUTION

770691701 DRAFT Geotechnical BASELINE Report\_SFMTA Potrero Facility Rebuild\_San Francisco\_REV1

## **ATTACHMENTS**

### **FIGURES**

- Figure 1 Site Location Map
- Figure 2 Site Plan with Existing Conditions
- Figure 3 Site Plan with Proposed Development
- Figure 4 Regional Geologic Map
- Figure 5 Interpretive Subsurface Profile A-A'
- Figure 6 Interpretive Subsurface Profile B-B'
- Figure 7 Contours of Top of Colma Elevation
- Figure 8 Contours of Top of Bedrock Elevation

### **APPENDICES**

- Appendix A As-built Records for Existing Retaining Walls
- Appendix B Logs of Test Borings by others
- Appendix C Logs of Test Borings by Arup/RYCG
- Appendix D Geophysical Survey Investigation Report  
(GEOVision Geophysical Services, Inc.)
- Appendix E MASW Geophysical Survey Investigation Report  
(NORCAL Geophysical Consultants, Inc.)
- Appendix F Laboratory Test Results by ARUP/RYCG

## **GEOTECHNICAL BASELINE REPORT SFMTA Potrero Facility Rebuild San Francisco, California**

### **1.0 INTRODUCTION**

This Geotechnical Baseline Report (GBR) has been prepared by Langan CA, Inc. (Langan) for the new San Francisco Municipal Transit Authority (SFMTA) Potrero facility in San Francisco, California. The project site occupies one city block and is bound by 17<sup>th</sup> Street on the north, Hampshire Street on the east, Mariposa Street on the south, and Bryant Street on the west, as shown on Figure 1. The proposed development will be a 7- to 13-story mixed-use structure that will include a new bus maintenance facility and affordable and mixed income housing.

This GBR presents baselines with respect to certain subsurface conditions that are expected to be encountered during construction that may influence the contractor's rate of progress, tooling selection, tool wear, or approach to bidding the project. The GBR establishes a contractual basis for allocation of geotechnical risk during performance of the work; it does not define the single correct interpretation of geotechnical conditions. This baseline report represents the conditions the contractor is to assume for bidding purposes and for which the contractor is responsible for during construction.

This report includes:

- a summary of the geological and geotechnical information obtained for the project;
- interpretation of anticipated ground and groundwater conditions to be encountered, including interpretive geologic and geotechnical subsurface profiles;
- a summary of how these anticipated conditions have influenced the project design and are expected to impact construction;
- discussion of other design and construction considerations that will impact construction.

Interpretation of subsurface information contained in this GBR has included interpolation between widely spaced subsurface exploration points, extrapolations beyond points of exploration, and review of laboratory test data. Soil and rock deposits vary in type, strength, and other important properties between points of exploration. The judgements assume the use of appropriate means, methods, and levels of workmanship. Ultimately, the behavior of the soil and rock deposits present in the surface and subsurface excavations will be influenced by the contractor's means and methods, and levels of workmanship.

This GBR is to be read in conjunction with the following project Geotechnical Design Report (GDR), which is part of the Contract Documents:

- Geotechnical Investigation Report (Draft), SFMTA Potrero Facility Rebuild, San Francisco, California, dated 23 June 2023, by Langan.

Some of the technical concepts, terms, and descriptions in the GBR may not be familiar to bidders. It is highly recommended that bidders engage a California registered geotechnical engineer or engineering geologist who is familiar with all topics of this report, to carefully review and explain this information so that a complete understanding of the information presented in the GBR can be developed prior to submitting a bid.

Certain drawings and figures contained in other documents in the Contract are referenced by the GBR as an aid to bidders in understanding the elements of the work. Such drawings are not reproduced in the GBR, so this GBR shall be reviewed in conjunction with the Drawings and Specifications and all documents in the Contract.

The GBR was performed in general accordance with our scope of services outlined in our add service request dated 15 December 2023.

## 2.0 PROJECT DESCRIPTION

The project site is rectangular with plan dimensions measuring approximately 480 by 410 feet. It is occupied by an existing paved electrified-bus parking area on the western portion of the site and a one- to two-story bus maintenance facility with rooftop parking and below-grade vehicle service pits on the eastern portion, as shown on Figure 2. The existing grade of the surrounding streets generally slopes down towards the southwest, with the high point at the corner of 17<sup>th</sup> Street and Hampshire Street and lowest point at the corner of Mariposa Street and Bryant Street. The current SFMTA facility is generally at the elevation of Mariposa Street to the south at Elevation 53.5 feet<sup>1</sup>, with up to about 22 feet of retained soil and rock at the northeastern corner of the site where existing adjacent street grade is highest.

According to a review of the 50 percent schematic design drawings (IBI Group, 2023), we understand that the current plans are to demolish the existing paved electrified-bus parking area

---

<sup>1</sup> All elevations reference the City & County of San Francisco Vertical Datum of 2013 based on North American Vertical Datum of 1988 (CCSF-VD13); ground surface elevations are based on the ALTA/NSPS Land Title Survey by IBI Group, dated 3 May 2023.

and the bus maintenance facility and replace them with a 7- to 13-story mixed-use structure that will include a new bus maintenance facility and affordable and mixed income housing.

The proposed finished floor elevation of the ground floor is currently Elevation 50 feet, and the maximum building height is anticipated to be 145 feet above the ground floor, excluding penthouses. A description of the proposed development is as follows:

- The footprint of the new bus maintenance facility will be east of gridline B<sup>2</sup>, as shown on Figure 3. The new bus maintenance facility will occupy the lower four levels (designated as Bus Floor), with the Bus Floor level heights ranging from 12 feet to 20.5 feet, with the roof of the bus maintenance facility 70 feet above the ground floor.
- East of gridline B, four- to seven-levels of affordable and mixed income housing units are planned above the new bus maintenance facility. West of gridline B, 13 floors of housing units are planned.
- The western portion of the site will have a one level basement, as shown on Figure 3; the proposed basement extends 20 feet below the ground floor elevation, with the finished floor elevation of the basement at Elevation 30 feet. In addition, a lower-level work area located between gridlines F to G and 8 to 10.5, as shown on Figure 3, is planned below the ground floor on the southeast portion of the site; according to Sheet S3003 of the structural drawings (Nabih Youssef Structural Engineers, 2023), the finished floor of the lower-level work area is 8.5 feet below the ground floor level, corresponding to a finished floor elevation of Elevation 41.5 feet. The remaining footprint of the site will have the ground floor at Elevation 50 feet.

### 3.0 MANMADE FEATURES

Most of the site along the east side is occupied by a 215-foot-wide bus maintenance facility, as shown on Figure 2. It is a double-height, single-story structure, and the floor level of the maintenance facility conforms to the elevations of Mariposa Street. The garage area of the maintenance facility includes below-grade vehicle service pits. There is roof parking on top of the maintenance facility, which is accessed from 17<sup>th</sup> Street. At this time, as-built drawings of the existing maintenance facility were not available for review.

The geotechnical investigation report by SCI (SCI, 1989), indicates the existing maintenance building is supported on spread footings extending to depths of up to six feet bgs. An asphalt and concrete paved electrified bus parking area occupies the remainder of the site. The bus

---

<sup>2</sup> Gridline based on Sheet A1001 titled, "Site Plan" by IBI Group dated 3 May 2023.

parking area includes ancillary facilities such as support poles for the overhead catenary system, guy wires and electrical lines, a bus washing station and trash compactor facility.

According to borings drilled in the electrified-bus parking area, the area is covered by a section of asphalt over concrete that has thicknesses ranging from 10 to 13 inches. Borings drilled in the existing maintenance building show the building's concrete slab is 6 to 14 inches thick. However, an environmental boring drilled recently in the southeast section of the existing maintenance building cored 22 inches through the existing concrete floor slab and did not find the bottom of the slab.

The site is relatively level as a result of being benched into a natural slope. Elevations of the parking area vary from Elevation 54 feet in the northeast corner to Elevation 48 feet in the southwest corner. Street grades along 17<sup>th</sup> Street are relatively flat along the eastern 1/3 of the street with elevations ranging from Elevation 75 to 77 feet; the western 2/3 of the street slope steeply with elevations varying from Elevation 75 to 62 feet at the intersection of 17<sup>th</sup> Street and Bryant Street. Grades along Bryant and Hampshire Street slope down towards Mariposa Street to Elevation 48 and 54 feet, respectively. The site grades generally conform to the street grades along Mariposa Street.

The site is surrounded by reinforced concrete retaining walls up to 23 feet high along Bryant and 17<sup>th</sup> Street and within the maintenance building along the eastern portion of 17<sup>th</sup> Street and along Hampshire Street. The available as-built records of the retaining walls that were included in the Arup/RYCB report (Arup, 2019) are included in Appendix A. According to the available as-built records, the walls are concrete walls supported on shallow foundations. The as-built records indicate that the shallow footings are of varying dimensions and embedment depths. According to the as-built records, the north and west retaining walls are backdrained; however, drawings with the details of the east wall were not available for our review. Detail sections on Drawing DL-9809 (see as-built drawings in Appendix A) shows granular drain material, surrounded by filter fabric, along the back of the existing north and west walls and a six-inch-diameter perforated pipe near the base of the walls; drawings of the east wall were not available for our review. If these walls are to be incorporated into the new building, the functionality of the drainage system shall be confirmed. In addition, new basement walls and associated floor slabs shall have drainage panels and underdrains, respectively to prevent the buildup of hydrostatic pressures. For baseline purposes, the contractor shall expect to use sumps to pump out water collected beneath the basement level and lower-level work area.

#### **4.0 SOURCES OF GEOLOGIC AND GEOTECHNICAL INFORMATION**

Details of the field exploration activities, laboratory testing and geophysical surveys are described in geotechnical investigation report (Langan, 2023).

Subsurface information was provided by the SFMTA's geotechnical engineer for the design-build bids, which consisted of a report titled *San Francisco Public Works, SFMTA Potrero Facility Rebuild, Geotechnical Engineering Report*, dated 11 November 2019 by Arup/RYCG A Joint Venture (Arup/RYCG). The Arup/RYCG's report included subsurface data by Subsurface Consultants Inc. (SCI), Earth Mechanics Consulting Engineers (EMCE) and by Treadwell & Rollo, Inc. (T&R) from borings performed at and in the site vicinity. The locations of previous exploration points are shown on Figures 2 and 3. Boring logs by SCI, ECME and T&R are presented in Appendix A. Arup/RYCG drilled six additional borings and performed in-situ seismic measurements using active and passive surface wave techniques along four seismic lines. The boring logs and laboratory tests from the Arup/RYCG's report, are presented in Appendix B and the geophysical survey is presented in Appendix C.

To further evaluate the subsurface conditions and excavatability of the bedrock at and in the vicinity of the site, Langan performed additional geophysical surveys. The locations of the geophysical surveys are shown on Figure 2. The geophysical survey results and a brief evaluation by Norcal are presented in Appendix D.

Results of the laboratory testing from the Arup/RYCG 2018 investigation are included in Appendix E.

#### **5.0 GEOLOGIC SETTING**

The project is in the northern part of the San Francisco Peninsula, which falls under the Coastal Ranges geomorphic province. This province is characterized by a series of north-northwest trending mountains and valleys. However, because of recent deposition, these ridges are generally not very visible in San Francisco. Only a few outcrops such as Russian Hill, Nob Hill, Telegraph Hill, Twin Peaks, Potrero Hill, Mount Sutro, Mount Davidson, and the Bayview Hills are exposed (Arup, 2018).

On the basis of our review of the map titled *Geologic Map of the City and County of San Francisco* (AEG, 2018, Modified from Blake and others, 2000; Bonilla, 1998, 1971; and Schlocker, 1974), the northeast portion of the site is underlain by bedrock of the Franciscan or Coast Range Ophiolite, specifically of the Hunters Point Serpentinite-Matrix Melange, while the southern and

western portions of the site are underlain by Pleistocene deposits as presented in Figure 4. The bedrock is mapped primarily as Serpentinite, but also includes zones of sheared shale. For baseline purposes, the contractor shall expect the serpentinite to contain naturally occurring asbestos (NOA).

## 6.0 GROUND CHARACTERIZATION

Our conclusions regarding the subsurface conditions described in this section of the report are based on the previously performed borings and laboratory tests and the results of the geophysical surveys performed at the site.

### 6.1 Subsurface Conditions

For engineering analyses, excavations and supporting systems, the soils at the were subdivided into soil Units 1 through 3 and bedrock as Unit 4. Interpretive subsurface profiles have been developed based on the information in the GDR and is provided shown on Figures 5 and 6.

#### Unit 1 - Fill:

Unit 1 consists of fill, consisting of loose to dense silty sand, sand with silt, sand with gravel, clayey gravel, and silty gravel and soft to stiff sandy clay, was encountered beneath the existing pavement section and building slab. With the exception of BH-04, the fill thickness encountered was six feet or less; deeper fill, consisting of loose to medium dense silty gravel, clayey gravel, and silty sand with gravel, and medium stiff to stiff sandy clay was encountered to 11 feet bgs at BH-04, which was reported by Arup/RYCG as fill that is possibly associated with the construction of the maintenance building. Where tested, the fines of the silty sand fill have a plasticity index (PI) of 29 which indicates a high expansion potential.

For baseline purposes, the contractor shall expect the fill to be heterogenous, with loose to dense sand and gravel with varying fines, and soft to stiff clay and silt with high expansion potential. In addition, the contractor shall expect to encounter fill up to 11 feet below the existing ground surface elevation beneath the site and the fill includes man-made debris.

#### Unit 2 – Clay and Sand:

Unit 2 consists of 6 to 9½ foot thick layer of soft to medium stiff sandy clay and loose to medium dense clayey sand and sand with clay and was encountered at the southeast corner of the site (Borings BH-SCI-05, BH-04, and BH-06) beneath the fill. Where tested, the sandy clay layer has PIs ranging between 20 to 22 and is moderately expansive.

For baseline purposes, the contractor shall expect up to 10 feet of loose to medium dense sand with varying fines and soft to medium stiff moderately expansive clays to be encountered beneath the fill at the southeast portion of the site.

**Unit 3 - Colma Formation:** Unit 3 consists of a medium dense to very dense sand with varying amounts of fines, known as the Colma Formation. The unit was encountered at the western and southeastern portions of the site. Where encountered, the sand is approximately 5 to 68 feet thick. The Colma Formation was encountered at depths ranging from approximately two feet (Elevation 51.4 feet) to 12 feet (Elevation 37.4 feet). Where tested, it contained 23 and 43 percent fines (particles passing the No. 200 sieve). The shear wave velocity measured in the Colma Formation is 1,000 to 2,000 feet per second.

For baseline purposes, the contractor shall expect the medium dense to very dense Colma Formation sand with fines content ranging from 20 to 45 percent to be encountered at the western and southeastern portions of the site. The contractor shall expect the top of the unit to be encountered at the elevations shown on the contour plan on Figure 7. The contractor shall expect the thickness of the unit to range from 5 to 70 feet.

**Unit 4 - Bedrock:** Unit 4 consists of bedrock of the Franciscan or Coast Range Ophiolite, specifically of the Hunters Point Serpentinite-Matrix Melange. The bedrock is mapped primarily as Serpentinite, but also includes zones of sheared shale. Serpentinite is expected to contain naturally occurring asbestos (NOA). During the site investigation, shale and serpentinite were both encountered where explored.

For baseline purposes, the contractor shall expect the unit to consist of bedrock of the Franciscan and Coast Range Ophiolite Formations and is soft to hard, weak to moderately strong and highly to completely weathered. The contractor shall assume the serpentinite bedrock contains naturally occurring asbestos (NOA). The contractor shall expect the top of the unit to be encountered at the elevations shown on the contour plan on Figure 8.

**Groundwater:** Groundwater was encountered at the site in two of the borings drilled by Arup/RYCG. In BH-01, groundwater was encountered at depths between 30 and 35 feet bgs, corresponding to Elevation 21.8 feet and Elevation 16.8 feet. Arup/RYCG reported perched groundwater above the bedrock encountered in BH-06 at a depth of approximately 9 feet bgs (Elevation 44.9 feet).

For baseline purposes, the contractor shall expect groundwater to be encountered at Elevation 22 feet or perched eight feet above the bedrock where bedrock is encountered above Elevation 22 feet. The contractor shall expect groundwater to exist in seams and fractures in the bedrock.

## 6.2 Soil Corrosivity

CERCO Analytical, Inc. had performed tests on five soil samples from the site to evaluate corrosion potential to buried metals and concrete for Arup/RYCG. The results of the tests as reported by Arup/RYCG in their geotechnical report are summarized in Table 3.

**TABLE 3**  
**Summary of Corrosivity Test Results**

<b>Test Boring</b>	<b>Sample Depth (feet)</b>	<b>pH</b>	<b>Sulfate (mg/kg)</b>	<b>Min. Resistivity (ohms-cm)</b>	<b>Chloride (mg/kg)</b>
BH-01	7	7.44	28	1,400	N.D.
BH-01	41	7.95	N.D.	7,500	N.D.
BH-02	30	7.67	N.D.	8,400	N.D.
BH-02	48	7.27	60	320	N.D.
BH-03	2.5	8.77	22	1,900	N.D.

Note:

1. N.D. = Not detected

According to the resistivity measurements, the soil samples of the fill tested are classified as "corrosive" to buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron. All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron shall be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines shall be protected against corrosion.

For more detailed recommendations regarding the corrosion protection of buried metals and concrete, a licensed corrosion consultant shall be retained.

### **6.3 Naturally Occurring Asbestos (NOA)**

Serpentinite bedrock containing NOA in the form of green rock fragments exhibiting chrysotile fibers (based on visual observations) has been encountered in Franciscan Complex bedrock. Chrysotile is a grey to green, soft, fibrous silicate mineral in the serpentine subgroup and is one of the most commonly encountered forms of NOA. Any asbestiform material shall be sampled and analyzed via the California Air Resource Board (CARB) 435 method for asbestos content.

Serpentinite bedrock was encountered at the site and therefore the site will be subject to the CARB Asbestos Airborne Toxic Control Measure (ATCM) for construction, grading, quarrying, and surface mining operations dated July 2001 during redevelopment. The CARB's Asbestos ATCM is enforced locally by the Bay Area Air Quality Management District (BAAQMD) and requires construction projects greater than one acre to prepare a site-specific Asbestos Dust Monitoring Plan (ADMP) for agency approval. The ADMP specifies dust mitigation measures that must be

initiated at the start and maintained throughout the duration of the excavation and grading activity per the ATCM. This shall include the following:

- Construction vehicle speed at the work site must be limited to 15 miles per hour (mph) or less.
- Prior to any ground disturbance, sufficient water must be applied to the area to be disturbed to prevent visible dust emissions from crossing the property line.
- Areas to be graded or excavated must be kept adequately wetted<sup>3</sup> to prevent visible dust emission from crossing the property line.
- Storage piles must be kept adequately wetted, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile.
- Equipment must be washed down before moving from the property onto a paved public road.
- Visible track-out on the paved public road must be cleaned using a wet sweeping or a high-efficiency particulate air (HEPA) filter equipped vacuum device within 24 hours.

The project will be required to install a perimeter dust air monitoring network. This typically includes one upwind and two downwind dust monitors, the collection and analysis of daily samples (three per day at a minimum), and daily reporting of those results to BAAQMD throughout the duration of construction grading<sup>4</sup>. Once prepared, the ADMP will be enforceable at the site until post construction stabilization is complete, which shall include one or all of the following:

- establishment of a vegetative cover;
- placement of at least three inches of non-asbestos-containing material; and/or
- fully encapsulating the site in hardscape (i.e., asphalt, sidewalk, or building foundation).

---

<sup>3</sup> "Adequately Wetted" means sufficiently moistened with water to minimize the release of particulate matter into the ambient air as determined by the test method in ATCM subsection (h) (5).

<sup>4</sup> "Construction grading" means any surface disturbance conducted with powered equipment or any related activity, including, but not limited to, all surface and subsurface cuts and fills, excavation, trenching, stockpiling, bulldozing, and landfills.

## 7.0 CONSTRUCTION CONSIDERATIONS

From a geotechnical standpoint, the proposed project is feasible provided the recommendations presented in the GDR (Langan, 2023) are incorporated into the project plans and specifications and implemented during construction. The primary geotechnical issues for this project include:

- presence of undocumented fill and soft to medium stiff clays and loose to medium dense sands above the Colma Formation (Unit 3) at the southeast portion of the site,
- adequate foundation support,
- shoring for the proposed basement excavations and excavation into bedrock,
- potential presence of naturally occurring asbestos (NOA) in the serpentinite bedrock, and
- potential presence of groundwater perched on the bedrock and in bedrock seams and fractures.

### 7.1 Foundation and Settlement

For baseline purposes, the contractor shall expect bedrock (Unit 4) to be exposed at or just beneath the existing maintenance facility in the northeast portion of the site. The contractor shall expect the remainder of the site to be underlain by fill (Unit 1) over Colma Formation (Unit 3), with the exception of the southeast corner of the site where sand and clay (Unit 2) was encountered above the Colma Formation (Unit 3).

The primary factor influencing the design of the foundation system is the variability in the subsurface conditions across the site at the depths of the proposed foundations for the proposed building. Bedrock (Unit 4) and the Colma Formation (Unit 3) have a relatively high bearing capacity and low compressibility and where bedrock or Colma Formation (Unit 3) sand are encountered at or near the subgrade level, the structure can be supported on spread footing foundations. Where the depth to Colma Formation (Unit 3) or bedrock (Unit 4) renders footings uneconomical, drilled piers taking support in Colma Formation (Unit 3) or bedrock (Unit 4) may be used to support the structure. We expect footings and drilled piers supported in Colma Formation (Unit 3) or bedrock (Unit 4) will settle less than an inch.

For baseline purposes, the contractor shall expect where the finished floor elevation is less than five feet above the top of the Colma Formation (Unit 3) a shallow foundation system will be used. Where finished floor is greater than five feet above the top of the Colma Formation (Unit 3), the contractor shall install a drilled pier; this assumes a maximum practical footing depth of five feet.

The contractor shall anticipate the transition between footings and drilled pier foundations to occur where the top of Colma Formation (Unit 3) is at approximate Elevation 45 feet or deeper (see Figure 6 for the Elevation 45-foot top of Colma Formation (Unit 3) elevation contour line) where the proposed finished floor is at Elevation 50 feet. During initial stages of construction, the contractor shall expect to perform exploratory pits, borings, or piers along the proposed foundation transition line to verify the baseline assumptions.

## **7.2 Groundwater Considerations**

The groundwater elevation is likely influenced by wet and dry seasons and will fluctuate a few feet. For baseline purposes, the contractor shall expect the groundwater will be encountered at Elevation 22 feet or at the top of bedrock (Unit 4) if bedrock is shallower than Elevation 22 feet.

Because the site is currently benched into a bedrock slope and groundwater may be perched on bedrock. During excavation groundwater may be encountered perched on top of bedrock or in fractures and may flow into the excavation. The contractor shall be prepared to control groundwater flowing into excavations by installing a drainage system and localized dewatering. The contractor shall be aware the City and County of San Francisco's permit requirements and fees for disposal of groundwater. Alternatively, an impervious shoring system could be installed in lieu of local dewatering and/or drainage system.

## **7.3 Excavation and Dewatering**

According to the current project drawings (IBI Group, 2023), the proposed basement will have a finished floor elevation of Elevation 30 feet. In addition, a lower-level work area located between gridline F to G and 8 to 10.5, will have a finished floor elevation of Elevation 41.5 feet. Assuming average footing excavations of three feet, we anticipate the bottom of excavation elevations will range from Elevation 27 feet for the basement and Elevation 38.5 feet for the lower-level work area. According to the topographic map of the existing street and site grades, we estimate retaining heights ranging from 21 feet to 44 feet for the proposed basement and 10 feet for the lower-level work area.

It is anticipated that dense to very dense Colma Formation (Unit 3) sand and interbedded shale and serpentinite bedrock (Unit 4) with varying degrees of weathering will be encountered at the bottom of excavations. Although weak bedrock can be excavated with conventional earth-moving equipment, such as loaders and backhoes, capable of breaking the moderately hard bedrock, such as hoe-rams and large excavators will likely be required to remove some bedrock. For baseline purposes, the contractor shall expect to use conventional earth-moving equipment

for the excavation of Units 1, 2 and 3 and expect the need for larger equipment, such as hoe-rams and large excavator, for Unit 4. The seismic refraction reports by GEOVision and Norcal (Appendices C and D) have more information regarding the excavatability of the bedrock and shall be reviewed by excavation contractor prior to bidding on the project.

For baseline purposes, the contractor shall expect heavier equipment, such as hoe-rams and large excavators, will be required to remove any remnants of buried foundations or walls from previous buildings that might have occupied the site, or of the existing facilities that interfere with the proposed development. The contractor shall review as built drawings of the existing foundation system and walls to estimate the volume of concrete and assume that they will need to use heavier equipment to remove them.

When preparing the subgrade for the spread footings, areas of loose or disturbed soil may be encountered in localized areas. If loose areas are encountered, the loose material shall be removed and replaced with either lean or structural concrete.

During excavation, the contractor shall expect groundwater will be perched on top of bedrock or in the fractures. The contractor shall expect the portions of the excavations for the basement and lower-level work area that will be in exposed bedrock will require a system of sumps and collection trenches. The contractor shall be familiar with any permit requirements and fees for the installation of wells and for disposal of the groundwater.

Even with active dewatering, wet, disturbed subgrade soil/rock could be exposed at the bottom of excavations and require stabilization prior to placement of improvements. For baseline purposes, the contractor shall expect that in order to stabilize the subgrade, the wet and disturbed subgrade shall be overexcavated and replaced with a lean concrete rat slab.

For drilled shafts, if more than six inches of water is present during concrete placement, either the water shall be pumped out or the concrete be placed into pier shafts using the tremie method and/or a pumper pipe. Concrete shall be placed from the bottom up in a single operation. The tremie pipe shall be maintained at least five feet below the upper surface of the concrete during casting of the piers. To develop the design skin friction value provided in the geotechnical investigation report (Langan, 2023), concrete used for pier construction shall have a slump between seven and nine inches. As the concrete is placed, casing used to stabilize the hole can be withdrawn. The bottom of the casing shall be maintained at least three feet below the surface of the concrete.

## 7.4 Shoring

Where space permits, excavations shallower than five feet may be vertical; however, for deeper excavations, adjacent improvements shall be retained by temporary shoring during excavation for the basement and construction of the building in accordance with the Occupational Safety and Health Administration (OSHA) standards (29 CFR Part 1926). There are several key considerations in selecting a suitable shoring system. Those we consider to be primary concerns are:

- reuse of existing walls along the perimeter of the site to provide temporary support;
- protection of surrounding improvements including the existing streets and buildings;
- ease of installation;
- proper installation of the shoring system to reduce the potential of ground movement, and
- construction cost.

Currently, the site has retaining walls along the northwest, north and northeast property line. The shoring designer shall consider reusing the existing retaining walls as part of their shoring system if they do not interfere with the proposed improvements and are considered structurally sound.

If the existing walls cannot be used as shoring, there are several methods of providing lateral support for the excavation including sheet piles, soldier piles and lagging and soil nailing. Sheet piles are difficult to install into the dense Colma Formation (Unit 3) sand and bedrock (Unit 4). The presence of cohesionless soil precludes soil nailing the entire excavation. Therefore, considering the depths of the proposed cuts, expected soil conditions and our past experiences, soldier pile and lagging system with tiebacks shall be considered the baseline shoring system for the project by the contractor. The presence of sand and bedrock may cause some difficulty with installation of the soldier piles and tiebacks. However, this system has been successfully used in a number of major projects in the vicinity of this site with similar subsurface conditions.

A soldier-pile-and-lagging system consists of concrete encased steel beams placed in predrilled holes extending below the bottom of the excavation. Wood lagging is placed between the piles as the excavation proceeds. Shoring will require tiebacks or internal bracing for lateral support if a cantilever shoring system is not appropriate for the basement excavation.

The shoring system selected shall be designed by a civil engineer knowledgeable in the specific type of construction. The shoring contractor shall select the shoring system based on the subsurface conditions.

Because of the presence of loose to medium dense sand, steel piles shall not be vibrated into place. Our experience has shown that vibration causes settlement of sand and distress to existing improvements. Steel piles shall be placed in predrilled holes backfilled with concrete. For baseline purposes, the contractor shall expect that drilling of the shafts for the soldier piles will require casing and/or the use of slurry to prevent caving of sand layers. If water is encountered in the shafts or drilling mud is used, concrete shall be placed by tremie method. The contractor shall expect drilling of the holes for the soldier beams in the bedrock will be problematic where hard competent rock is encountered. Because the tiebacks will extend beneath the public streets and adjacent buildings, the contractor shall expect encroachment permits will be required. The contractor shall expect deep utility vaults present beneath sidewalks and streets, which will limit the use of tiebacks or require them to.

Where space allows, temporary slopes may be used. Temporary slopes shall not be steeper than 1.5:1 (horizontal to vertical) for slopes up to 10 feet in height. The contractor shall anticipate where temporary slopes are greater than 10 feet, the temporary slopes shall be analyzed on a case-by-case basis by the geotechnical engineer for factor of safety (FS) of at least 1.3. Vertical cuts can be used where the excavation is less than four feet, but the contractor shall expect soil to slough or not remain vertical where cohesionless soil is encountered. The contractor shall remove soil which sloughs into an excavation.

If there is insufficient space to slope the excavation, then a shoring system shall be used to retain the sides of the excavations. Because the depth of the excavations for the basement on the western portion of the site will be on the order of 20 feet, which will require a retained height of 21 to 44 feet, the contractor shall expect the shoring be tied back or internally braced.

## **7.5 Site Preparation and Earthwork**

For baseline purposes, the contractor shall expect that demolition in areas to be developed shall include removal of existing pavement, utility lines, wells, and underground obstructions, including foundations of existing structures. Any vegetation and organic topsoil shall be stripped in areas to receive new site improvements. Stripped organic soil shall be stockpiled for later use in landscaped areas, if approved by the owner and architect; organic topsoil shall not be used as compacted fill.

For baseline purposes, the contractor shall expect brick, rock, concrete, old foundations, and other building rubble will be encountered in the fill (Unit 1). The fill (Unit 1) is likely contaminated and special handling and disposal may be required; the contractor shall review available environmental reports. The contractor shall expect installation of shoring and foundations and excavation will also be difficult in some areas of the site as a result of the obstructions in the fill. In addition, the contractor shall expect serpentinite bedrock containing naturally occurring asbestos (NOA) will be encounter when excavating for footings, the basement level and lower-level work area. Detailed discussion regarding NOA is presented in Section 6.3 and the monitoring for NOA is presented in Section 8.2.

From a geotechnical standpoint, asphalt and concrete removed from the site may be crushed and reused, provided it is free of organic material and rocks or lumps greater than three inches in greatest dimension. The acceptability of using crushed asphalt at the site shall be verified by the property owner, architect, and environmental consultant. Where crushed asphalt pavement materials are used, particles between 1½ and 3 inches in greatest dimension shall comprise no more than 20 percent of the fill by weight.

Where utilities to be removed extend off site, they shall be capped or plugged with grout at the property line. It may be feasible to abandon utilities in-place, provided they will not impact future utilities or building foundations. If utilities are abandoned in-place, they shall be completely filled with flowable cement grout over their entire length. Existing utility lines encountered during construction shall be addressed on a case-by-case basis. However, for baseline purposes, the contractor shall expect existing utilities within four feet of final grades shall be removed, and the resulting excavation shall be properly backfilled.

Where the proposed improvements are to be supported on drilled piers, it will be necessary to remove any obstructions that will interfere with installation of the drilled piers and construction of the footings, pier caps and grade beams. It may be possible to leave some obstructions in place; however, this shall be determined on a case-by-case basis. Excavations resulting from demolition activities shall be backfilled accordingly.

Loose to medium dense sands or gravels are present in the surficial soils. Heavy equipment is typically required to install drilled piers. This type of equipment can disturb the subgrade and may require that the subgrade be winterized or repaired after installation of the drilled pier elements. The contractor shall expect vertical excavations in sand to not be stable and will need to be formed. If caving of footings, pier caps or grade beams occur, the excavation will need to be cleaned out prior to pouring concrete.

## **8.0 INSTRUMENTATION AND MONITORING**

A monitoring program shall be established to evaluate the effects of the construction on the adjacent improvements. The contractor shall install surveying points to monitor the movement of shoring, adjacent improvements, and settlement of the adjacent ground surface during below-grade construction activities. The shoring system and adjacent improvements shall be monitored for movements throughout the excavation and at least until the ground-level slab is cast. Details regarding the location and frequency of the monitoring is presented in the following subsections.

### **8.1 Ground Movement Monitoring**

The conditions of existing buildings within 100 feet of the site shall be photographed and surveyed prior to the start of construction and monitored periodically during construction. A thorough crack survey of the adjacent buildings, especially those surrounding the proposed excavation shall be performed prior to the start of construction and immediately after its completion.

The purpose of these observations is to provide photographic and/or video documentation representative of general existing conditions, and to identify obvious visual deficiencies. The preconditions observations shall also identify areas requiring specific monitoring during construction. Structural integrity is not addressed in such documentation. This baseline information is often critical in the event of future damage claims resulting from construction activities. The preconstruction conditions documentation shall be used to inform an observational and instrumentation monitoring program that can be used to evaluate the performance of adjacent structures and construction procedures.

To monitor ground movements and shoring movements during the excavation activities, the contractor shall install the instrumentation listed below:

Slope inclinometers: For baseline purposes, the contractor shall install slope inclinometers adjacent to the proposed shoring system. The number of inclinometers will be determined once the location of the temporary shoring system has been finalized. However, for baseline purposes, the contractor shall expect to install two inclinometers behind each shoring wall. The slope inclinometers shall be installed following the installation of the shoring walls and prior to excavation. Langan shall obtain inclinometer readings regularly. Initially, depending upon the speed of excavation, the instrumentation shall be read weekly. The frequency of readings may, in the later stage of construction, be modified as appropriate.

Survey points: Survey points shall be installed on the adjacent streets and improvements that are within 100 feet of the proposed excavation. In addition, survey points shall be installed at the tops of the shoring walls at 20-foot-spacing. These points shall be used to monitor the vertical and horizontal movements of the shoring and these improvements. These points shall be selected with the help of the geotechnical engineer, so they can provide the most value to the project. The survey shall be read regularly, and the results shall be submitted to us in a timely manner for review. For estimating purposes, assume that the survey points will be read as follows:

- prior to any shoring work at the site;
- after installing soldier piles;
- after excavation of each lift;
- after the excavation reaches the planned excavation level;
- every two weeks until the street-level floor slab is constructed.

## **8.2 NOA**

As discussed in Section 6.3, the site will be subject to the CARB Asbestos Airborne Toxic Control Measure (ATCM) for construction, grading, quarrying, and surface mining operations dated July 2001 during redevelopment. Also, the project will be required to install a perimeter dust air monitoring network. Upon completion of construction grading and post-construction stabilization, a written closure request is submitted to BAAQMD, and a final district approved site inspection is completed. Based on the discovery of serpentinite, the subsurface lithology beneath the site, and proposed excavation activities, Langan recommends notifying BAAQMD on the discovery of serpentinite at the site and the preparation of an ADMP for BAAQMD review and approval for regulatory compliance prior to construction.

In addition, Langan recommends that the project team consult with a Certified Industrial Hygienist (CIH) to provide health and safety recommendations for potential worker exposure to NOA per California Occupational Safety and Health Administration (OSHA) requirements. Based on our experience on other NOA construction projects in the San Francisco Bay Area, the health and safety recommendations provided by a CIH shall include the following:

- Update the site-specific Health and Safety Plan (HASP) to address the presence of NOA at the site.
- Perform NOA worker training for each trade performing activities in or disturbing NOA.

In our experience, training must be conducted for each applicable subcontractor and individual employees working in NOA or with potential exposure to NOA.

- Perform a series of negative exposure assessments (i.e., personal air monitoring) for each activity and each subcontractor disturbing NOA (excavation and grading, foundation work, etc.).
- During the initial personal air monitoring, personnel protective equipment (PPE) is typically upgraded to Level C (as determined by the CIH). The CIH will work with the subcontractors to determine which activities require personal air monitoring. This typically needs to be repeated for each subcontractor and each new activity.
- Document acceptable personal air monitoring results below the OSHA permissible exposure limit (PEL) for asbestos and deescalate PPE to Level D (if monitoring results are below the OSHA PEL) For baseline purposes, the contractor shall expect that if monitoring results are elevated above OSHA PELs, the CIH will recommend that Level C PPE remain in place until monitoring results indicated acceptable air quality for workers.

A CIH will be able to provide more details on hazard notification and appropriate Cal OSHA compliance requirements. Langan recommends consulting with a CIH before continuing any work in potential areas containing NOA.

## REFERENCES

Arup/RYCG A Joint Venture (2019). "San Francisco Public Works, SFMTA Potrero Facility Rebuild, Geotechnical Engineering Report."

IBI Group (2023). "Potrero Yard Modernization Project 50% Schematic Design," dated 3 May 2023.

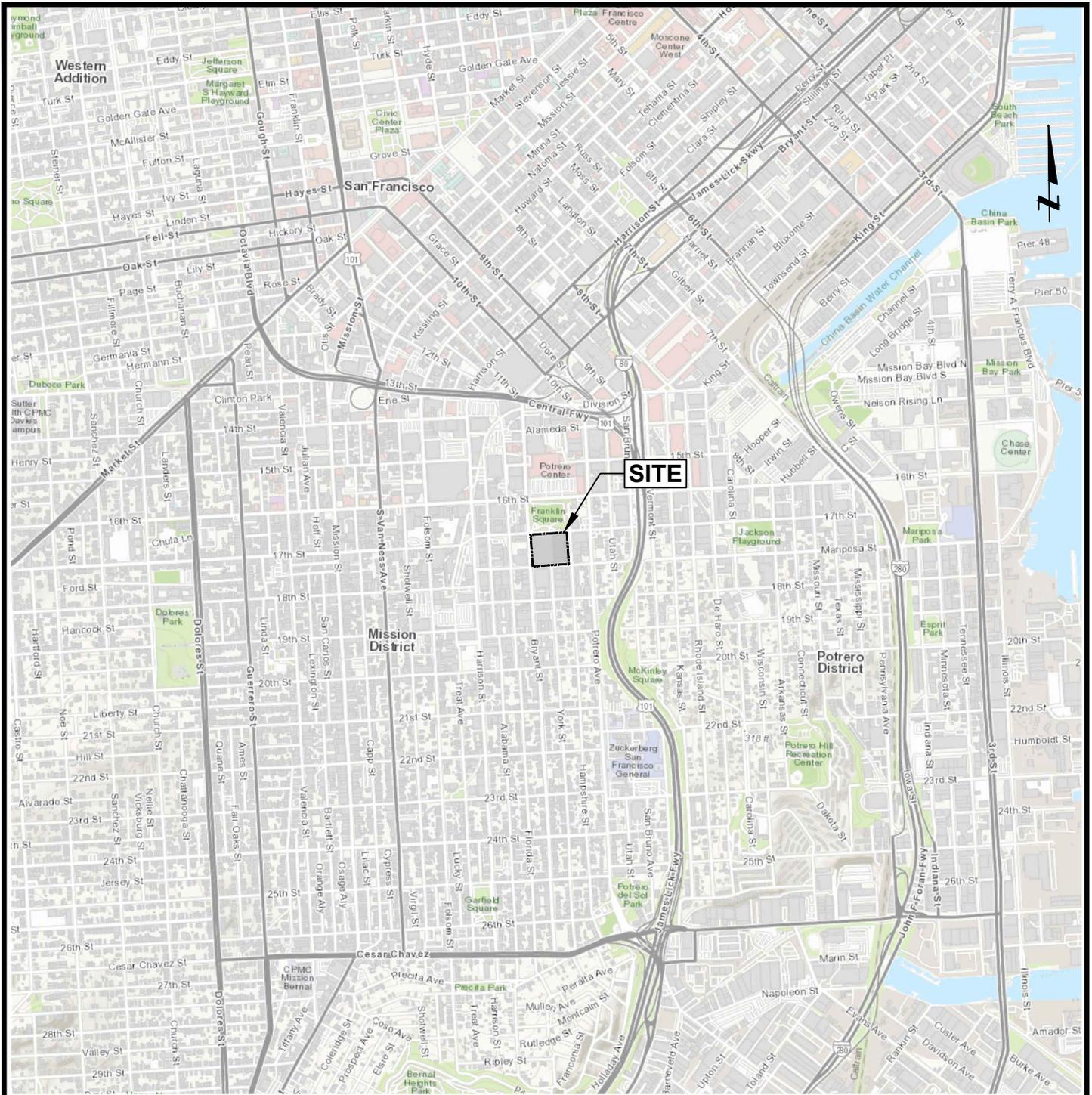
Schlocker, J. (1958). "Geology of the San Francisco North Quadrangle, California."

Subsurface Consultants, Inc. (1990). "Geotechnical Investigation, Renovation and Seismic Upgrade, Muni Potrero Facility, Mariposa and Hampshire Street, San Francisco, California." SCI 473.002 dated 25 September 1990.

DRAFT

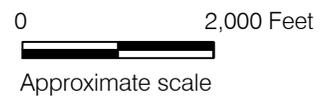
DRAFT

**FIGURES**

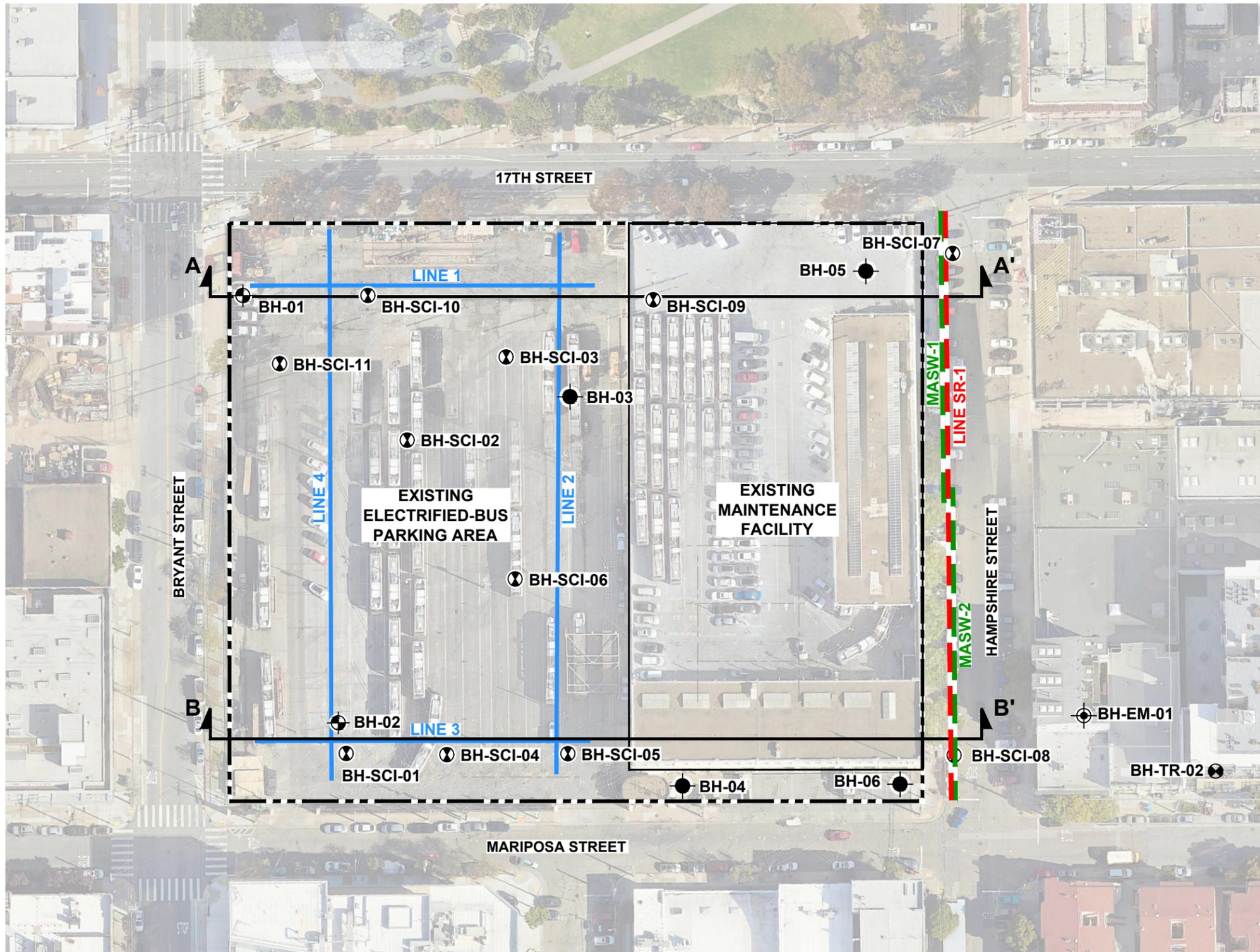


Note:  
 Base map is provided through Langan's Esri  
 Arc GIS software licensing and Arc GIS online.  
 Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN.

**DRAFT**



<p>Langan CA, Inc.          1 Almaden Boulevard, Suite 590          San Jose, CA 95113</p> <p>T: 408.283.3600 F: 408.283.3601 www.langan.com</p>	<p>Project</p> <p><b>SFMTA POTRERO FACILITY REBUILD</b></p> <p><b>SAN FRANCISCO</b></p> <p><b>SAN FRANCISCO COUNTY CALIFORNIA</b></p>	Figure Title	Project No.	<p><b>1</b></p>	
		<p><b>SITE LOCATION MAP</b></p>	770691701		
			Date		03/11/2024
			Drawn By		AG
		Checked By	JN		

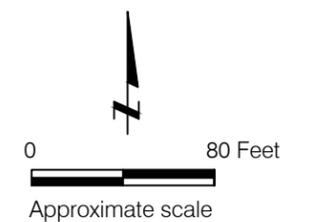


**EXPLANATION**

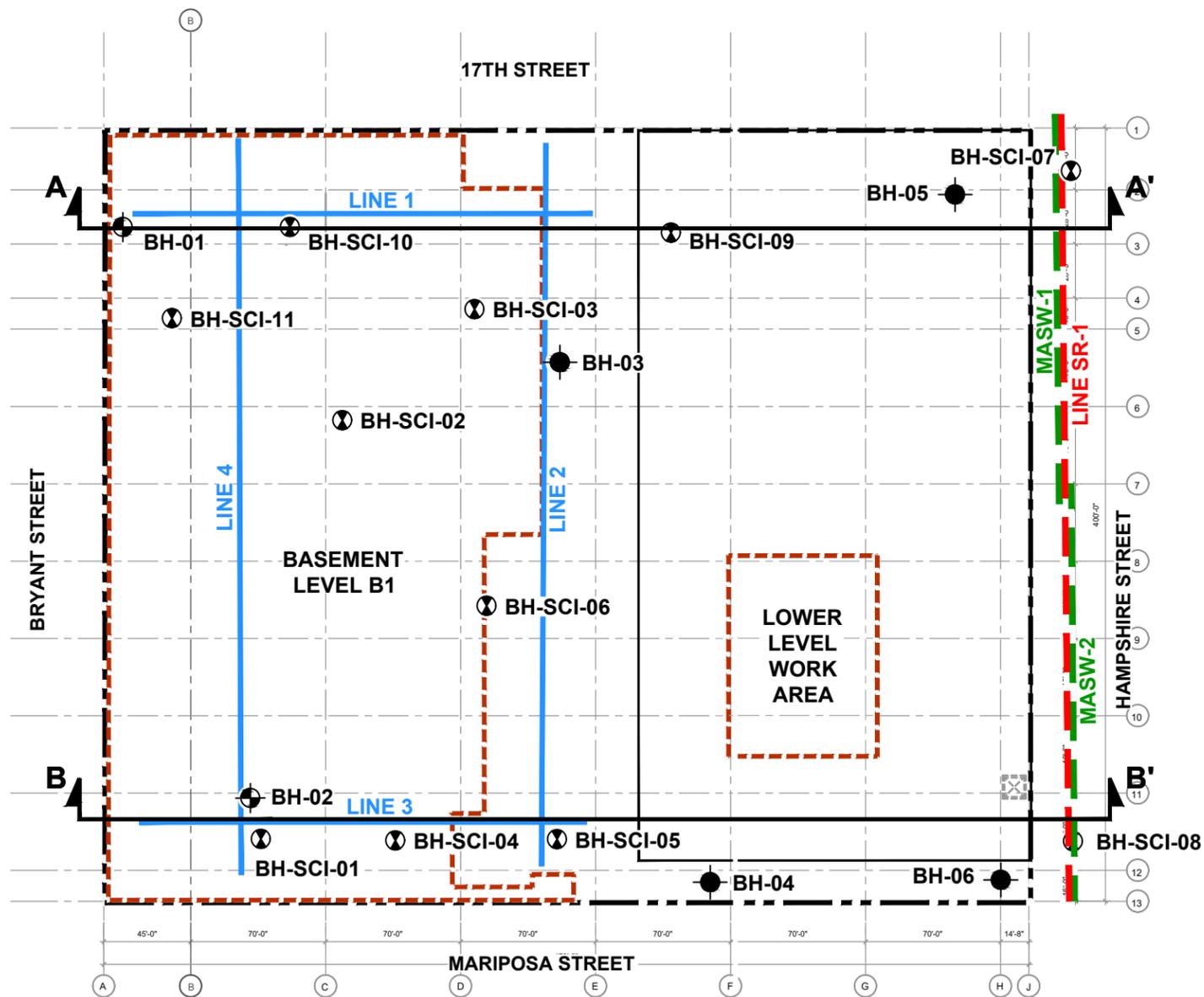
- BH-01** Approximate location of deep boring by Arup, March 2018
- BH-03** Approximate location of shallow boring by Arup, March 2018
- BH-TR-02** Approximate location of boring by Treadwell & Rollo, Inc., December 2004
- BH-EM-01** Approximate location of boring by Earth Mechanics, July 1998
- BH-SCI-01** Approximate location of boring by Subsurface Consultants, Inc., January 1989
- LINE 1** Approximate location of surface wave geophysics line by GEOVision Geophysical Services, Inc, March 2018
- LINE SR-1** Approximate location of seismic refraction line by NORCAL Geophysical Consultants, Inc., April 2023
- MASW-1** Approximate location of surface wave geophysics line by NORCAL Geophysical Consultants, Inc., April 2023
- A-A'** Interpretive cross section location
- Site boundary

Reference: Aerial by Google Earth Pro 2023.

**DRAFT**



 Langan CA, Inc. 1 Almaden Boulevard, Suite 590 San Jose, CA 95113 T: 408.283.3600 F: 408.283.3601 www.langan.com	Project <b>SFMTA POTRERO          FACILITY REBUILD</b> SAN FRANCISCO SAN FRANCISCO COUNTY CALIFORNIA	Figure Title <b>SITE PLAN WITH          EXISTING CONDITIONS</b>	Project No. 770691701	Figure No. <b>2</b>
			Date 06/04/2024	
			Drawn By AG	
			Checked By JN	

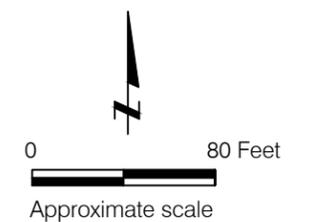


**EXPLANATION**

- BH-01** Approximate location of deep boring by Arup, March 2018
- BH-03** Approximate location of shallow boring by Arup, March 2018
- BH-TR-02** Approximate location of boring by Treadwell & Rollo, Inc., December 2004
- BH-EM-01** Approximate location of boring by Earth Mechanics, July 1998
- BH-SCI-01** Approximate location of boring by Subsurface Consultants, Inc., January 1989
- LINE 1** Approximate location of surface wave geophysics line by GEOVision Geophysical Services, Inc, March 2018
- Footprint of proposed basement (Level B1) and lower level work area (Note 1)
- LINE SR-1** Approximate location of seismic refraction line by NORCAL Geophysical Consultants, Inc., April 2023
- MASW-1** Approximate location of surface wave geophysics line by NORCAL Geophysical Consultants, Inc., April 2023
- A A'** Interpretive cross section location
- Site boundary

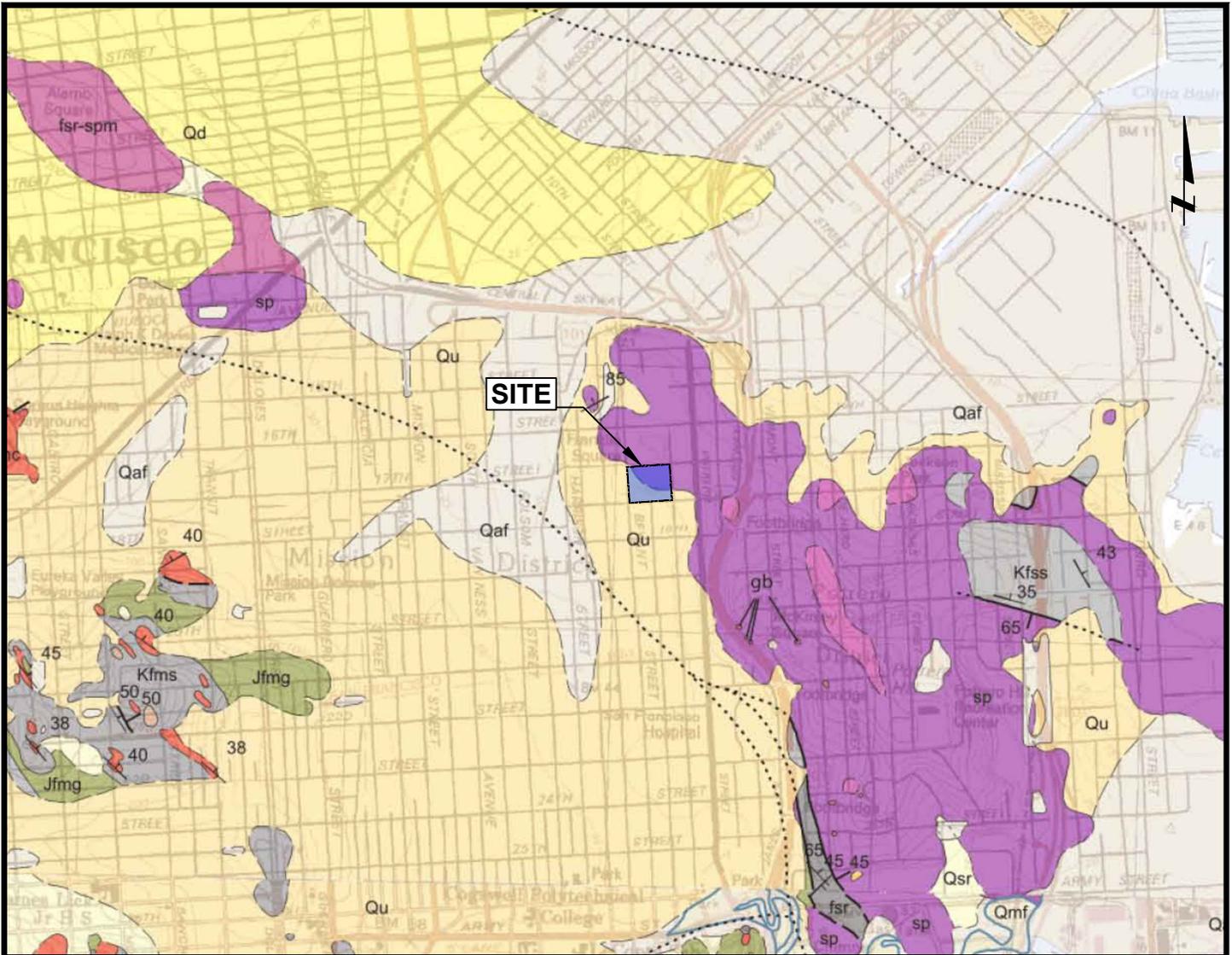
Note: 1. The footprint of proposed basement (Level B1) and lower level work area is approximate and should not be relied upon for bidding or construction.

**DRAFT**

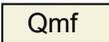
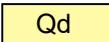
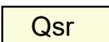
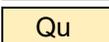
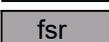


Reference: Base drawings provided by IBI Group titled "Potrero Yard Modernization Project 50% Schematic Design", dated 05/03/2023, Sheet No. A1001 titled "SITE PLAN".

<p style="font-size: 8pt; margin-top: 5px;">Langan CA, Inc. 1 Almaden Boulevard, Suite 590 San Jose, CA 95113 T: 408.283.3600 F: 408.283.3601 www.langan.com</p>	Project	Figure Title	Project No.	Figure No.
	SFMTA POTRERO FACILITY REBUILD	SITE PLAN WITH PROPOSED DEVELOPMENT	770691701	3
	SAN FRANCISCO	SAN FRANCISCO COUNTY CALIFORNIA	Date	
			06/04/2024	
		Drawn By		
		AG		
		Checked By		
		JN		



**EXPLANATION**

 Qaf	Artificial fill	 fsr-spm	Intermixed serpentinite and sheared sandstone and shale
 Qmf	Artificial fill over bay mud	 sp	Serpentinite with small blocks of other rock
 Qd	Dune sand	 gb	Gabbro
 Qsr	Slope and ravine fill	 Kjfm	Chert
 Qu	Undifferentiated surficial deposits	 Jfmg	Greenstone
 Kfss	Franciscan(?) sandstone	 Kfms	Sandstone
 fsr	Sheared sandstone and shale with small blocks of other rock (Melange)		

 **Contact** -- Depositional or intrusive contact, dashed where approximately located, dotted where concealed

 **Fault** -- Dashed where approximately located; small dashed where inferred, dotted where concealed; dip value and direction

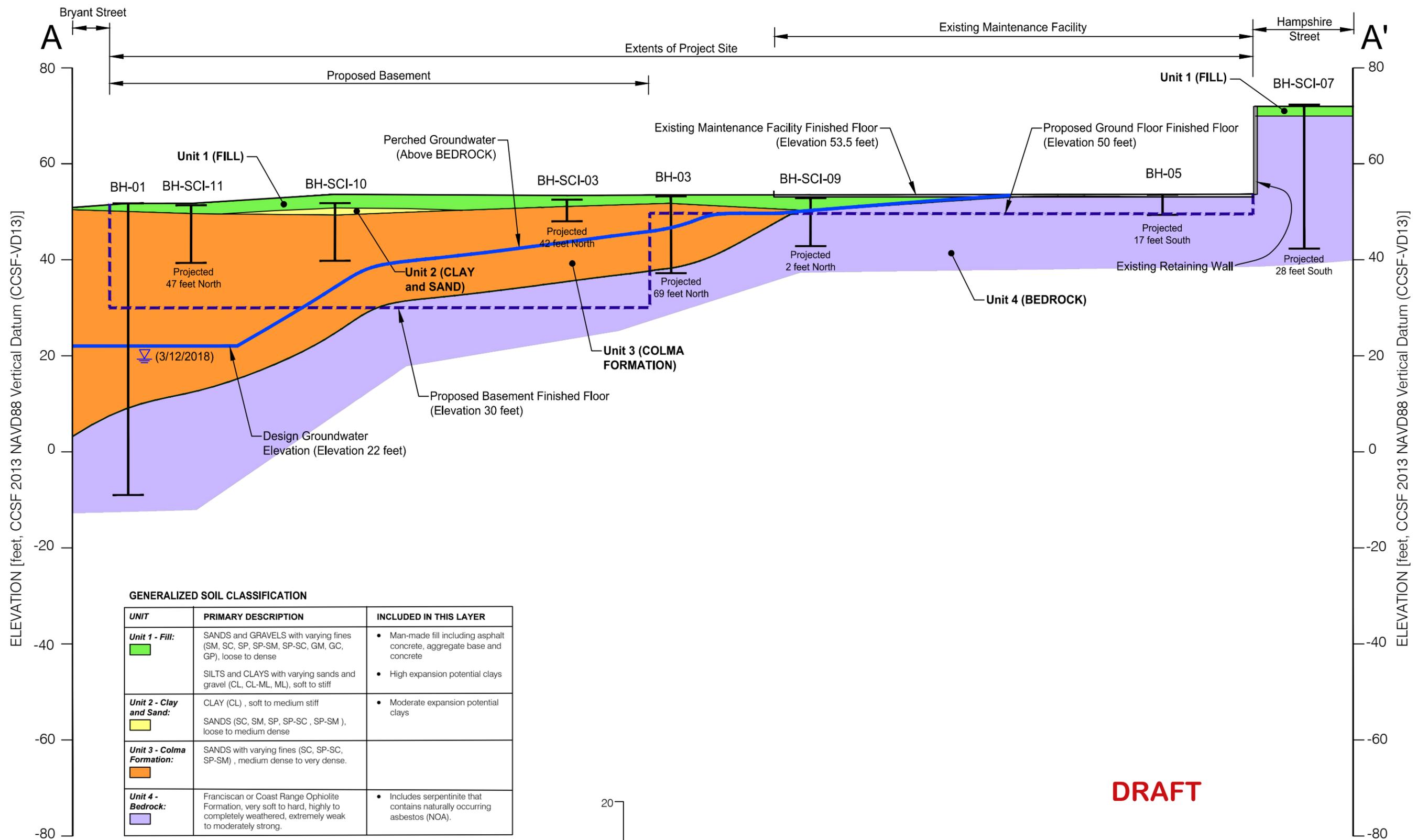
 50  
Strike and dip of bedding

**DRAFT**

0 2000 Feet  
Approximate scale

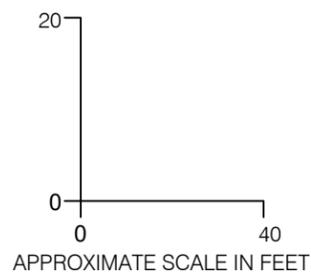
Base map: Geologic Map of the City and County of San Francisco. Modified from Blake and others (2000); Bonilla (1998; 1971); and Schlocker (1974).

 Langan CA, Inc. 1 Almaden Boulevard, Suite 590 San Jose, CA 95113 T: 408.283.3600 F: 408.283.3601 www.langan.com	Project	Figure Title	Project No.	Figure	
	SFMTA POTRERO FACILITY REBUILD		770691701		
	SAN FRANCISCO		REGIONAL GEOLOGIC MAP		Date
	SAN FRANCISCO COUNTY CALIFORNIA				03/11/2024
			Drawn By	4	
			AG		
			Checked By		
			JN		



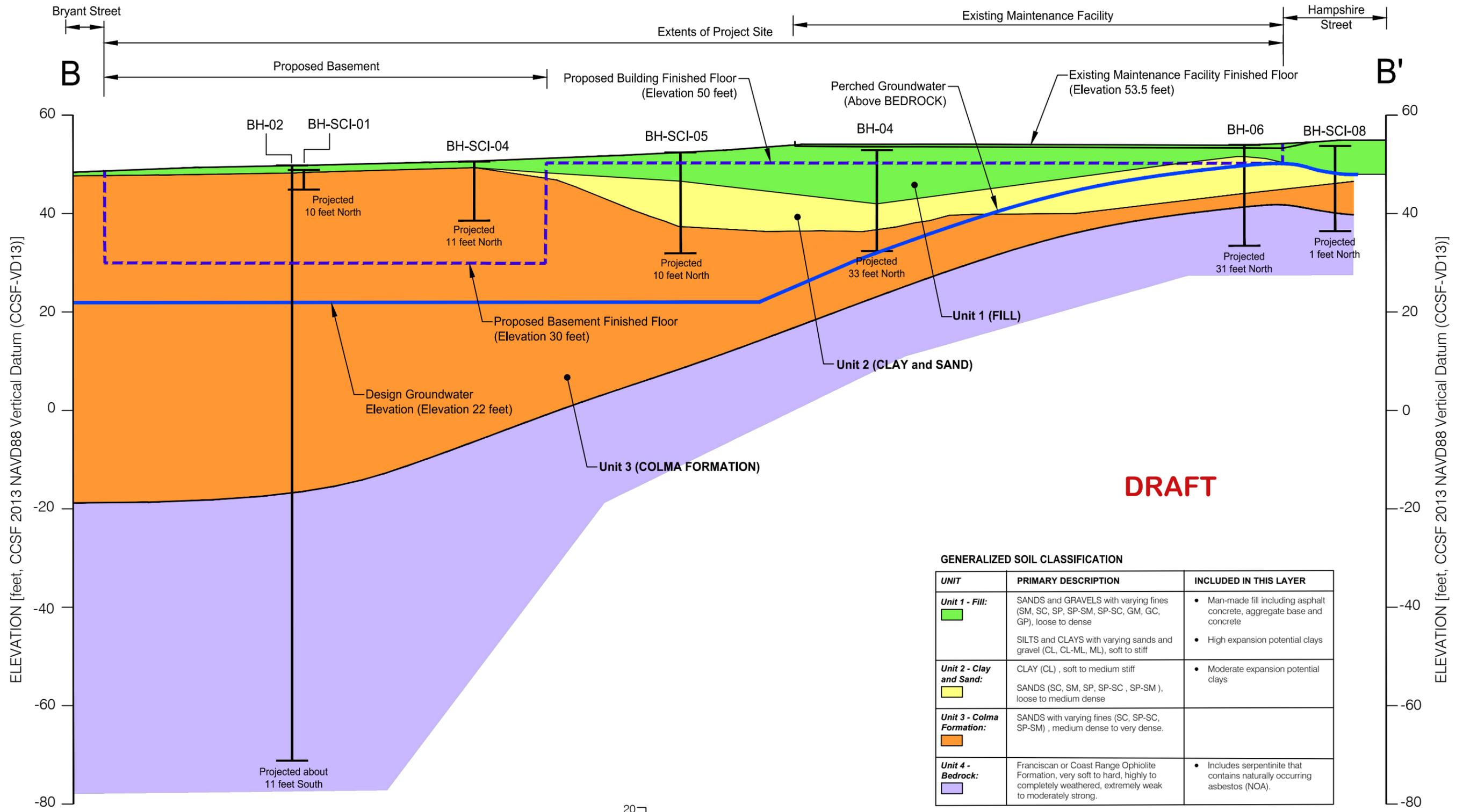
**GENERALIZED SOIL CLASSIFICATION**

UNIT	PRIMARY DESCRIPTION	INCLUDED IN THIS LAYER
<b>Unit 1 - Fill:</b> 	SANDS and GRAVELS with varying fines (SM, SC, SP, SP-SM, SP-SC, GM, GC, GP), loose to dense  SILTS and CLAYS with varying sands and gravel (CL, CL-ML, ML), soft to stiff	<ul style="list-style-type: none"> <li>Man-made fill including asphalt concrete, aggregate base and concrete</li> <li>High expansion potential clays</li> </ul>
<b>Unit 2 - Clay and Sand:</b> 	CLAY (CL), soft to medium stiff  SANDS (SC, SM, SP, SP-SC, SP-SM), loose to medium dense	<ul style="list-style-type: none"> <li>Moderate expansion potential clays</li> </ul>
<b>Unit 3 - Colma Formation:</b> 	SANDS with varying fines (SC, SP-SC, SP-SM), medium dense to very dense.	
<b>Unit 4 - Bedrock:</b> 	Franciscan or Coast Range Ophiolite Formation, very soft to hard, highly to completely weathered, extremely weak to moderately strong.	<ul style="list-style-type: none"> <li>Includes serpentinite that contains naturally occurring asbestos (NOA).</li> </ul>



**DRAFT**

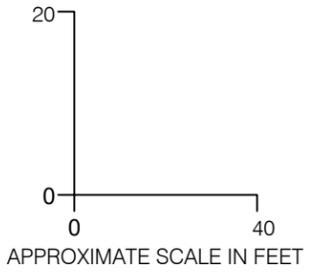
 Langan CA, Inc. 1 Almaden Boulevard, Suite 590 San Jose, CA 95113 T: 408.283.3600 F: 408.283.3601 www.Langan.com	Project <b>SFMTA POTRERO FACILITY REBUILD</b> SAN FRANCISCO SAN FRANCISCO COUNTY CALIFORNIA	Figure Title <b>INTERPRETIVE SUBSURFACE PROFILE A-A'</b>	Project No. 770691701	Figure No. <b>5</b>
			Date 06/04/2024	
			Drawn By AG	
			Checked By JN	



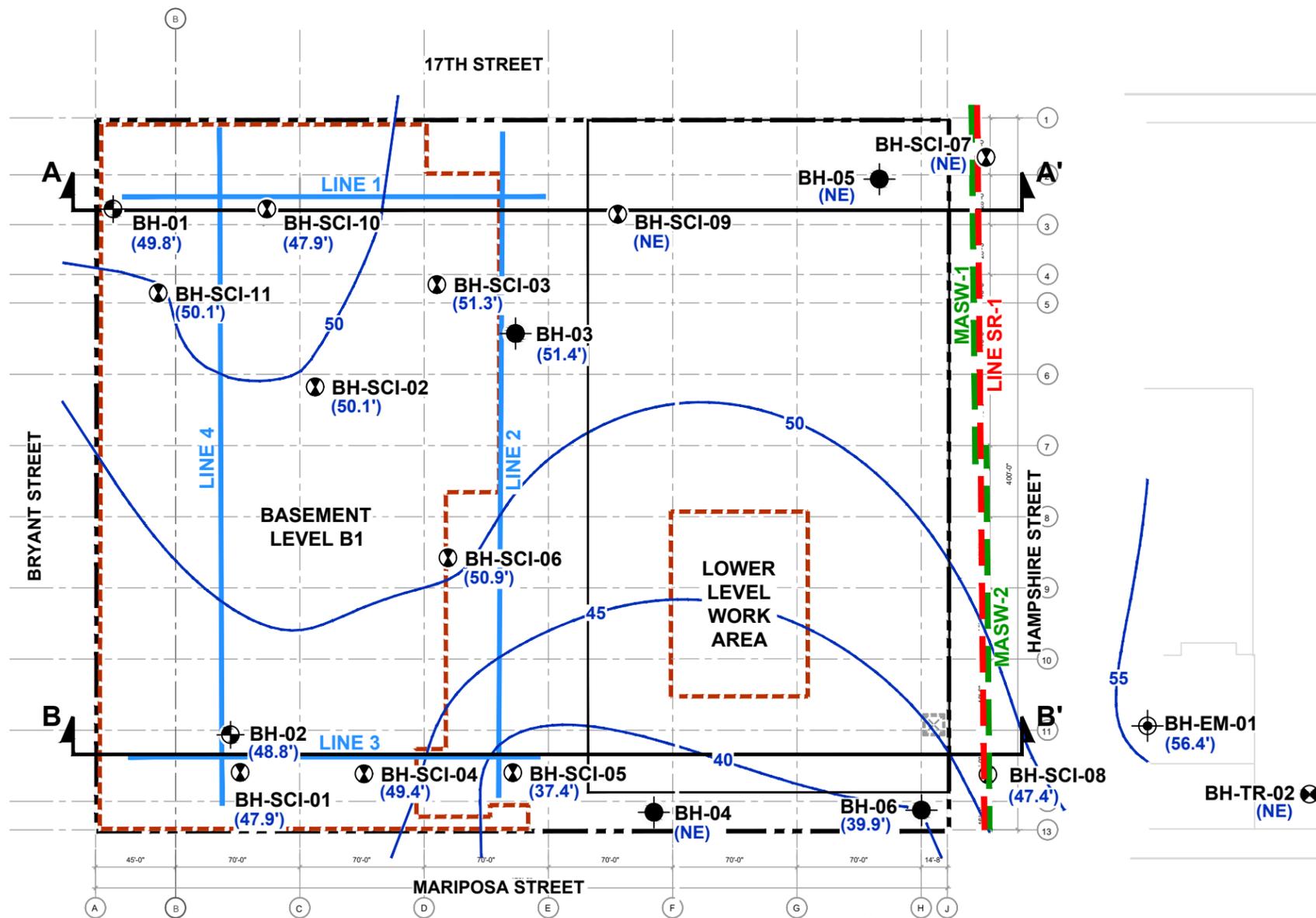
**DRAFT**

**GENERALIZED SOIL CLASSIFICATION**

UNIT	PRIMARY DESCRIPTION	INCLUDED IN THIS LAYER
<b>Unit 1 - Fill:</b> 	SANDS and GRAVELS with varying fines (SM, SC, SP, SP-SM, SP-SC, GM, GC, GP), loose to dense  SILTS and CLAYS with varying sands and gravel (CL, CL-ML, ML), soft to stiff	<ul style="list-style-type: none"> <li>Man-made fill including asphalt concrete, aggregate base and concrete</li> <li>High expansion potential clays</li> </ul>
<b>Unit 2 - Clay and Sand:</b> 	CLAY (CL), soft to medium stiff  SANDS (SC, SM, SP, SP-SC, SP-SM), loose to medium dense	<ul style="list-style-type: none"> <li>Moderate expansion potential clays</li> </ul>
<b>Unit 3 - Colma Formation:</b> 	SANDS with varying fines (SC, SP-SC, SP-SM), medium dense to very dense.	
<b>Unit 4 - Bedrock:</b> 	Franciscan or Coast Range Ophiolite Formation, very soft to hard, highly to completely weathered, extremely weak to moderately strong.	<ul style="list-style-type: none"> <li>Includes serpentinite that contains naturally occurring asbestos (NOA).</li> </ul>



 Langan CA, Inc. 1 Almaden Boulevard, Suite 590 San Jose, CA 95113 T: 408.283.3600 F: 408.283.3601 www.Langan.com	Project <b>SFMTA POTRERO FACILITY REBUILD</b> SAN FRANCISCO SAN FRANCISCO COUNTY CALIFORNIA	Figure Title <b>INTERPRETIVE SUBSURFACE PROFILE B-B'</b>	Project No. 770691701	Figure No. <b>6</b>
			Date 06/04/2024	
			Drawn By AG	
			Checked By JN	



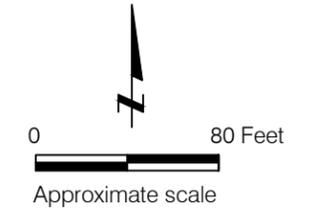
**EXPLANATION**

- BH-01** Approximate location of deep boring by Arup, March 2018
- BH-03** Approximate location of shallow boring by Arup, March 2018
- BH-TR-02** Approximate location of boring by Treadwell & Rollo, Inc., December 2004
- BH-EM-01** Approximate location of boring by Earth Mechanics, July 1998
- BH-SCI-01** Approximate location of boring by Subsurface Consultants, Inc., January 1989
- LINE 1** Approximate location of surface wave geophysics line by GEOVision Geophysical Services, Inc, March 2018
- Footprint of proposed basement (Level B1) and lower level work area
- Contours of Top of Colma Elevation (feet, CCSF-VD13), Langan 2023
- (49.8')** Top of Colma Elevation (feet, CCSF-VD13), Langan 2023
- LINE SR-1** Approximate location of seismic refraction line by NORCAL Geophysical Consultants, Inc., April 2023
- MASW-1** Approximate location of surface wave geophysics line by NORCAL Geophysical Consultants, Inc., April 2023
- A A'** Interpretive cross section location
- Site boundary

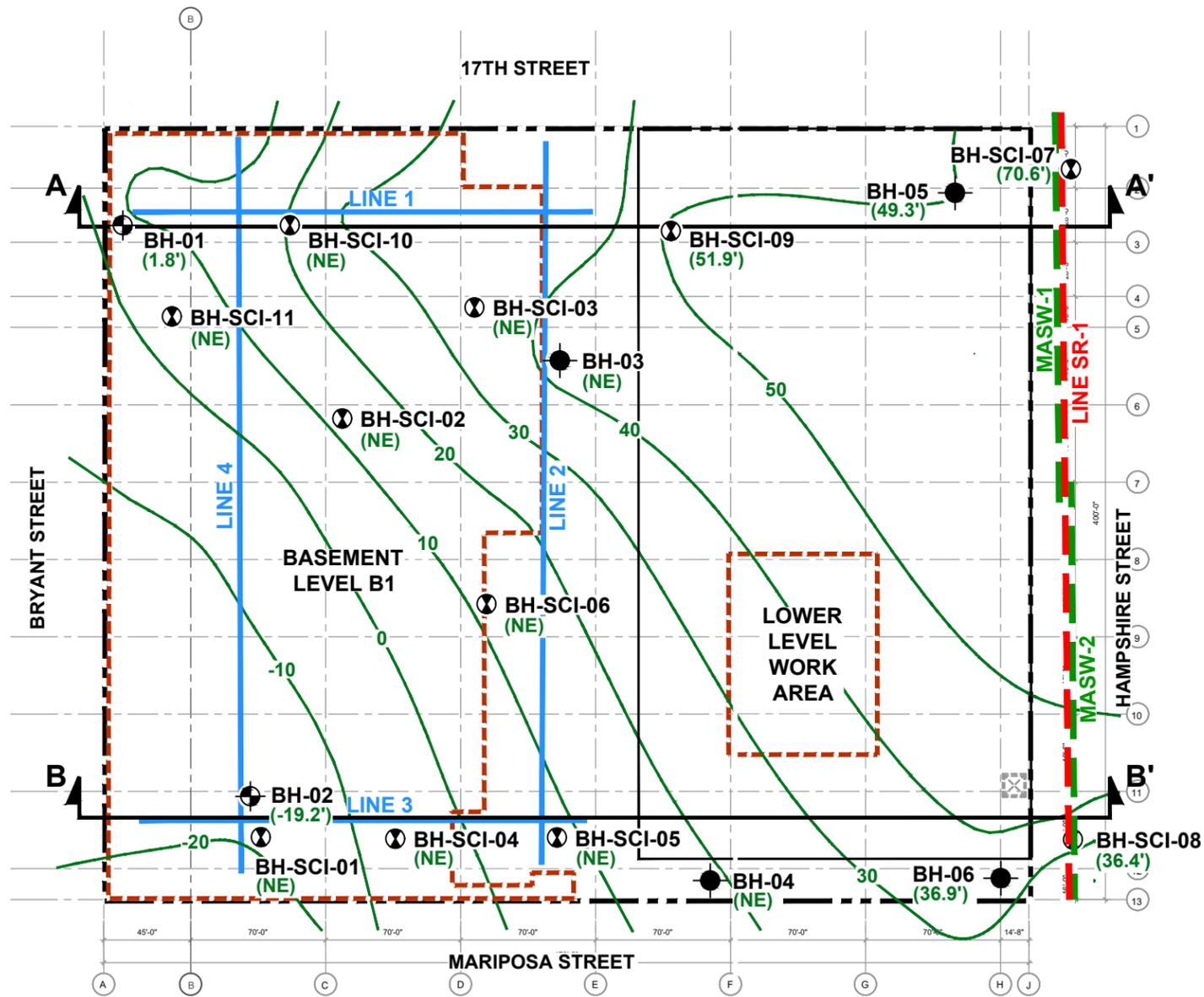
Note: 1. The footprint of proposed basement (Level B1) and lower level work area is approximate and should not be relied upon for bidding or construction.

**DRAFT**

Reference: Base drawings provided by IBI Group titled "Potrero Yard Modernization Project 50% Schematic Design", dated 05/03/2023, Sheet No. A1001 titled "SITE PLAN"



 Langan CA, Inc. 1 Almaden Boulevard, Suite 590 San Jose, CA 95113 T: 408.283.3600 F: 408.283.3601 www.langan.com	Project	Figure Title	Project No.	Figure No.
	SFMTA POTRERO FACILITY REBUILD	CONTOURS OF TOP OF COLMA ELEVATION	770691701	7
	SAN FRANCISCO		Date	
	SAN FRANCISCO COUNTY CALIFORNIA		06/04/2024	
			Drawn By	
			AG	
			Checked By	
			JN	



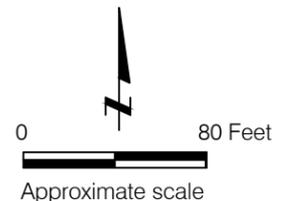
**EXPLANATION**

- BH-01** Approximate location of deep boring by Arup, March 2018
- BH-03** Approximate location of shallow boring by Arup, March 2018
- BH-TR-02** Approximate location of boring by Treadwell & Rollo, Inc., December 2004
- BH-EM-01** Approximate location of boring by Earth Mechanics, July 1998
- BH-SCI-01** Approximate location of boring by Subsurface Consultants, Inc., January 1989
- LINE 1** Approximate location of surface wave geophysics line by GEOVision Geophysical Services, Inc, March 2018
- Footprint of proposed basement (Level B1) and lower level work area
- 50 Contours of Top of Bedrock Elevation (feet, CCSF-VD13), Langan 2023
- (49.3') Top of Bedrock Elevation (feet, CCSF-VD13)
- LINE SR-1** Approximate location of seismic refraction line by NORCAL Geophysical Consultants, Inc., April 2023
- MASW-1** Approximate location of surface wave geophysics line by NORCAL Geophysical Consultants, Inc., April 2023
- Interpretive cross section location
- Site boundary

Note: 1. The footprint of proposed basement (Level B1) and lower level work area is approximate and should not be relied upon for bidding or construction.

**DRAFT**

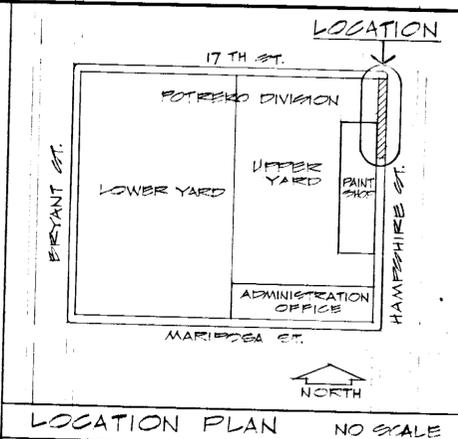
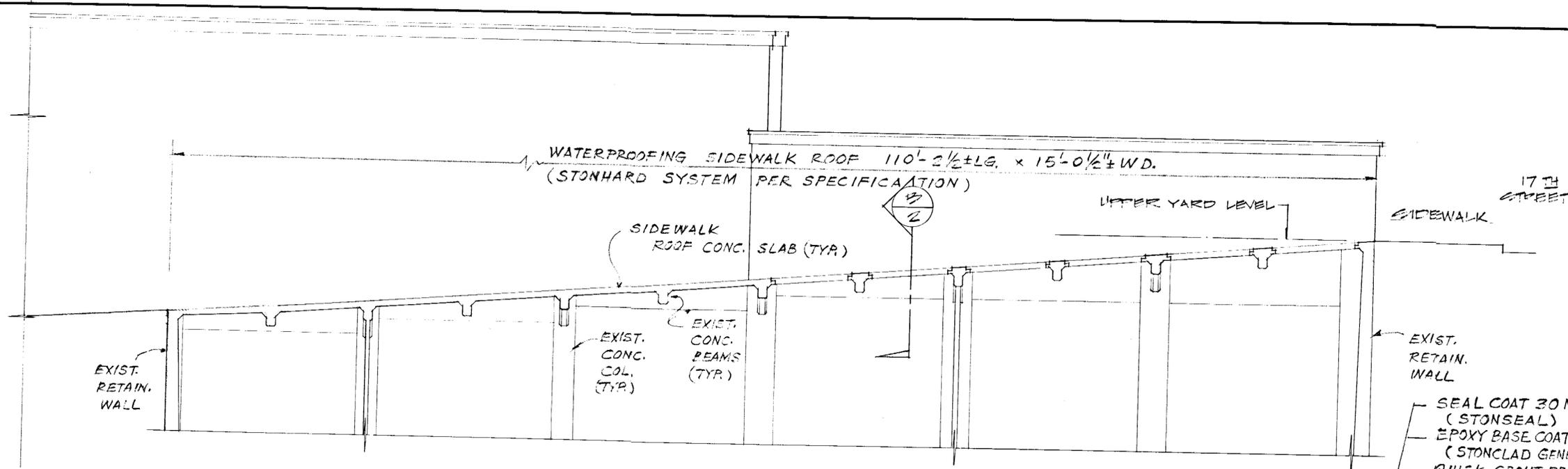
Reference: Base drawings provided by IBI Group titled "Potrero Yard Modernization Project 50% Schematic Design", dated 05/03/2023, Sheet No. A1001 titled "SITE PLAN"



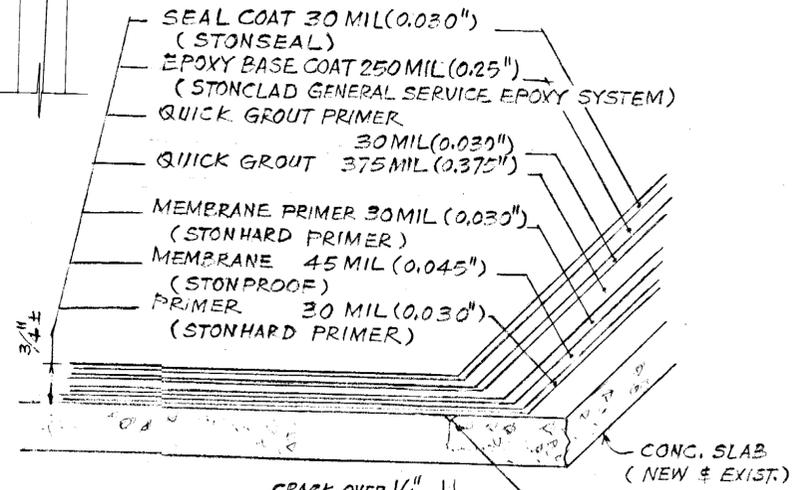
 Langan CA, Inc. 1 Almaden Boulevard, Suite 590 San Jose, CA 95113 T: 408.283.3600 F: 408.283.3601 www.langan.com	Project	Figure Title	Project No. 770691701	Figure No.
	<b>SFMTA POTRERO FACILITY REBUILD</b>	<b>CONTOURS OF TOP OF BEDROCK ELEVATION</b>	Date 06/04/2024	8
	SAN FRANCISCO		Drawn By AG	
	SAN FRANCISCO COUNTY CALIFORNIA		Checked By JN	

DRAFT

**APPENDIX A**  
**AS-BUILT RECORDS FOR EXISTING RETAINING WALLS**

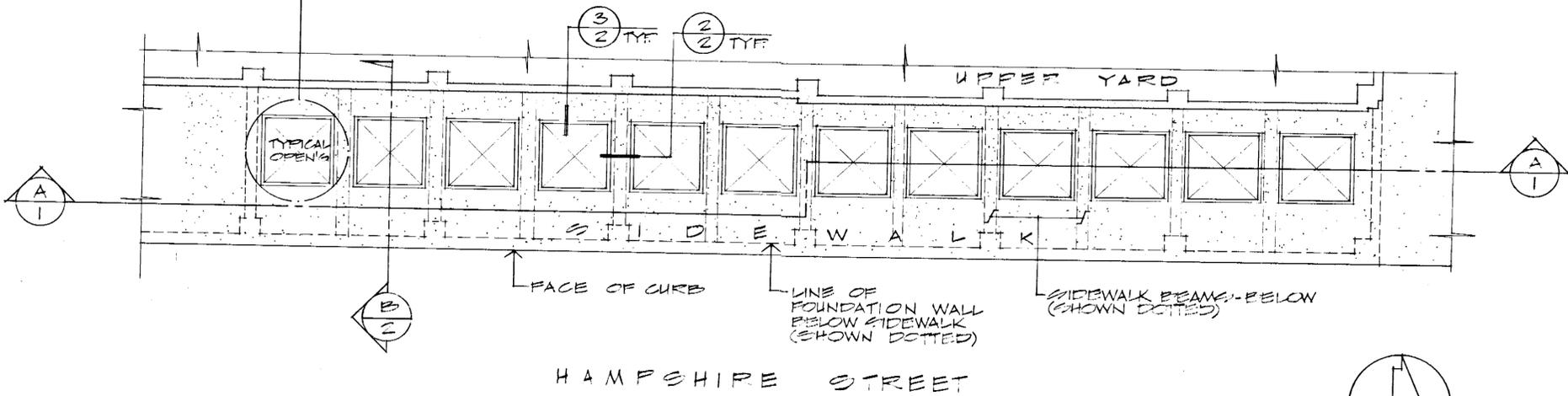


**A**  
**SECTION / SIDEWALK AND SIDEWALK LIGHTS**  
(HAMPSHIRE STREET)  
SCALE: 1/4" = 1'-0"



**1**  
**1**  
**TYPICAL DETAIL**  
**WATERPROOF SYSTEM (STONHARD)**  
NO SCALE

REMOVE EXISTING SIDEWALK LIGHTS AND REPLACE WITH REINF. CONC. IN OPENINGS  
SEE **1** SLAB PLAN  
**2** DETAIL



**PLAN**

SCALE: 1/8" = 1'-0"

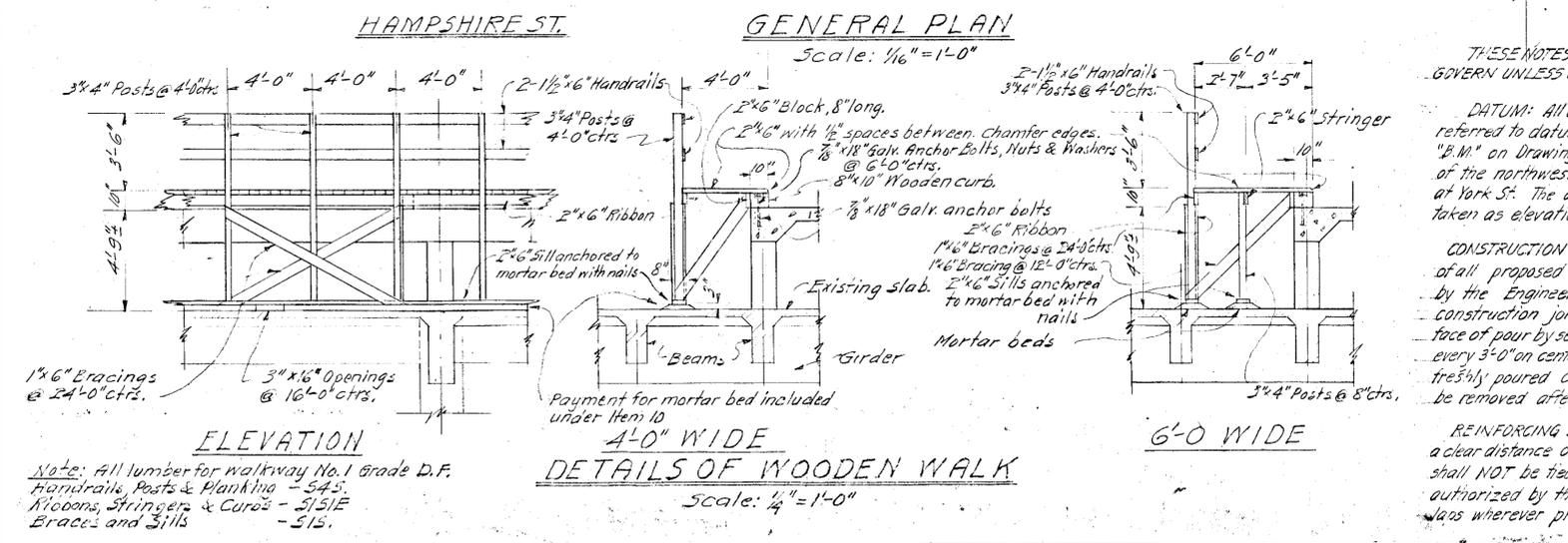
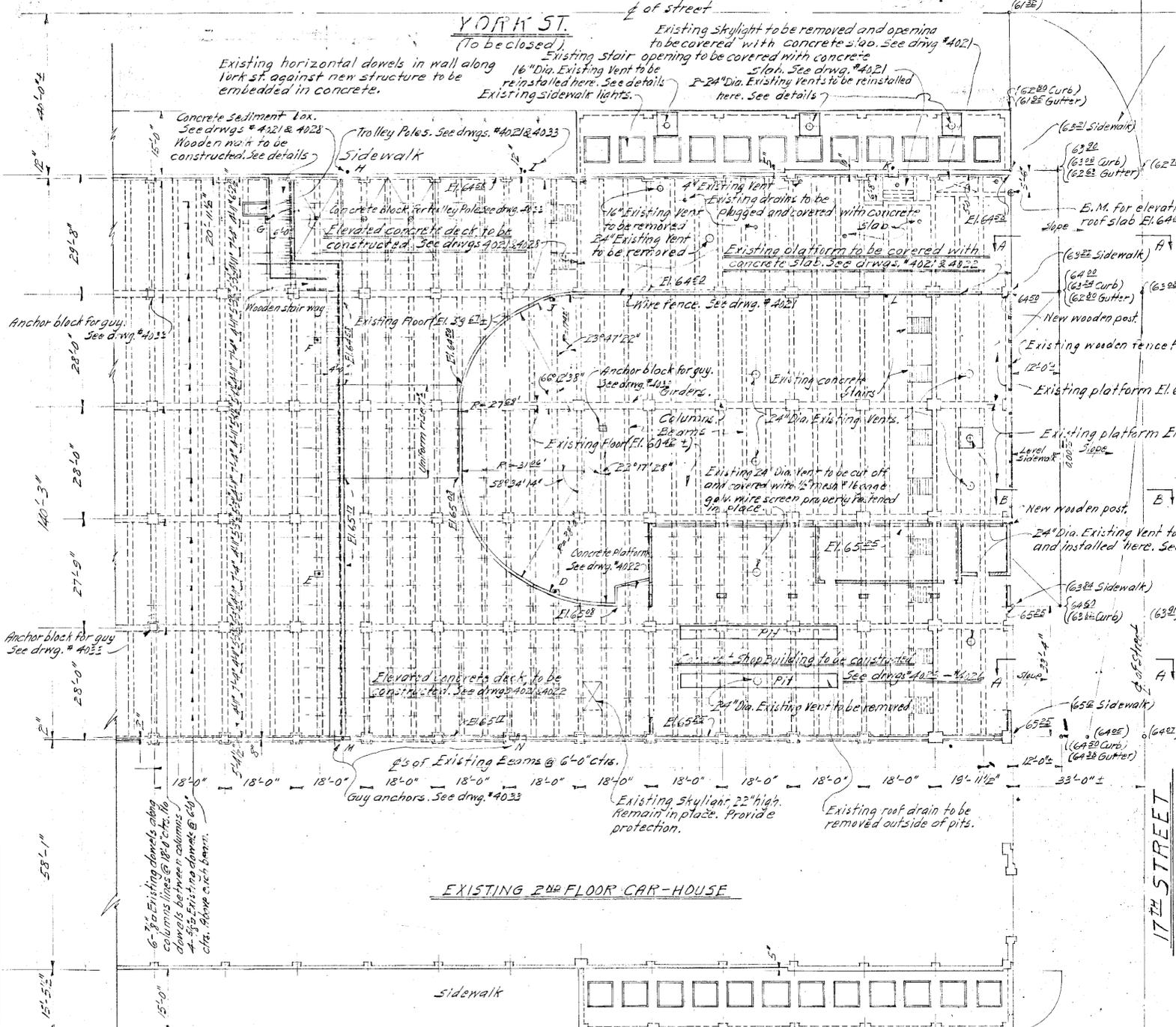
CONTRACT NO. M.R. 955

CITY AND COUNTY OF SAN FRANCISCO  
PUBLIC UTILITIES COMMISSION  
SAN FRANCISCO MUNICIPAL RAILWAY

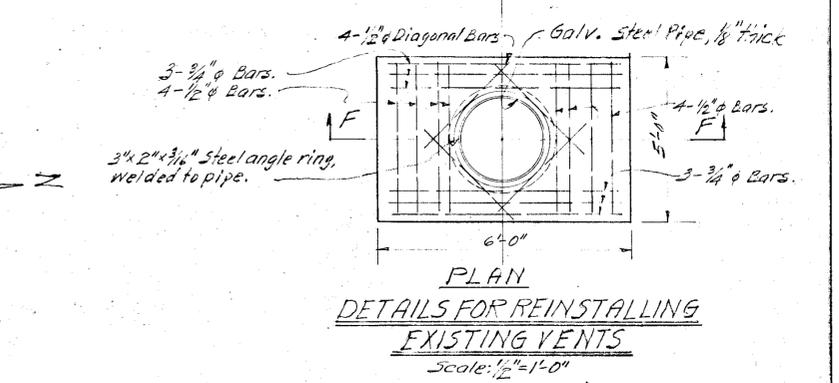
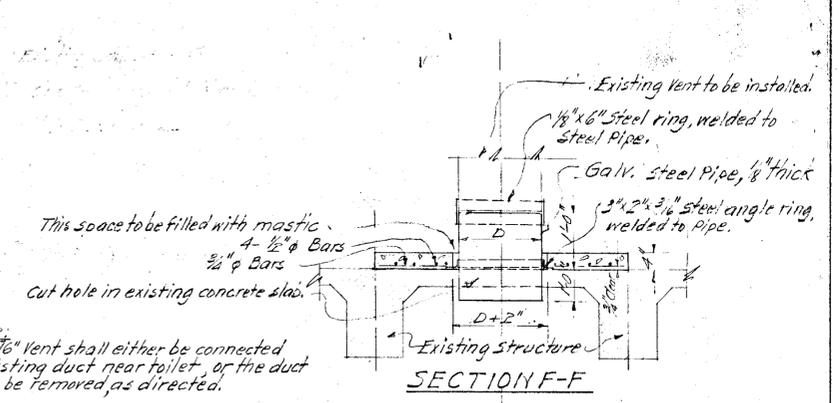
HAMPSHIRE STREET  
SIDEWALK ROOF WATERPROOFING  
PLAN & SECTION

17 th & HAMPSHIRE ST., SAN FRANCISCO, CA.

RECOMMENDED	BY	TR.	KL	SCALE	AS SHOWN
APPROVED	OR	CH.	EJ	DATE	4-23-1938
APPROVED	BY	APPR'D.		DRAWING NO.	CL-8344
				REVISION NO.	0



**Note:**  
 Unless otherwise shown or noted the figures in parenthesis thus (6422) represent existing elevations or grades.  
 All figures without parenthesis represent finished elevations of proposed work.  
 Trolley pole locations, shown thus E, K, etc. For details of anchoring see drwg. #4023.



E.M. for elevations is existing roof slab El. 6422 at this point.

**Note:**  
 16\"/>

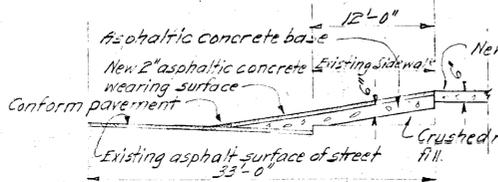
Existing wooden fence to be repaired

24\"/>

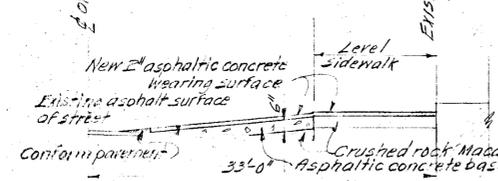
24\"/>

Existing skylight 22\"/>

Existing roof drain to be removed outside of pits.



**SECTION A-A**  
 Similar for entrance section



**SECTION B-B**

**LIST OF DRAWINGS**

Drawing No.	Description
4020	General Plan and Details
4021	Elevated Deck - Plan and Concrete Details
4022	Elevated Deck - Concrete Details
4023	Concrete Shop Building - Plan of Substructure
4024	Concrete Shop Building - Plan and Elevations
4025	Concrete Shop Building - Substructure & Building Details
4026	Concrete Shop Building - Roof Plan and Details
4027	Concrete Shop Building - Miscellaneous Details
4028	Plumbing & Piping - Sewer and Drainage Systems
4029	Plumbing & Piping - Water, Gas, Air & Lubricating Systems
4030	Electrical Work - New Service & Switchboard, Light & Power
4031	Electrical Work - Light & Power for Shop Building
4032	Trolley Service Platform
4033	Trolley Pole Supports and Guy Anchors.

**GENERAL NOTES**

THESE NOTES APPLY TO ALL DRAWINGS AND GOVERN UNLESS OTHERWISE SHOWN OR NOTED.

**DATUM:** All elevations shown on the plans are referred to datum, which is a bench mark marked "B.M." on Drawing 4020 and is located 5'-6" east of the northwest corner of the existing building at York St. The assumed elevation of this B.M. is taken as elevation 64.00.

**CONSTRUCTION JOINTS:** The location and type of all proposed construction joints must be approved by the Engineer prior to starting work. At all construction joints in exterior walls, form keys in face of pair by setting pieces of 2" x 4" x 1'-6" long every 3'-0" on centers along the center of wall in the freshly poured concrete. The 2" x 4" pieces are to be removed after concrete has set.

**REINFORCING STEEL:** Bars shall be kept apart a clear distance of 1 1/2 diameters at splices and shall NOT be tied together unless such tie is authorized by the Engineer. Stagger adjacent laps wherever practicable.

**COVER OF REINFORCING:** The following is the clear distance from face of concrete to reinforcing steel: Walls 1"; Columns and Piers 1" to ties; Beams and Spandrels 1" to stirrups; 6" and 8" thick Slabs 1"; 4" Slabs 3/4"; Top of Parapets 2".

All reinforcing steel shall be rigidly supported away from the forms by means of metal spreaders, and/or tie wires. No wall ties or spreaders shall extend closer than 1" to face of concrete.

**BAR SUPPORTS:** Walls reinforced with steel in each face shall have curtain spreaders at not over 4'-0" on centers each way.

Joists shall have 3" Snap-in type joist bar chairs per span.

Beams and Girders shall have beam chairs at not over 5'-0" on centers.

All slab steel shall be rigidly supported by means of "Snap-in" type low slab chairs and continuous high chairs.

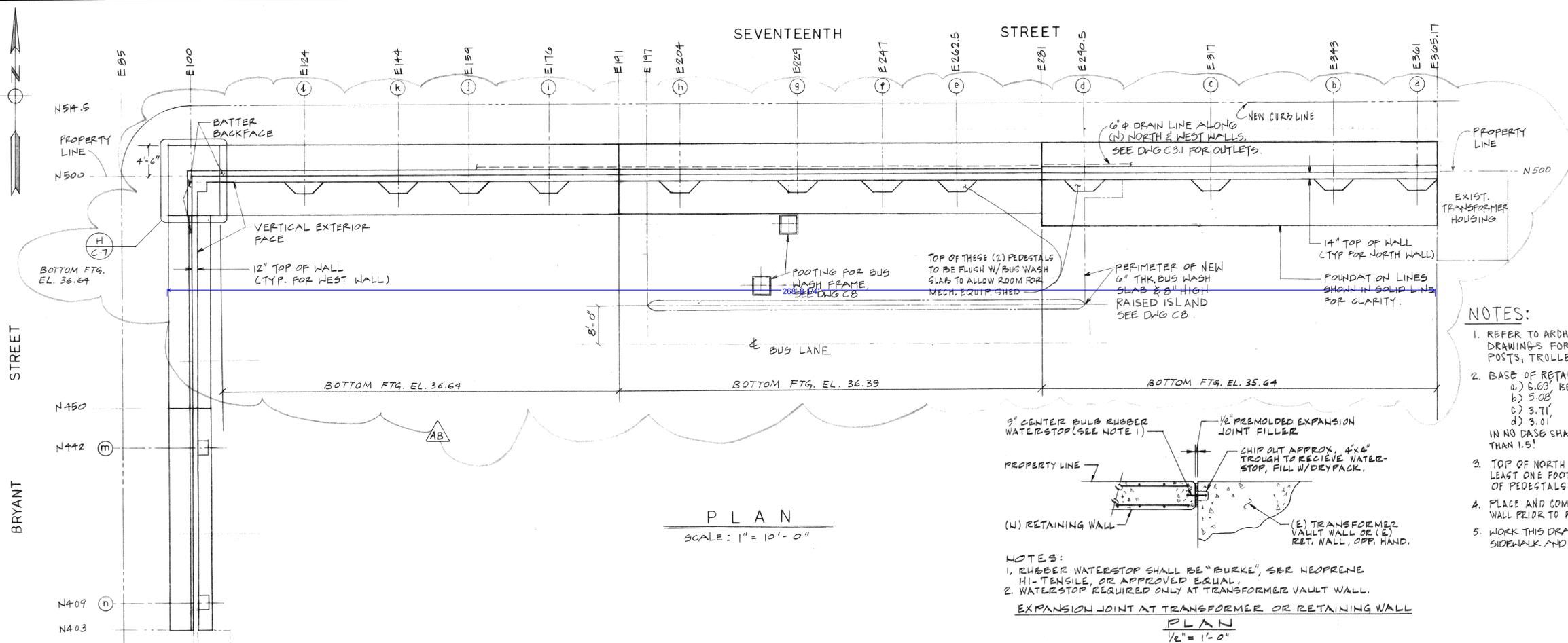
Where mesh in slabs over joists is spliced the laps shall be tied together at 1'-0" intervals along each edge, staggered, thus:

Former Electric Power Bureau No. 4020

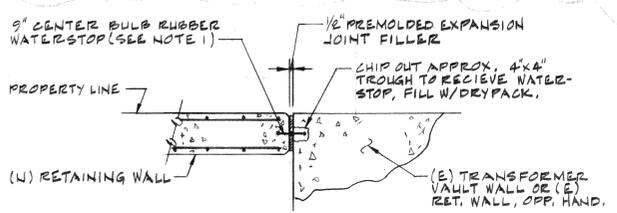
CITY AND COUNTY OF SAN FRANCISCO  
 PUBLIC UTILITIES COMMISSION  
 ELECTRIC POWER BUREAU

ADDITIONS TO 17TH STREET CAR HOUSE  
 GENERAL PLAN AND DETAILS

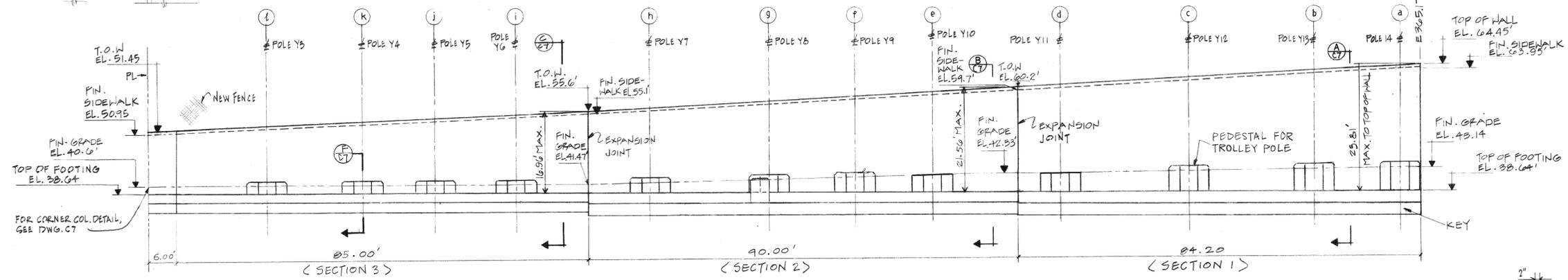
SCALE As Shown	BY N. Belkin	ON N. E.	DATE Feb. 1940
APPROVED	BY J. J. ...	CH G. W.	REVISED
APPROVED	GENERAL MANAGER AND CHIEF ENGINEER		DRAWING NO. DL-4329



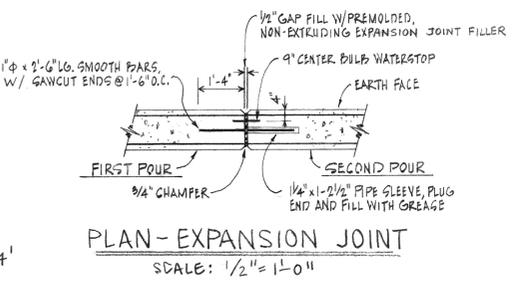
- NOTES:**
- REFER TO ARCHITECTURAL, OVERHEAD, AND ELECTRICAL DRAWINGS FOR LOCATION AND/OR SIZE OF FENCE POSTS, TROLLEY POLES AND LIGHT POLES.
  - BASE OF RETAINING WALL FOOTING TO BE AT LEAST:
    - 6.69' BELOW FINISHED GRADE FOR SECTION 1
    - 5.08' "
    - 3.71' "
    - 3.01' "
 IN NO CASE SHALL SOIL COVER, ON THE YARD SIDE BE LESS THAN 1.5!
  - TOP OF NORTH WALL TROLLEY POLE PEDESTALS TO BE AT LEAST ONE FOOT ABOVE FINISH GRADE WITH THE EXCEPTION OF PEDESTALS @ E262.5 & E290.5
  - PLACE AND COMPACT BACKFILL IN FRONT OF THE RETAINING WALL PRIOR TO BACKFILLING BEHIND THE WALL.
  - WORK THIS DRAWING WITH DWG C3.1 FOR TOP OF FINISHED SIDEWALK AND PAVEMENT ELEVATIONS.



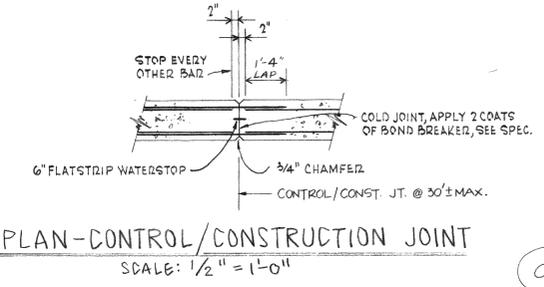
- NOTES:**
- RUBBER WATERSTOP SHALL BE "BURKE", SER. NEOPRENE HI-TENSILE, OR APPROVED EQUAL.
  - WATERSTOP REQUIRED ONLY AT TRANSFORMER VAULT WALL.
- EXPANSION JOINT AT TRANSFORMER OR RETAINING WALL**
- PLAN**  
1/2" = 1'-0"



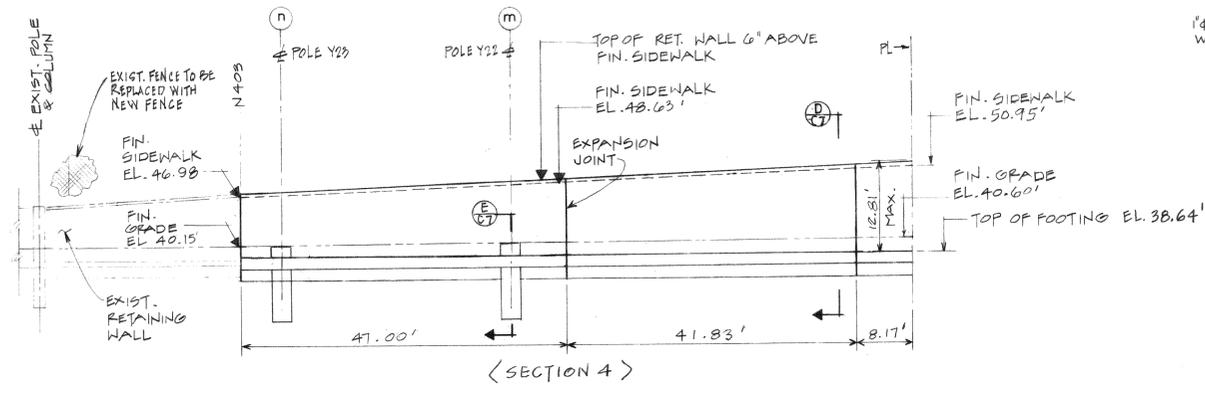
**YARD ELEVATION LOOKING NORTH**  
SCALE: 1" = 10'-0"



**PLAN-EXPANSION JOINT**  
SCALE: 1/2" = 1'-0"



**PLAN-CONTROL/CONSTRUCTION JOINT**  
SCALE: 1/2" = 1'-0"



**YARD ELEVATION LOOKING WEST**  
SCALE: 1" = 10'-0"



ELEVATION DATUM	DATE	DESCRIPTION	BY	APPROV.
AS BUILT	11/15/24		JF	
AS BUILT	08-15-93		JF	

**CONTRACT NO. MR-869**

CITY AND COUNTY OF SAN FRANCISCO  
**PUBLIC UTILITIES COMMISSION**  
UTILITIES ENGINEERING BUREAU

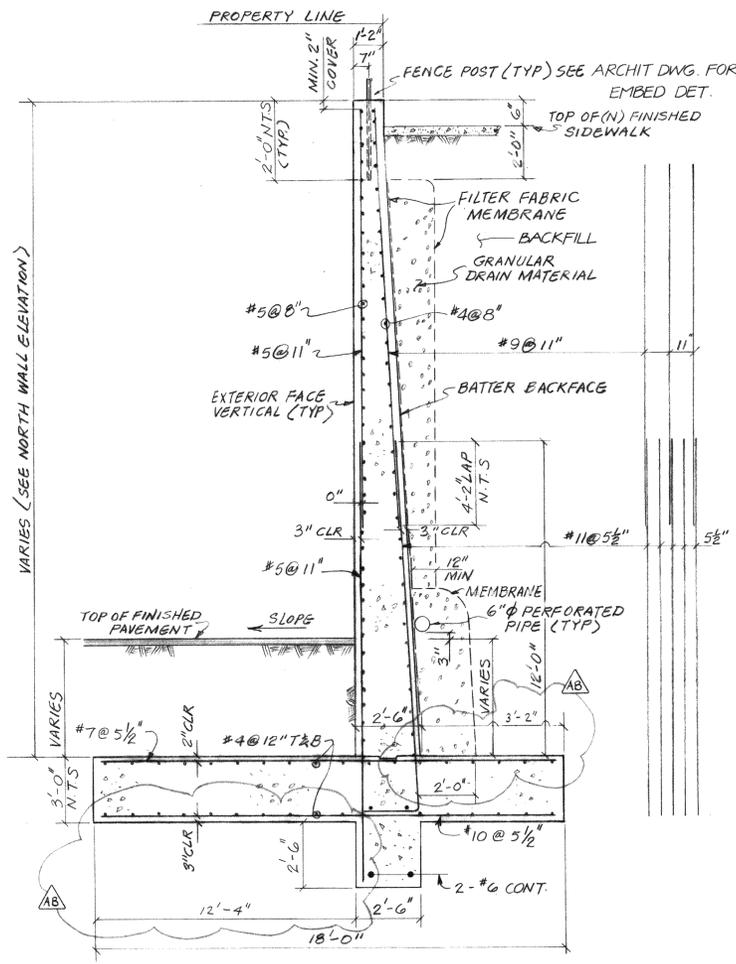
MUNI-POTRERO DIV. REHABILITATION

**RETAINING WALL**  
**PLAN & ELEVATIONS**

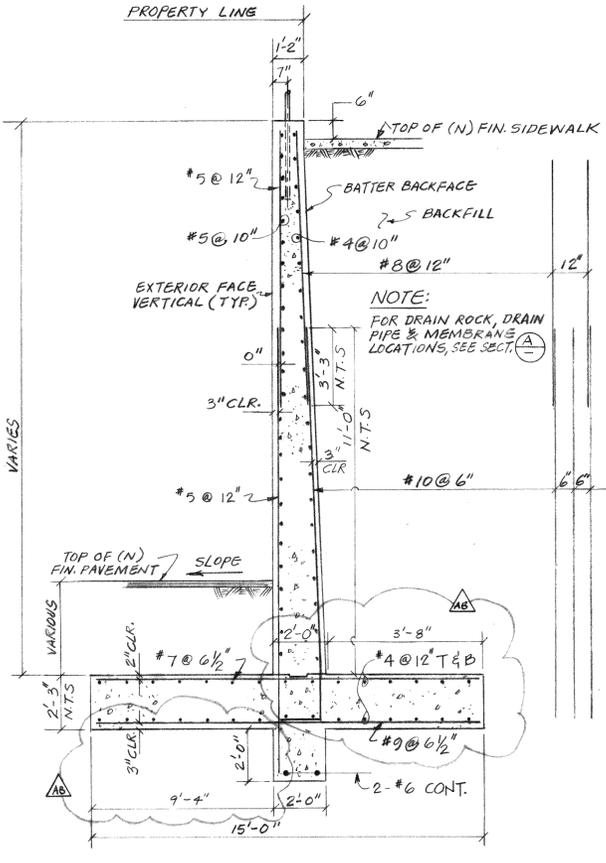
DESIGNED BY	DATE	SCALE
CHECKED BY	DATE	
APPROVED BY	DATE	

GENERAL MANAGER: Johnny B. Stein  
UTILITIES ENGINEERING BUREAU: J.F. KALINOWSKI

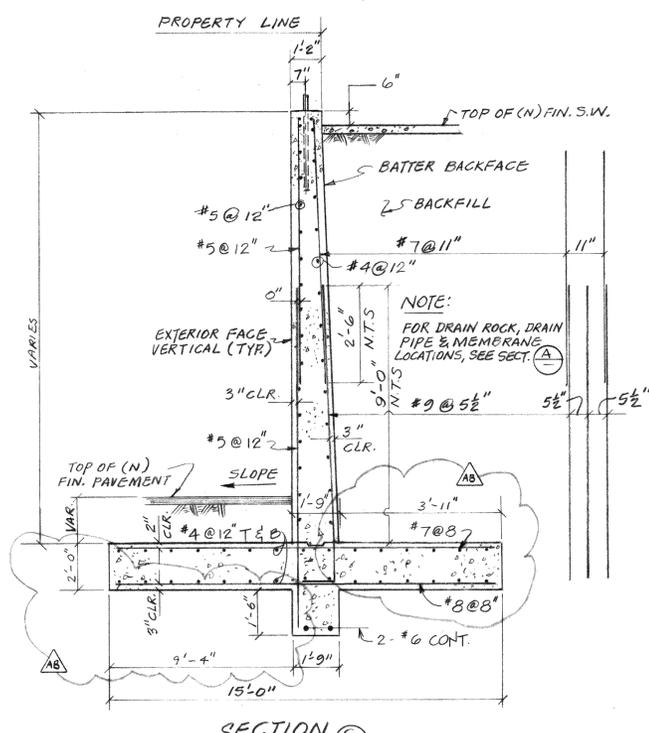
SHEET 8 OF 117 DL-9803 AB



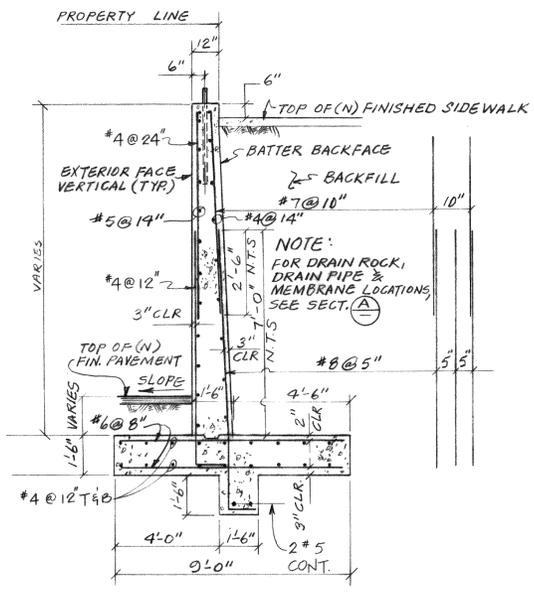
SECTION A  
 (TYP. FOR WALL FROM E-281 TO E-365)



SECTION B  
 (TYP. FOR WALL FROM E-191 TO E-281)

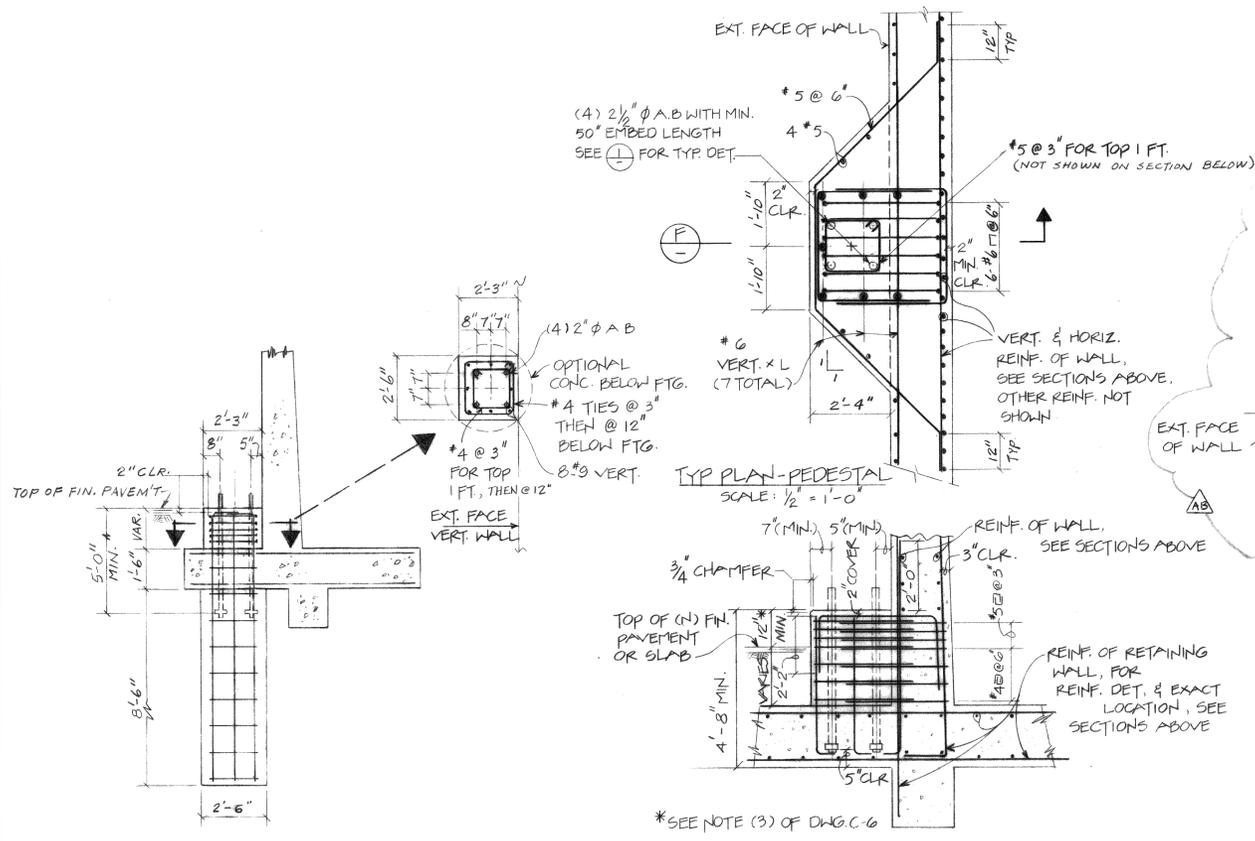


SECTION C  
 (TYP. FOR WALL FROM E-106 TO E-191)

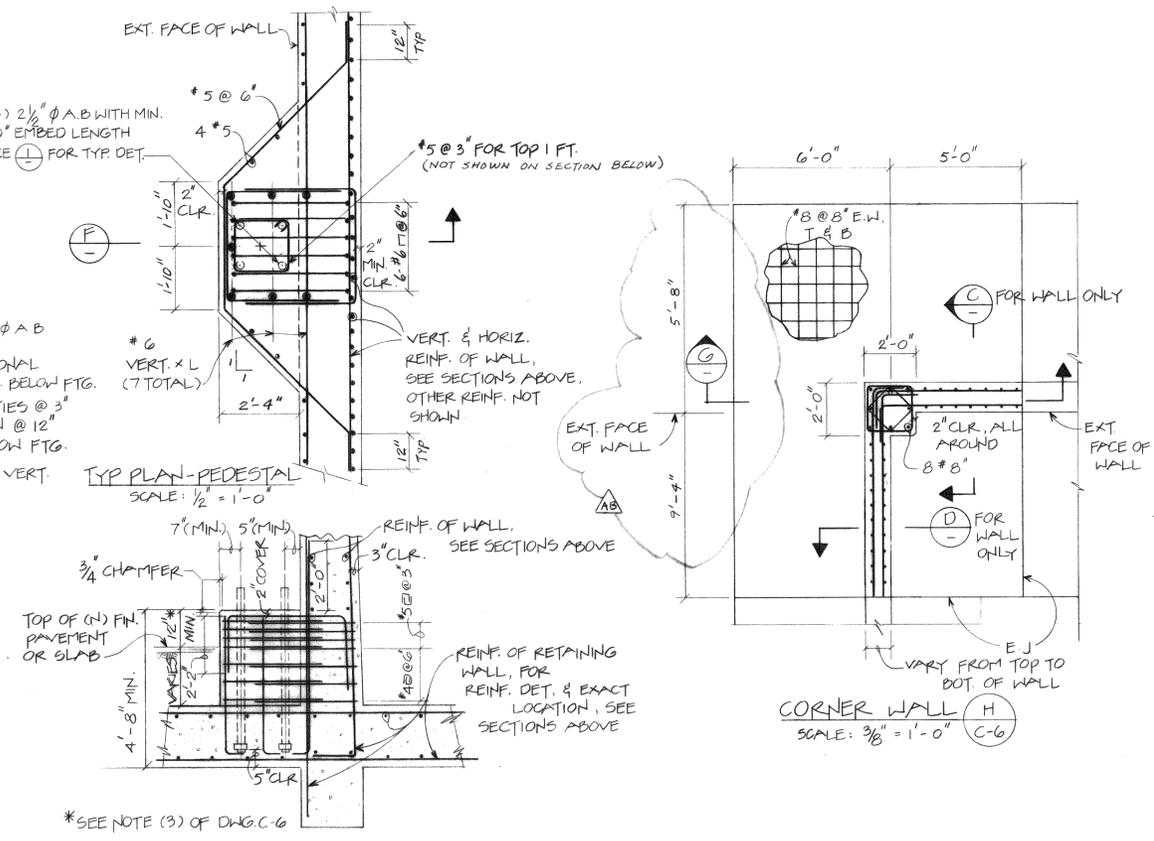


SECTION D  
 (TYP. FOR WALL FROM N-403 TO N-491.8)

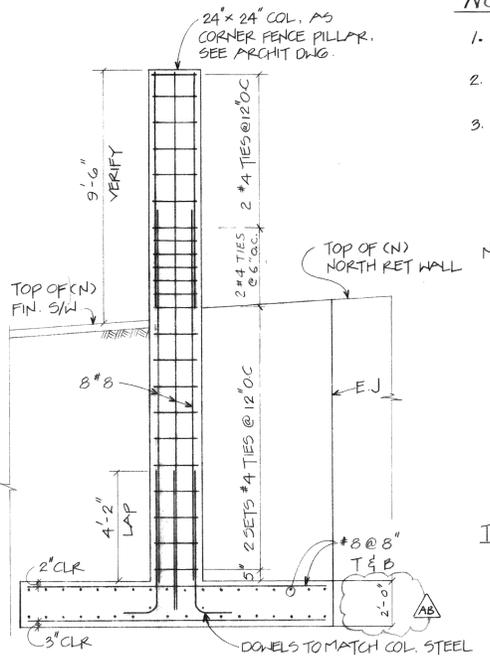
- NOTE:
- 1/4" MASTIC JOINT BETWEEN PAVEMENT AND RETAINING WALL.
  - ANCHOR BOLTS AND NUTS SHALL CONFORM TO ASTM A307.
  - ANCHOR BOLTS SHALL NOT BE TIGHTENED UNTIL AT LEAST 14 DAYS HAVE ELAPSED AFTER PLACING OF CONCRETE.



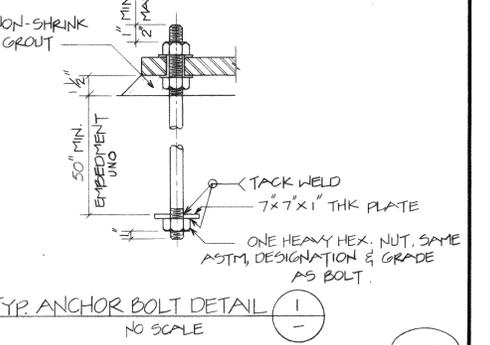
TYP. SECTION E  
 SCALE: 3/8" = 1'-0"



SECTION F  
 SCALE: 1/2" = 1'-0"



SECTION G  
 SCALE: 3/8" = 1'-0"



TYP. ANCHOR BOLT DETAIL  
 NO SCALE

CONTRACT NO. MR-869

CITY AND COUNTY OF SAN FRANCISCO  
 PUBLIC UTILITIES COMMISSION  
 UTILITIES ENGINEERING BUREAU

MUNI-POTRERO DIV. REHABILITATION  
 RETAINING WALL  
 SECTIONS & DETAILS

DESIGNED BY	DR. J. J. DON	SCALE	AS BUILT
CHECKED BY	DATE	DATE	DATE
APPROVED	DATE	DATE	DATE
GENERAL MANAGER	DATE	DATE	DATE
UTILITIES ENGINEERING BUREAU	DATE	DATE	DATE
SHEET 9 OF 117		DL-9809	



ELEVATION	DATE	DESCRIPTION	BY	APP'D
AS BUILT	11-1-89			

DRAFT

**APPENDIX B**  
**LOGS OF TEST BORINGS BY OTHERS**

# LOG OF TEST BORING 1

EQUIPMENT 8" Hollow Stem Auger

DATE DRILLED 1/5/89

ELEVATION --

LABORATORY TESTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	DEPTH (FT)	SAMPLE	BLOWS PER FOOT	DESCRIPTION
	16.3	109	0			ASPHALTIC CONCRETE - 4" thick
			0			RED-BROWN CLAYEY GRAVEL (GC)
			0			dense, moist (fill)
			0			BROWN CLAYEY SAND (SC)
			0			dense, moist
			5		55*	
			5			NO GROUNDWATER ENCOUNTERED DURING DRILLING
			10			
			15			

UC = UNCONFINED COMPRESSIVE SHEAR STRENGTH (psf)  
 PI = PLASTICITY INDEX (%)  
 LL = LIQUID LIMIT (%)

SAMPLER TYPES:  
 CALIFORNIA DRIVE  
 O.D.: 2.5 inches  
 I.D.: 2.0 inches

\*MODIFIED CALIFORNIA DRIVE  
 O.D.: 3.0 inches  
 I.D.: 2.5 inches

HAMMER WEIGHT: 140 pounds  
 HAMMER DROP: 30 inches  
 (Test borings 1-8)

# LOG OF TEST BORING 2

EQUIPMENT 8" Hollow Stem Auger

DATE DRILLED 1/5/89

ELEVATION --

LABORATORY TESTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	DEPTH (FT)	SAMPLE	BLOWS PER FOOT	DESCRIPTION
	15.9	109	0			ASPHALTIC CONCRETE - 4" thick
			0			RED-BROWN CLAYEY SAND (SC)
			0			dense, moist, with gravel (fill)
			0			MOTTLED ORANGE AND BROWN CLAYEY SAND (SC)
			0			dense, moist
			5		51*	
			5			NO GROUNDWATER ENCOUNTERED DURING DRILLING
			10			
			15			

Subsurface Consultants

MUNI-POTRERO - SAN FRANCISCO, CA

JOB NUMBER

473.002

DATE

1/20/89

APPROVED

*[Signature]*

PLATE

2

# LOG OF TEST BORING 3

EQUIPMENT 8" Hollow Stem Auger

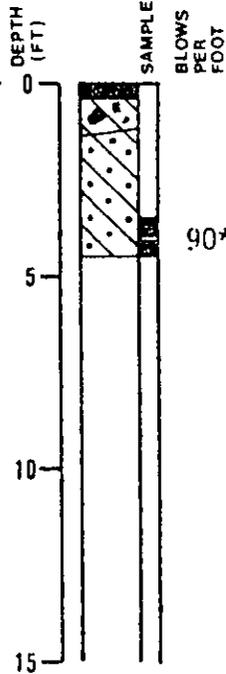
DATE DRILLED 1/5/89

ELEVATION --

LABORATORY TESTS

MOISTURE CONTENT %  
16.7

DRY DENSITY (PCF)  
115



ASPHALTIC CONCRETE - 4" thick  
RED-BROWN CLAYEY GRAVEL (GC)  
dense, moist (fill)  
ORANGE-BROWN CLAYEY SAND (SC)  
dense, moist

NO GROUNDWATER ENCOUNTERED  
DURING DRILLING

# LOG OF TEST BORING 4

EQUIPMENT 8" Hollow Stem Auger

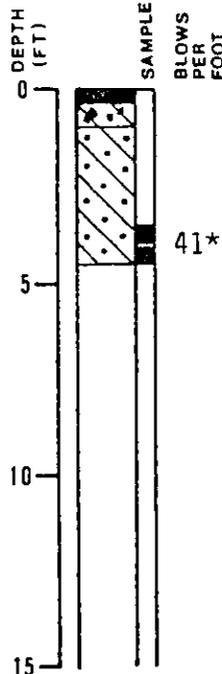
DATE DRILLED 1/5/89

ELEVATION --

LABORATORY TESTS

MOISTURE CONTENT %  
15.5

DRY DENSITY (PCF)  
111



ASPHALTIC CONCRETE - 4" thick  
RED-BROWN CLAYEY GRAVEL (GC)  
dense, moist (fill)  
MOTTLED ORANGE AND BROWN  
CLAYEY SAND (SC)  
medium dense, moist

NO GROUNDWATER ENCOUNTERED  
DURING DRILLING

Subsurface Consultants

MUNI-POTRERO - SAN FRANCISCO, CA

PLATE

JOB NUMBER  
473.002

DATE  
1/20/89

APPROVED  
*[Signature]*

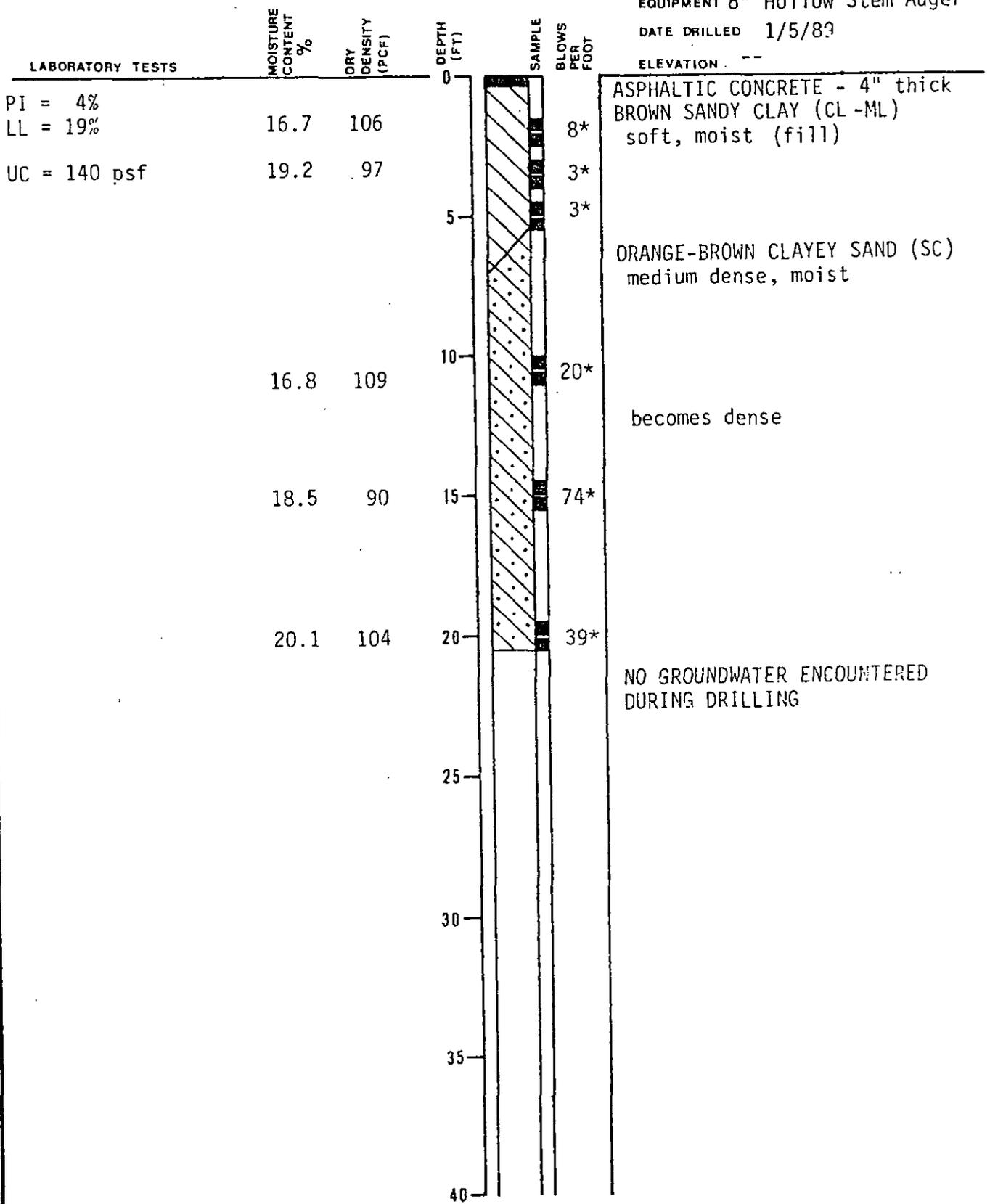
3

# LOG OF TEST BORING 5

EQUIPMENT 8" Hollow Stem Auger

DATE DRILLED 1/5/89

ELEVATION --



Subsurface Consultants

MUNI-POTRERO - SAN FRANCISCO, CA

PLATE

JOB NUMBER

DATE

APPROVED

473.002

1/20/89

*[Signature]*

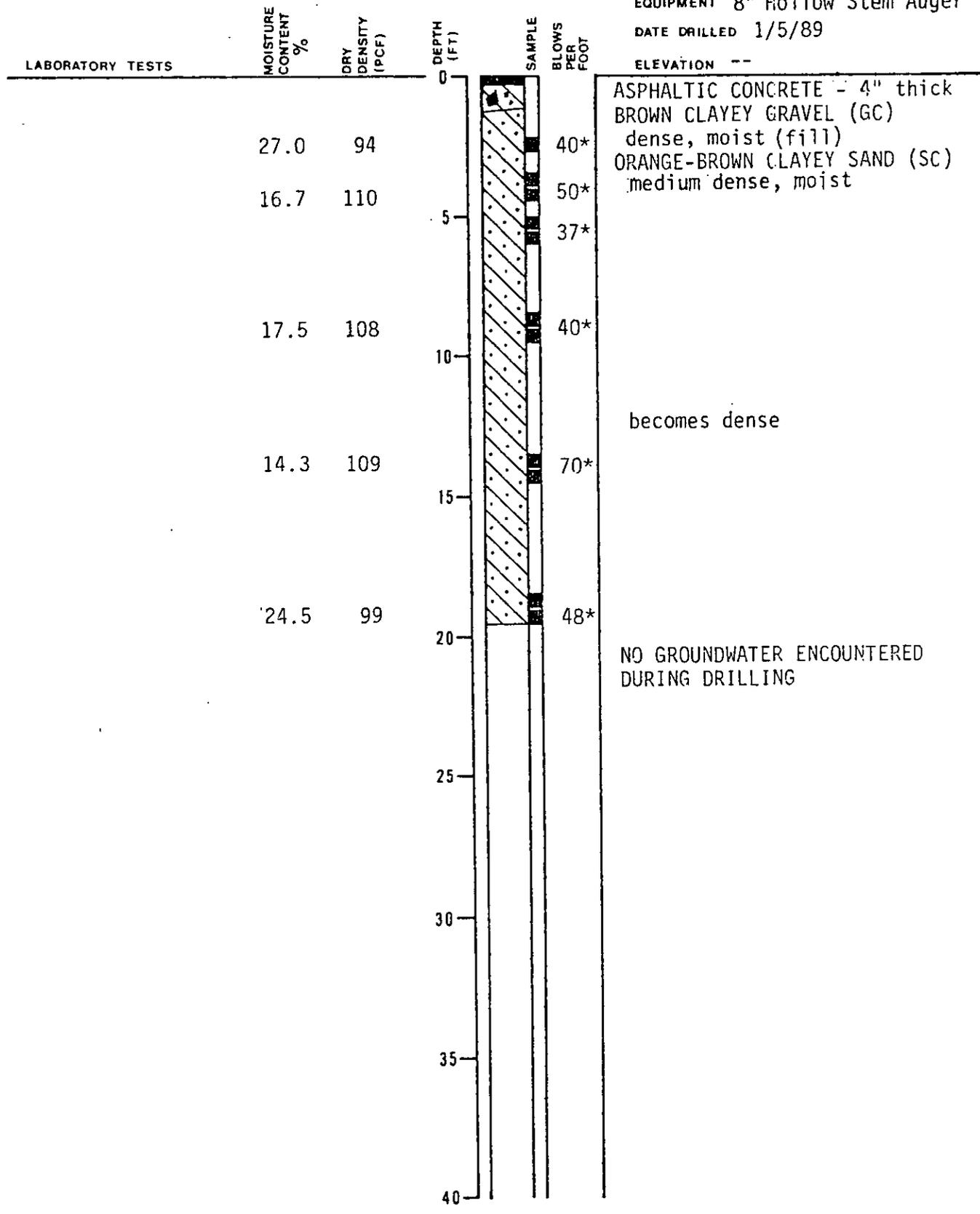
4

# LOG OF TEST BORING 6

EQUIPMENT 8" Hollow Stem Auger

DATE DRILLED 1/5/89

ELEVATION --



Subsurface Consultants

MUNI-POTRERO - SAN FRANCISCO, CA		PLATE
JOB NUMBER	DATE	APPROVED
473.002	1/20/89	<i>[Signature]</i>
		<b>5</b>

# LOG OF TEST BORING 7

EQUIPMENT 8" Hollow Stem Auger

DATE DRILLED 1/12/89

ELEVATION --

LABORATORY TESTS

MOISTURE CONTENT %  
DRY DENSITY (PCF)

DEPTH (FT)

SAMPLE

BLOWS PER FOOT

15.9 104

0

58

ASPHALTIC CONCRETE - 2½" thick  
CONCRETE - 4" thick  
BROWN GRAVELLY SILT (ML)  
stiff, moist  
GRAY-GREEN SHALE/SERPENTINE  
crushed, low hardness, weak,  
deep weathering

12.6 115

5

50/  
3"

color change to gray

14.0 117

10

67

12.4 116

15

50/  
6"

harder drilling at 18.0 feet  
color change to gray-green

9.5 109

20

79

GROUNDWATER LEVEL 1/13/89

▼ 25

121/  
3"

NO GROUNDWATER ENCOUNTERED  
DURING DRILLING

30

35

40

Subsurface Consultants

MUNI-POTRERO - SAN FRANCISCO, CA

PLATE

JOB NUMBER

DATE

APPROVED

473.002

1/20/89

*[Signature]*

6

# LOG OF TEST BORING 9

EQUIPMENT 6" Solid Flight Auger

DATE DRILLED 1/12/89

ELEVATION --

LABORATORY TESTS	MOISTURE CONTENT %	DRY DENSITY (PCF)	DEPTH (FT)	SAMPLE	BLOWS PER FOOT
	22.5	91	0		17/4"
			4		50/4"
	21.9	95	5		50/6"
			10		50/6"

CONCRETE - 12" thick  
GREEN SHALE/SERPENTINE  
intensely fractured, low  
hardness, weak, deep weathering

NO GROUNDWATER ENCOUNTERED  
DURING DRILLING

HAMMER WEIGHT: 150 pounds  
HAMMER DROP: 27 inches  
(Test borings 9-11)

# LOG OF TEST BORING 10

EQUIPMENT 6" Solid Flight Auger

DATE DRILLED 1/18/89

ELEVATION --

LABORATORY TESTS	MOISTURE CONTENT %	DRY DENSITY (PCF)	DEPTH (FT)	SAMPLE	BLOWS PER FOOT
UC = 3100 psf	20.4	107	0		7
			5		20
	14.7	106	5		48
			10		34
	27.2	87	10		

ASPHALTIC CONCRETE - 3" thick  
RED-BROWN CLAYEY GRAVEL (GC)  
loose, moist (fill)  
LIGHT BROWN CLAYEY SAND (SC)  
loose, moist  
ORANGE-GRAY SANDY CLAY (CL)  
stiff, moist  
ORANGE-BROWN CLAYEY SAND (SC)  
dense, moist

NO GROUNDWATER ENCOUNTERED  
DURING DRILLING

# LOG OF TEST BORING 11

EQUIPMENT 6" Solid Flight Auger

DATE DRILLED 1/18/89

ELEVATION --

LABORATORY TESTS	MOISTURE CONTENT %	DRY DENSITY (PCF)	DEPTH (FT)	SAMPLE	BLOWS PER FOOT	DESCRIPTION
	20.0	107	21			ASPHALTIC CONCRETE - 3" thick
	19.2	106	23			DARK BROWN CLAYEY GRAVEL (GC) loose, moist(fill)
			25			LIGHT ORANGE-GRAY SANDY CLAY (CL) stiff, moist
	20.1	107	54			ORANGE-BROWN CLAYEY SAND (SC) dense, moist
NO GROUNDWATER ENCOUNTERED DURING DRILLING						

Subsurface Consultants

MUNI-POTRERO - SAN FRANCISCO, CA  
 JOB NUMBER 473.002      DATE 1/20/89      APPROVED *[Signature]*

PLATE **9**

GENERAL SOIL CATEGORIES		SYMBOLS	TYPICAL SOIL TYPES		
<b>COARSE GRAINED SOILS</b> More than half is larger than No. 200 sieve	<b>GRAVEL</b> More than half coarse fraction is larger than No. 4 sieve size	Clean Gravel with little or no fines	<b>GW</b>  <b>GP</b> 	Well Graded Gravel, Gravel-Sand Mixtures Poorly Graded Gravel, Gravel-Sand Mixtures	
		Gravel with more than 12% fines	<b>GM</b>  <b>GC</b> 	Silty Gravel, Poorly Graded Gravel-Sand-Silt Mixtures Clayey Gravel, Poorly Graded Gravel-Sand-Clay Mixtures	
			<b>SAND</b> More than half coarse fraction is smaller than No. 4 sieve size	Clean sand with little or no fines	<b>SW</b>  <b>SP</b> 
		Sand with more than 12% fines		<b>SM</b>  <b>SC</b> 	Silty Sand, Poorly Graded Sand-Silt Mixtures Clayey Sand, Poorly Graded Sand-Clay Mixtures
	<b>FINE GRAINED SOILS</b> More than half is smaller than No. 200 sieve			<b>SILT AND CLAY</b> Liquid Limit Less than 50%	<b>ML</b>  <b>CL</b> 
		<b>OL</b> 			Organic Clay and Organic Silty Clay of Low Plasticity
		<b>SILT AND CLAY</b> Liquid Limit Greater than 50%	<b>MH</b>  <b>CH</b> 		Inorganic Silt, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silt Inorganic Clay of High Plasticity, Fat Clay
			<b>OH</b> 	Organic Clay of Medium to High Plasticity, Organic Silt	
<b>HIGHLY ORGANIC SOILS</b>			<b>PT</b> 	Peat and Other Highly Organic Soils	

UNIFIED SOIL CLASSIFICATION SYSTEM

Subsurface Consultants

MUNI-POTRERO - SAN FRANCISCO, CA  
 JOB NUMBER 473.002      DATE 1/20/89      APPROVED *[Signature]*

PLATE  
**10**

**BEDDING OF SEDIMENTARY ROCKS**

Very thick-bedded .....	Greater than 4.0	} Bed thickness in feet
Thick-bedded .....	2.0 to 4.0	
Thin-bedded .....	0.2 to 2.0	
Very thin-bedded .....	0.05 to 0.2	
Laminated .....	0.01 to 0.05	
Thinly laminated .....	less than 0.01	

**FRACTURING**

Very little fractured .....	Greater than 4.0	} Size of pieces in feet
Occasionally fractured .....	1.0 to 4.0	
Moderately fractured .....	0.5 to 1.0	
Closely fractured .....	0.1 to 0.5	
Intensely fractured .....	0.05 to 0.1	
Crushed .....	less than 0.05	

**HARDNESS**

- Soft ..... reserved for plastic material alone.
- Low hardness ..... can be gouged deeply or carved easily with a knife blade.
- Moderately hard ..... can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and is readily visible after the powder has been blown away.
- Hard ..... can be scratched with difficulty; scratch produces little powder and is often faintly visible.
- Very hard ..... cannot be scratched with knife blade; leaves a metallic streak.

**STRENGTH**

- Plastic ..... very low strength.
- Friable ..... crumbles easily by rubbing with fingers.
- Weak ..... an unfractured specimen of such material will crumble under light hammer blows.
- Moderately strong ... specimen will withstand a few heavy hammer blows before breaking.
- Strong ..... specimen will withstand a few heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.
- Very strong ..... specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.

**WEATHERING**

- Deep ..... moderate to complete mineral decomposition, extensive disintegration, deep and thorough discoloration, many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt.
- Moderate ..... slight change or partial decomposition of minerals, little disintegration; cementation little to unaffected. Moderate to occasionally intense discoloration. Moderately coated fractures.
- Little ..... no megascopic decomposition of minerals; little or no effect on normal cementation. Slight and intermittent, or localized discoloration. Few stains on fracture surfaces.
- Fresh ..... unaffected by weathering agents. No disintegration or discoloration. Fractures usually less numerous than joints.

**ROCK CLASSIFICATION CRITERIA**

Subsurface Consultants

MUNI-POTRERO - SAN FRANCISCO, CA		
JOB NUMBER 473.002	DATE 1/20/89	APPROVED <i>[Signature]</i>

PLATE  
**11**

Other Laboratory Tests	Pocket Penetrometer (ksf)	Moisture Content (%)	Dry Density (pcf)	% Passing #200 sieve	Blows/foot Sample	DEPTH (FEET)	EQUIPMENT: 6" Flight Auger LOGGED BY: A. Gruen	ELEVATION: ** START DATE: 7-30-98 FINISH DATE: 7-30-98
						0	1" AC Paving	
						1	BROWN CLAYEY SAND (SC), medium dense to dense, moist to wet	
						2		
						3		
		19.5		30	38	4		
						5		
		48.6		44	28	6	rock fragments	
						7		
						8	SERPENTINE, soft to moderately hard, plastic to weak, moderately weathered	
						9		
		24.4		11	46	10		
						11		
						12	Drilling Refusal	

BOTTOM OF BORING 1 @ 12 FEET  
No Free Water Encountered

\*\* Existing ground surface at time of drilling.

**Earth Mechanics**  
Consulting Engineers

Job No: 98-1127

Appr:

Drwn: CD

Date: SEP 1998

**LOG OF BORING 1**

2440 Mariposa Street

San Francisco, California

PLATE

**2**

MAJOR DIVISIONS					TYPICAL NAMES
COARSE GRAINED SOILS More than Half > #200 sieve	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS, GRAVEL-SAND
			GP		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC		CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS, GRAVELLY SANDS
			SP		POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC		CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than Half < #200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50	ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
		CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
		OL		ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50	MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
		CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS

### UNIFIED SOIL CLASSIFICATION SYSTEM

		Shear Strength, psf		Confining Pressure, psf	
Consol	Consolidation	Tx	2630 (240)	Unconsolidated Undrained Triaxial	
LL	Liquid Limit (in %)	Tx sat	2100 (575)	Unconsolidated Undrained Triaxial, saturated prior to test	
PL	Plastic Limit (in %)	DS	3740 (960)	Unconsolidated Undrained Direct Shear	
PI	Plasticity Index	TV	1320	Torvane Shear	
Gs	Specific Gravity	UC	4200	Unconfined Compression	
SA	Sieve Analysis	LVS	500	Laboratory Vane Shear	
■	Undisturbed Sample (2.5-inch ID)	FS	Free Swell		
▣	2-inch-ID Sample	EI	Expansion Index		
▤	Standard Penetration Test	Perm	Permeability		
⊠	Bulk Sample	SE	Sand Equivalent		

### KEY TO TEST DATA

Earth Mechanics  
Consulting Engineers

Job No: 98-1127

Appr:

Drwn: CD

Date: SEP 1998

SOIL CLASSIFICATION CHART  
AND KEY TO TEST DATA

2440 Mariposa Street

San Francisco, California

PLATE

3

PROJECT:

**480 POTRERO AVENUE**  
San Francisco, California

# Log of Boring B-2

Boring location: See Site Plan, Figure 2

Logged by: M. Pinheiro

Date started: 12/6/04

Date finished: 12/6/04

Drilling method: Minute Man Rig; 4" Solid Auger

Hammer weight/drop: 140 lbs./30-inches

Hammer type:

### LABORATORY TEST DATA

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
	Sampler Type	Sample	SPT N-Value <sup>1</sup>								
					Ground Surface Elevation: 50.5 feet <sup>2</sup>						
					8.5-inches Concrete Slab						
1	S&H	[Sample]	10	CL	SANDY CLAY with GRAVEL (CL) yellow brown and brown, stiff, moist					16.0	105
2											
3	S&H	[Sample]	8	CL	SANDY CLAY (CL) dark brown, medium stiff to stiff, moist						
4											
5				CH	CLAY (CH) yellow brown, medium stiff to stiff, most						
6	S&H	[Sample]	30/ 4"		SERPENTINITE green brown, completely weathered, weak, soft, plastic						
7											
8	SPT	[Sample]	60/ 4"		deeply weathered						
9											
10											

TEST GEOTECH LOG 404801.GPJ TR.GDT 12/21/04

Boring terminated at a depth of 8.5 feet below ground surface. <sup>1</sup> S&H blow counts converted to SPT N-Values using a factor of 0.6.  
 Boring backfilled with cement grout. <sup>2</sup> Elevations based on San Francisco City datum.  
 Groundwater not encountered during drilling.



UNIFIED SOIL CLASSIFICATION SYSTEM			
Major Divisions		Symbols	Typical Names
Coarse-Grained Soils (more than half of soil > no. 200 sieve size)	<b>Gravels</b> (More than half of coarse fraction > no. 4 sieve size)	<b>GW</b>	Well-graded gravels or gravel-sand mixtures, little or no fines
		<b>GP</b>	Poorly-graded gravels or gravel-sand mixtures, little or no fines
		<b>GM</b>	Silty gravels, gravel-sand-silt mixtures
		<b>GC</b>	Clayey gravels, gravel-sand-clay mixtures
	<b>Sands</b> (More than half of coarse fraction < no. 4 sieve size)	<b>SW</b>	Well-graded sands or gravelly sands, little or no fines
		<b>SP</b>	Poorly-graded sands or gravelly sands, little or no fines
		<b>SM</b>	Silty sands, sand-silt mixtures
Fine-Grained Soils (more than half of soil < no. 200 sieve size)	<b>Silts and Clays</b> LL = < 50	<b>ML</b>	Inorganic silts and clayey silts of low plasticity, sandy silts, gravelly silts
		<b>CL</b>	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
		<b>OL</b>	Organic silts and organic silt-clays of low plasticity
	<b>Silts and Clays</b> LL = > 50	<b>MH</b>	Inorganic silts of high plasticity
		<b>CH</b>	Inorganic clays of high plasticity, fat clays
		<b>OH</b>	Organic silts and clays of high plasticity
<b>Highly Organic Soils</b>		<b>PT</b>	Peat and other highly organic soils

### SAMPLE DESIGNATIONS/SYMBOLS

GRAIN SIZE CHART		
Classification	Range of Grain Sizes	
	U.S. Standard Sieve Size	Grain Size in Millimeters
Boulders	Above 12"	Above 305
Cobbles	12" to 3"	305 to 76.2
Gravel coarse fine	3" to No. 4	76.2 to 4.76
	3" to 3/4"	76.2 to 19.1
Sand coarse medium fine	3/4" to No. 4	19.1 to 4.76
	No. 4 to No. 200	4.76 to 0.074
	No. 4 to No. 10	4.76 to 2.00
	No. 10 to No. 40	2.00 to 0.420
	No. 40 to No. 200	0.420 to 0.074
Silt and Clay	Below No. 200	Below 0.074

-  Sample taken with Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter. Darkened area indicates soil recovered
-  Classification sample taken with Standard Penetration Test sampler
-  Undisturbed sample taken with thin-walled tube
-  Disturbed sample
-  Sampling attempted with no recovery
-  Core sample
-  Analytical laboratory sample
-  Sample taken with Direct Push sampler

-  Unstabilized groundwater level
-  Stabilized groundwater level

### SAMPLER TYPE

- |  |   |
|--|---|
| <b>C</b> Core barrel   | <b>PT</b> Pitcher tube sampler using 3.0-inch outside diameter, thin-walled Shelby tube   |
| <b>CA</b> California split-barrel sampler with 2.5-inch outside diameter and a 1.93-inch inside diameter | <b>S&amp;H</b> Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter          |
| <b>D&amp;M</b> Dames & Moore piston sampler using 2.5-inch outside diameter, thin-walled tube            | <b>SPT</b> Standard Penetration Test (SPT) split-barrel sampler with a 2.0-inch outside diameter and a 1.5-inch inside diameter |
| <b>O</b> Osterberg piston sampler using 3.0-inch outside diameter, thin-walled Shelby tube               | <b>ST</b> Shelby Tube (3.0-inch outside diameter, thin-walled tube) advanced with hydraulic pressure                            |

480 POTRERO AVENUE  
San Francisco, California

### CLASSIFICATION CHART

**Treadwell & Rollo**

Date 12/08/04

Project No. 4048.01

Figure A-3

**I FRACTURING**

<b>Intensity</b>	<b>Size of Pieces in Feet</b>
Very little fractured	Greater than 4.0
Occasionally fractured	1.0 to 4.0
Moderately fractured	0.5 to 1.0
Closely fractured	0.1 to 0.5
Intensely fractured	0.05 to 0.1
Crushed	Less than 0.05

**II HARDNESS**

1. **Soft** - reserved for plastic material alone.
2. **Low hardness** - can be gouged deeply or carved easily with a knife blade.
3. **Moderately hard** - can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and is readily visible after the powder has been blown away.
4. **Hard** - can be scratched with difficulty; scratch produced a little powder and is often faintly visible.
5. **Very hard** - cannot be scratched with knife blade; leaves a metallic streak.

**III STRENGTH**

1. **Plastic** or very low strength.
2. **Friable** - crumbles easily by rubbing with fingers.
3. **Weak** - an unfractured specimen of such material will crumble under light hammer blows.
4. **Moderately strong** - specimen will withstand a few heavy hammer blows before breaking.
5. **Strong** - specimen will withstand a few heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.
6. **Very strong** - specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.

**IV WEATHERING** - The physical and chemical disintegration and decomposition of rocks and minerals by natural processes such as oxidation, reduction, hydration, solution, carbonation, and freezing and thawing.

- D. Deep** - moderate to complete mineral decomposition; extensive disintegration; deep and thorough discoloration; many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt.
- M. Moderate** - slight change or partial decomposition of minerals; little disintegration; cementation little to unaffected. Moderate to occasionally intense discoloration. Moderately coated fractures.
- L. Little** - no megascopic decomposition of minerals; little or no effect on normal cementation. Slight and intermittent, or localized discoloration. Few stains on fracture surfaces.
- F. Fresh** - unaffected by weathering agents. No disintegration or discoloration. Fractures usually less numerous than joints.

**ADDITIONAL COMMENTS:**

**V CONSOLIDATION OF SEDIMENTARY ROCKS:** usually determined from unweathered samples. Largely dependent on cementation.

- U = unconsolidated
- P = poorly consolidated
- M = moderately consolidated
- W = well consolidated

**VI BEDDING OF SEDIMENTARY ROCKS**

<b>Splitting Property</b>	<b>Thickness</b>	<b>Stratification</b>
Massive	Greater than 4.0 ft.	very thick-bedded
Blocky	2.0 to 4.0 ft.	thick bedded
Slabby	0.2 to 2.0 ft.	thin bedded
Flaggy	0.05 to 0.2 ft.	very thin-bedded
Shaly or platy	0.01 to 0.05 ft.	laminated
Papery	less than 0.01	thinly laminated

480 POTRERO AVENUE  
San Francisco, California



**PHYSICAL PROPERTIES CRITERIA  
FOR ROCK DESCRIPTIONS**

DRAFT

**APPENDIX C**  
**LOGS OF TEST BORINGS BY ARUP/RYCG**

PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-12-18	COMPLETION DATE Mar-12-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106322.98418 / E6009541.52542 (NAD83)			HOLE ID <b>BH-01</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH, JT and WV			IN-SITU TESTING			SURFACE ELEVATION 51.8 ft (SF-VD13)		
DRILLING METHOD GARBAGE BARREL(0'-3'), MUD ROTARY(3'-60.75')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4"), SPT(1.375")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS 33 ft (3/12/2018 ) Depth (Date/Time)			TOTAL DEPTH OF BORING 60.75 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		CONCRETE PAVEMENT (13") (CR).															
			SILTY SAND (SM); dark yellowish brown/dark reddish brown; fine; [FILL?].															
			SANDY CLAY interlayered with CLAYEY SAND (CL/SC); very stiff and medium dense; dark yellowish brown with black speckling; moist; fine SAND; [OLDER SEDIMENTARY DEPOSIT/COLMA FORMATION].	MC	S1	41	18	18		72.0			46	31				
46.80	5		CLAYEY SAND (SC); medium dense; dark yellowish brown; moist; fine.	MC	S2	44	18	15										
41.80	10		10.0', dense; decrease in CLAY content.	MC	S3	59	18	15		43.0	15	134	25	11				
36.80	15		15.0', very dense.	SPT	S4	51	18	13										
31.80	20																	

(continued)

DS  
Phi' =  
40°  
c' =  
325 psf

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-12-18	COMPLETION DATE Mar-12-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106322.98418 / E6009541.52542 (NAD83)			HOLE ID <b>BH-01</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH, JT and WV			IN-SITU TESTING			SURFACE ELEVATION 51.8 ft (SF-VD13)		
DRILLING METHOD GARBAGE BARREL(0'-3'), MUD ROTARY(3'-60.75')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4"), SPT(1.375")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS 33 ft (3/12/2018 ) Depth (Date/Time)			TOTAL DEPTH OF BORING 60.75 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
20			POORLY GRADED SAND with CLAY (SP-SC); very dense; dark yellowish brown; moist; fine.		MC	S5	80/11"	17	14									
26.80	25		25.0', dense.		SPT	S6	46	18	15									
21.80	30		30.0', very moist.		MC	S7	59	18	15		26	120						
16.80	35		- hydrocarbon odor (like creosote) and dark oil droplets noticed in drilling mud at 33±. 35.0', very dense; saturated; hydrocarbon odor in sample.		SPT	S8	54	18	18									Groundwater between 30' and 35', estimated at 33'.
11.80	40																	

(continued)

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-12-18	COMPLETION DATE Mar-12-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106322.98418 / E6009541.52542 (NAD83)			HOLE ID <b>BH-01</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH, JT and WV			IN-SITU TESTING			SURFACE ELEVATION 51.8 ft (SF-VD13)		
DRILLING METHOD GARBAGE BARREL(0'-3'), MUD ROTARY(3'-60.75')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4"), SPT(1.375")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS 33 ft (3/12/2018 ) Depth (Date/Time)			TOTAL DEPTH OF BORING 60.75 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
40			POORLY GRADED SAND (SP); very dense; dark yellowish brown; saturated; fine; slight hydrocarbon odor in sample.	MC	S9	83/11"	17	15										
6.80	45		45.0', slight hydrocarbon odor.	SPT	S10	74	18	18										
1.80	50		SERPENTINITE (SRP); soft with moderately hard zones (H6/H4); olive gray, olive and very dark gray.	MC	S11	50/3"	9	9										
-3.20	55		55.0', black; highly to completely weathered (W4/W5), very weak (R1), soft to moderately soft (H6/H5), with white mineralization.	SPT	S12	50/5"	11	8										
-8.20	60																	

(continued)

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-12-18	COMPLETION DATE Mar-12-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106322.98418 / E6009541.52542 (NAD83)			HOLE ID <b>BH-01</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH, JT and WV			IN-SITU TESTING			SURFACE ELEVATION 51.8 ft (SF-VD13)		
DRILLING METHOD GARBAGE BARREL(0'-3'), MUD ROTARY(3'-60.75')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4"), SPT(1.375")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS 33 ft (3/12/2018 ) Depth (Date/Time)			TOTAL DEPTH OF BORING 60.75 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60			Borehole terminated at depth of 60.75 feet.	MC	S13	70/3"	9	9			21	127			UU 1.4			
-13.20	65		See Borehole Log Legend for soil classification chart and key to test data and sampler type.															
-18.20	70																	
-23.20	75																	
-28.20	80																	

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-13-18	COMPLETION DATE Mar-14-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106029.09884 / E6009623.035692 (NAD83)			HOLE ID <b>BH-02</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH and WV			IN-SITU TESTING Suspension velocity			SURFACE ELEVATION 49.8 ft (SF-VD13)		
DRILLING METHOD GARBAGE BARREL(0'-3'), MUD ROTARY(3'-121'), CORE(75'-82.5')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4"), SPT(1.375")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 121 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		ASPHALT CONCRETE PAVEMENT, 2.5" (AC).															
			CONCRETE PAVEMENT, 6.5" (CR).															
			CLAYEY SAND (SC); medium dense; dark yellowish brown; moist; fine; very CLAYEY; [OLD SEDIMENTARY DEPOSIT/COLMA FORMATION].															
	44.80		6.0', mottled with dark orange brown; decrease in CLAY content.	MC	S1	26	18	18										
				MC	S2	50	18	18		23.0	15	136	23	5				
	39.80		POORLY GRADED SAND WITH CLAY (SP-SC); medium dense; dark yellowish brown mottled with dark orange brown; moist; fine; slight cementation.	MC	S3	42	18	16										
			CLAYEY SAND (SC); medium dense; dark yellowish mottled with dark orange brown; very moist to saturated; fine, very CLAYEY.															
	34.80		SANDY FAT CLAY (CH/CL); very stiff; yellowish brown mottled with dark orange brown; saturated; fine SAND.	MC	S4	25	18	13			19	133			UU 3.3			
			CLAYEY SAND (SC); very dense; dark yellowish brown; very moist; fine.															
	29.80																	

(continued)

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-13-18	COMPLETION DATE Mar-14-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106029.09884 / E6009623.035692 (NAD83)			HOLE ID <b>BH-02</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH and WV			IN-SITU TESTING Suspension velocity			SURFACE ELEVATION 49.8 ft (SF-VD13)		
DRILLING METHOD GARBAGE BARREL(0'-3'), MUD ROTARY(3'-121'), CORE(75'-82.5')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4"), SPT(1.375")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 121 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
20				SPT	S5	51	18	17										
			POORLY GRADED SAND with SILT (SP-SM); dense; dark yellowish brown; moist; fine.															
24.80	25			MC	S6	58	18	14										
			30.0', saturated.															
19.80	30			SPT	S7	48	18	14										
			35.0', no noticeable odors in sample.															
14.80	35			MC	S8	58	18	14		11.0	23	125						
9.80	40																	

(continued)

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-13-18	COMPLETION DATE Mar-14-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106029.09884 / E6009623.035692 (NAD83)			HOLE ID <b>BH-02</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH and WV			IN-SITU TESTING Suspension velocity			SURFACE ELEVATION 49.8 ft (SF-VD13)		
DRILLING METHOD GARBAGE BARREL(0'-3'), MUD ROTARY(3'-121'), CORE(75'-82.5')			DRILL RIG Fraste MultidrillIXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4"), SPT(1.375")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 121 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
40					MC	S9	77	18	14									
										9.0	18	124						
4.80	45		48.0', very dense.		SPT	S10	51	18	15									
-0.20	50																	
-5.20	55		56.0', dense.		MC	S11	72	18	10									
											18	132						
-10.20	60																	

(continued)

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-13-18	COMPLETION DATE Mar-14-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106029.09884 / E6009623.035692 (NAD83)			HOLE ID <b>BH-02</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH and WV			IN-SITU TESTING Suspension velocity			SURFACE ELEVATION 49.8 ft (SF-VD13)		
DRILLING METHOD GARBAGE BARREL(0'-3'), MUD ROTARY(3'-121'), CORE(75'-82.5')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4"), SPT(1.375")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 121 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
60			60.0', very dense.		SPT	S12	84/12"	18	13									
-15.20	65		SHALE (SH); dark gray, light greenish gray, and black; highly weathered (W4), extremely to very weak (R0/R1), soft (H6) with moderately soft zones (H5), with white mineralization, crystallizing (HCL-), moderately soft zones with thin laminations, highly sheared; [BEDROCK - FRANCISCAN MELANGE].		MC	S13	50/2"	8	8									
-20.20	70		75.0', dark gray and black; variably weak to moderately strong (R2/R3), moderately soft (H5), with very thin laminations, quartz inclusions, altered/sheared appearance.		MC	S14	50/6"	12	12		4							75.0' - 80.0', No recovery Soft drilling Switch to HQ3 rock coring
-25.20	75																	
-30.20	80																	

(continued)

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT\_LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-13-18	COMPLETION DATE Mar-14-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106029.09884 / E6009623.035692 (NAD83)			HOLE ID <b>BH-02</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH and WV			IN-SITU TESTING Suspension velocity			SURFACE ELEVATION 49.8 ft (SF-VD13)		
DRILLING METHOD GARBAGE BARREL(0'-3'), MUD ROTARY(3'-121'), CORE(75'-82.5')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4"), SPT(1.375")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 121 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
80			SERPENTINITE MELANGE (SRP); black and dark gray; highly weathered (W4); very weak with weak zones and moderately strong clasts (R1/R2); soft to moderately soft (H6/H5); quartz inclusions; black zones with very thin friable foliation (altered shale?); dark gray moderately hard zones (SERPENTINITE); with clayey matrix (minor); saturated.															No recovery - gray clay in cuttings
-35.20	85			MC	S15	60	18	18										Switch to mud rotary with tricone bit. Drill out to 82.5' (too soft to core)
-40.20	90			MC	S16	72/6"	12	8										
-45.20	95		95.0', highly weathered with completely weathered clay zones.	MC	S17	90/10"	16	10										PP: 4.5 psf PP: >4.5 psf
-50.20	100																	

(continued)

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ\_ARUP-RYCG GINT\_LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-13-18	COMPLETION DATE Mar-14-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106029.09884 / E6009623.035692 (NAD83)			HOLE ID <b>BH-02</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH and WV			IN-SITU TESTING Suspension velocity			SURFACE ELEVATION 49.8 ft (SF-VD13)		
DRILLING METHOD GARBAGE BARREL(0'-3'), MUD ROTARY(3'-121'), CORE(75'-82.5')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4"), SPT(1.375")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 121 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
100			100.5', gray green; highly weathered (W4); very weak (R1); soft (H6); talc-like appearance (crumbles by hand pressure).	MC	S18	78/6"	12	11										
-55.20	105		105.0', dark gray; weak (R2); moderately soft (H5).	MC	S19	55/3"	9	9										
-60.20	110		110.0', dark gray and black; completely weathered (W5); extremely weak; very soft to soft (H7/H6); GRAVELLY CLAY with structure; some highly weathered, very weak zones.	MC	S20	70/6"	12	12										
-65.20	115		115.0', grayish green, dark grayish green, and dark gray; variably highly and completely weathered (W4/W5); extremely to very weak (R0/R1); soft (H6); variably saturated CLAY and moist talc-like (grayish green) highly weathered rock.	MC	S21	80/6"	12	12										
-70.20	120																	

(continued)

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ\_ARUP-RYCG GINT\_LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-13-18	COMPLETION DATE Mar-14-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106029.09884 / E6009623.035692 (NAD83)			HOLE ID <b>BH-02</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH and WV			IN-SITU TESTING Suspension velocity			SURFACE ELEVATION 49.8 ft (SF-VD13)		
DRILLING METHOD GARBAGE BARREL(0'-3'), MUD ROTARY(3'-121'), CORE(75'-82.5')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4"), SPT(1.375")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 121 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
120			Borehole terminated at depth of 121 feet.		MC	S22	73/6"	12	12									
-75.20	125		See Borehole Log Legend for soil classification chart and key to test data and sampler type.															
-80.20	130																	
-85.20	135																	
-90.20	140																	

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-16-18	COMPLETION DATE Mar-16-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106262.92825 / E6009772.481354 (NAD83)			HOLE ID <b>BH-03</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH, JT and WV			IN-SITU TESTING			SURFACE ELEVATION 53.2 ft (SF-VD13)		
DRILLING METHOD HOLLOW STEM AUGER(0'-16')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 16 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		ASPHALT CONCRETE PAVEMENT (2.5") (AC).															
			CONCRETE (8") (CR).															
			SILTY GRAVEL (GM); gray brown; saturated; [FILL].															
			CLAYEY SAND (SC); medium dense; dark yellowish brown; moist; fine; [COLMA FORMATION].		B	S1		6	6									
48.20	5			MC	S2		32	18	18									
										25.0			27	8				
43.20	10		SERPENTINITE (SRP); olive brown and very dark gray; highly weathered (W4); weak to moderately strong (R2/R3); variably moderately soft to moderately hard (H5/H4); [BEDROCK].	MC	S3		50/6"	12	12			36	103		UU 0.85			
38.20	15		14.0', highly to moderately weathered (W4/W3); moderately strong (R3); hard (H3); with moderately soft matrix (H5).	MC	S4		60/5"	5	4									
			Borehole terminated at depth of 16 feet on auger refusal.															
			See Borehole Log Legend for soil classification chart and key to test data and sampler type.															
33.20	20																	

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT\_LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-15-18	COMPLETION DATE Mar-15-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2105997.62975 / E6009865.763362 (NAD83)			HOLE ID <b>BH-04</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH			IN-SITU TESTING			SURFACE ELEVATION 52.8 ft (SF-VD13)		
DRILLING METHOD HOLLOW STEM AUGER(0'-20.5')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 20.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		CONCRETE DRIVEWAY (7") (CR).															
			SILTY GRAVEL (GM); gray and gray brown; slightly moist; [FILL].															
			CLAYEY GRAVEL (GC); dark brown; moist; sub angular and angular; with gravel to 1.5".		B	S1		12	12									
47.80	5		SILTY SAND with GRAVEL (SM); loose; dark yellowish brown; very moist; angular; with serpentinite gravel to 2".		MC	S2	12	18	16									
										49.0			67	29				
			SANDY LEAN CLAY (CL); medium stiff to stiff; mottled dark yellowish brown, brown and dark brown; saturated; with brown SANDY SILT inclusions; [FILL - DERIVED FROM NATIVE SOILS/COLMA FORMATION].		MC	S3	6	18	15									
42.80	10																	
			CLAYEY SAND (SC); loose; mottled dark yellowish brown; saturated; fine; iron oxide staining; [OLD SEDIMENTARY DEPOSIT/COLMA FORMATION].		MC	S4	8	18	18									
37.80	15		15.0', very clayey.							49.0	18	128	36	22				
															DS Phi' = 29° c' = 250 psf			
			19.0', medium dense.		MC	S5	21	18	18									
32.80	20																	

(continued)

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT\_LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-15-18	COMPLETION DATE Mar-15-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2105997.62975 / E6009865.763362 (NAD83)			HOLE ID <b>BH-04</b>		
DRILLING CONTRACTOR/DRILLER Pitcher Drilling/WH			IN-SITU TESTING			SURFACE ELEVATION 52.8 ft (SF-VD13)		
DRILLING METHOD HOLLOW STEM AUGER(0'-20.5')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 20.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
20.0	20.5		Borehole terminated at depth of 20.5 feet.	X						42.0	20	128			DS Phi' = 29° c' = 450 ps			
			See Borehole Log Legend for soil classification chart and key to test data and sampler type.															
27.80	25																	
22.80	30																	
17.80	35																	
12.80	40																	

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19

PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-16-18	COMPLETION DATE Mar-16-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106363.51629 / E6009975.414344 (NAD83)			HOLE ID <b>BH-05</b>		
DRILLING CONTRACTOR/DRILLER Pitcher/FT,WV and JT			IN-SITU TESTING			SURFACE ELEVATION 53.5 ft (SF-VD13)		
DRILLING METHOD HAND AUGER(0'-4.2')			DRILL RIG Hand Auger			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE/HAMMER ID			HAMMER EFFICIENCY, ERI		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 4.2 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		CONCRETE SLAB (7") (CR).															
			POORLY GRADED SAND with SILT and GRAVEL (SP-SM); dark brown; predominantly fine, trace of medium to coarse; with subrounded GRAVEL to 3"; [FILL].		B	S1		12	12									
			POORLY GRADED SAND (SP); dark yellowish brown; fine; [FILL?/NATIVE?].		B	S2		12	12									
48.50	5		Borehole terminated at depth of 4.2 feet on refusal of hand-auger on strata inferred to be Weathered Rock.															
			See Borehole Log Legend for soil classification chart and key to test data and sampler type.															
43.50	10																	
38.50	15																	
33.50	20																	

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19

PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-16-18	COMPLETION DATE Mar-16-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106007.33927 / E6010016.556221 (NAD83)			HOLE ID <b>BH-06</b>		
DRILLING CONTRACTOR/DRILLER Pitcher/FT,WV and JT			IN-SITU TESTING			SURFACE ELEVATION 53.9 ft (SF-VD13)		
DRILLING METHOD HOLLOW STEM AUGER(0'-20.5')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 20.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
	0		ASPHALT CONCRETE PAVEMENT (4") (AC).															
			CONCRETE (9") (CR).															
			SILTY GRAVEL with SAND (GM); light gray brown and gray; slightly moist; angular GRAVEL to 1"; [FILL].															
			CLAYEY SAND (SC); dark brown; very moist; fine to coarse SAND; trace GRAVEL to 1/2".		B	S1		12	12									
48.90	5		SANDY LEAN CLAY (CL); stiff; dark yellowish brown mottled with brown; very moist to saturated; fine, trace medium; [NATIVE].		MC	S2	8	18	18	69.0	18	126	35	20				
			CLAYEY SAND with LEAN CLAY lenses (SC-CL); loose/stiff; dark gray brown; saturated; CLAY lens at 6.5'.															
43.90	10		9.0', loose; dark gray brown mottled with dark yellowish brown; saturated; fine.		MC	S3	11	18	15									Free water, sampler wet, perched water?
			10.5', SANDY CLAY lens.															
38.90	15		POORLY GRADED SAND with CLAY (SP-SC); medium dense; olive brown; very moist (no free water); fine.		MC	S4	32	18	15	22.0	20	126						DS Phi' = 34° c' = 400 psf
			SERPENTINITE (SRP); dark greenish gray mottled with yellowish brown; completely weathered (W5); extremely weak (R0); very soft (H7); [BEDROCK].		MC	S5	36	18	18									

(continued)

1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19



PROJECT NAME <b>SFMTA Potrero Facility Rebuild</b>			PROJECT LOCATION <b>2500 Mariposa Street, San Francisco, California</b>			PROJECT NUMBER <b>260018</b>		
LOGGED BY R. Fisher	BEGIN DATE Mar-16-18	COMPLETION DATE Mar-16-18	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2106007.33927 / E6010016.556221 (NAD83)			HOLE ID <b>BH-06</b>		
DRILLING CONTRACTOR/DRILLER Pitcher/FT,WV and JT			IN-SITU TESTING			SURFACE ELEVATION 53.9 ft (SF-VD13)		
DRILLING METHOD HOLLOW STEM AUGER(0'-20.5')			DRILL RIG Fraste MultidrillXL (Track)			BOREHOLE DIAMETER 5.0 in		
SAMPLER TYPE(S) AND SIZE(S) (ID) MC(2.4")			SPT HAMMER TYPE/HAMMER ID Automatic, 140 lbs, 30-inch drop			HAMMER EFFICIENCY, ERI 91%		
BOREHOLE BACKFILL AND COMPLETION Neat cement grout			GROUNDWATER READINGS Depth (Date/Time)			TOTAL DEPTH OF BORING 20.5 ft		

Elevation (ft)	Depth (ft)	Material Graphics	Description	Sample Location	Sampler Type	Sample Number	N-Value (bl/ft)	Penetration (in)	Recovery (in)	200 Wash (%)	Moisture Content (%)	Total Unit Wt. (pcf)	Liquid Limit (%)	Plasticity Index (%)	Shear Strength (ksf)	Drilling Method	Casing Depth	Remarks/ Other Tests
20.0	20.5		20.0', weathered to a stiff, hard CLAY. Borehole terminated at depth of 20.5 feet.	X							21	129			UU 2.5			
See Borehole Log Legend for soil classification chart and key to test data and sampler type.																		

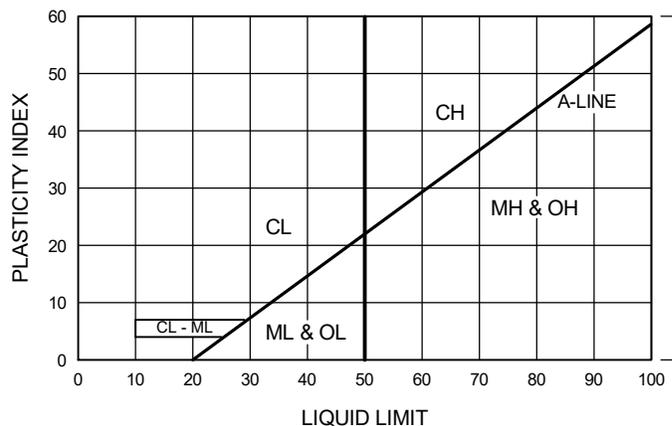
1.0.2B-BOREHOLE LOG (SOIL)-ARUP/RYCG JV GINT\_POTRERO.GPJ ARUP-RYCG GINT LIBRARY.GLB 9/30/19



# INDEXED SOIL CLASSIFICATIONS

GRAPHIC	SYMBOL	DESCRIPTION	MAJOR DIVISIONS			
	GW	WELL-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	<b>CLEAN GRAVELS</b> (LITTLE OR NO FINES)	<b>GRAVELS</b> MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO.4 SIEVE SIZE	FOR VISUAL CLASSIFICATION, THE 1/4" SIZE MAY BE USED AS EQUIVALENT TO THE NO.4 SIEVE SIZE	<b>COARSE-GRAINED SOILS</b> MORE THAN HALF OF MATERIAL IS LARGER THAN NO.200 SIEVE SIZE
	GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES				
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES				
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	<b>GRAVELS WITH FINES</b> (APPRECIABLE AMOUNT OF FINES)			
	SW	WELL-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES	<b>CLEAN SANDS</b> (LITTLE OR NO FINES)	<b>SANDS</b> MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO.4 SIEVE SIZE	FOR VISUAL CLASSIFICATION, THE 1/4" SIZE MAY BE USED AS EQUIVALENT TO THE NO.4 SIEVE SIZE	<b>COARSE-GRAINED SOILS</b> MORE THAN HALF OF MATERIAL IS LARGER THAN NO.200 SIEVE SIZE
	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES				
	SM	SILTY SANDS, SAND-SILT MIXTURES				
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES	<b>SANDS WITH FINES</b> (APPRECIABLE AMOUNT OF FINES)			
	ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	<b>SILTS &amp; CLAYS</b> LIQUID LIMIT LESS THAN 50			<b>FINE-GRAINED SOILS</b> MORE THAN HALF OF MATERIAL IS SMALLER THAN NO.200 SIEVE SIZE
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS				
	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY				
	MH	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF HIGH PLASTICITY	<b>SILTS &amp; CLAYS</b> LIQUID LIMIT GREATER THAN 50			<b>FINE-GRAINED SOILS</b> MORE THAN HALF OF MATERIAL IS SMALLER THAN NO.200 SIEVE SIZE
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS				
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS				
	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	<b>HIGHLY ORGANIC SOILS</b>			
	OS	OILY SEDIMENTS				

**PLASTICITY CHART**



**KEY TO TEST DATA**

- CONSOL = CONSOLIDATION
- CORR = CORROSIVITY
- DS = DIRECT SHEAR
- ORG = ORGANIC CONTENT
- PERM = PERMEABILITY
- PP = POCKET PENETROMETER
- RV = R-VALUE
- TV = FIELD TORVANE
- TXCD = CONSOLIDATED DRAINED TRIAXIAL
- TXCU = CONSOLIDATED UNDRAINED TRIAXIAL
- UCS = UNCONFINED COMPRESSIVE STRENGTH
- UU = UNCONSOLIDATED UNDRAINED TRIAXIAL

**KEY TO SAMPLER TYPE**

- HQ = HQ CORE BARREL SAMPLER
- MC = MODIFIED CALIFORNIA SAMPLER
- P = DAMES & MOORE PISTON SAMPLER
- PS = PITCHER SAMPLER
- SPT = STANDARD PENETRATION TEST SAMPLER
- ST = SHELBY TUBE SAMPLER
- NO RECOVERY

**APPENDIX D**

**GEOPHYSICAL SURVEY INVESTIGATION REPORT  
(GEOVISION GEOPHYSICAL SERVICES, INC.)**



**MTA POTRERO FACILITY  
SUSPENSION VELOCITIES  
BOREHOLE BH-POT-02  
SAN FRANCISCO, CALIFORNIA**

**March 23, 2018  
Report 18113-01 rev 0**

**MTA POTRERO FACILITY  
SUSPENSION VELOCITIES  
BOREHOLE BH-POT-02  
SAN FRANCISCO, CALIFORNIA**

**Prepared for**

**Arup, Inc.  
560 Mission Street, Suite 700  
San Francisco, California 94105  
(415) 957-9445**

**Prepared by**

**GEO*Vision* Geophysical Services  
1124 Olympic Drive  
Corona, California 92881  
(951) 549-1234  
Project 18113**

**March 23, 2018  
Report 18113-01 rev 0**

# TABLE OF CONTENTS

<b>TABLE OF CONTENTS</b> .....	<b>3</b>
<b>TABLE OF FIGURES</b> .....	<b>4</b>
<b>TABLE OF TABLES</b> .....	<b>4</b>
<b>APPENDICES</b> .....	<b>4</b>
<b>INTRODUCTION</b> .....	<b>5</b>
<b>SCOPE OF WORK</b> .....	<b>5</b>
<b>INSTRUMENTATION</b> .....	<b>6</b>
SUSPENSION VELOCITY INSTRUMENTATION .....	6
<b>MEASUREMENT PROCEDURES</b> .....	<b>9</b>
SUSPENSION VELOCITY .....	9
<b>DATA ANALYSIS</b> .....	<b>10</b>
SUSPENSION VELOCITY .....	10
<b>RESULTS</b> .....	<b>12</b>
SUSPENSION VELOCITY .....	12
<b>SUMMARY</b> .....	<b>13</b>
DISCUSSION OF SUSPENSION VELOCITY RESULTS .....	13
QUALITY ASSURANCE .....	14
SUSPENSION VELOCITY DATA RELIABILITY .....	14
<b>CERTIFICATION</b> .....	<b>15</b>

## Table of Figures

Figure 1: Concept illustration of P-S logging system .....	17
Figure 2: Example of filtered (1400 Hz lowpass) suspension record .....	18
Figure 3. Example of unfiltered suspension record.....	19
Figure 4: Boring BH-POT-02, Suspension R1-R2 P- and S <sub>H</sub> -wave velocities.....	20

## Table of Tables

Table 1. Boring locations and logging dates .....	16
Table 2. Logging dates and depth ranges .....	16
Table 3. Boring BH-POT-02, Suspension R1-R2 depths and P- and S <sub>H</sub> -wave velocities .....	21

## APPENDICES

**APPENDIX A            SUSPENSION VELOCITY MEASUREMENT QUALITY  
ASSURANCE SUSPENSION SOURCE TO RECEIVER  
ANALYSIS RESULTS**

**APPENDIX B            GEOPHYSICAL LOGGING SYSTEMS - NIST TRACEABLE  
CALIBRATION RECORDS**

## INTRODUCTION

**GEO***Vision* acquired PS Suspension data in one borehole at the Municipal Transportation Agency's Potrero Facility in San Francisco, California. This work was performed for Arup, Inc. Data analysis and report were reviewed by a **GEO***Vision* licensed California professional engineer or geophysicist.

## SCOPE OF WORK

This report presents the results of PS Suspension velocity data collected on March 15<sup>th</sup>, 2018 as detailed in Table 1. The purpose of these measurements was to supplement stratigraphic information obtained during the drilling investigation.

The OYO Suspension PS Logging System (Suspension System) was used to obtain in-situ horizontal shear ( $S_H$ ) and compressional (P) wave velocity measurements in one uncased borehole at 1.3 foot (0.4 m) intervals. Measurements followed **GEO***Vision* Procedure for PS Suspension Seismic Velocity Logging, revision 1.5. Acquired data were analyzed and a profile of velocity versus depth was produced for both  $S_H$  and P waves.

A detailed reference for the suspension PS velocity measurement techniques used in this study is:

Guidelines for Determining Design Basis Ground Motions, Report TR-102293,  
Electric Power Research Institute, Palo Alto, California, November 1993, Sections  
7 and 8.

# INSTRUMENTATION

## Suspension Velocity Instrumentation

Suspension velocity measurements were performed using the suspension PS logging system, manufactured by OYO Corporation, and their subsidiary, RG. This system directly determines the average velocity of a 3.3-foot high segment of the soil column surrounding the boring of interest by measuring the elapsed time between arrivals of a wave propagating upward through the soil column. The receivers that detect the wave, and the source that generates the wave, are moved as a unit in the boring producing relatively constant amplitude signals at all depths.

The suspension system probe consists of a combined reversible polarity solenoid horizontal shear-wave source ( $S_H$ ) and compressional-wave source (P), joined to two biaxial receivers by a flexible isolation cylinder, as shown in Figure 1. The separation of the two receivers is 3.3 feet, allowing average wave velocity in the region between the receivers to be determined by inversion of the wave travel time between the two receivers. The total length of the probe as used in these surveys is approximately 22 feet, with the center point of the receiver pair 12.5 feet above the bottom end of the probe.

The probe receives control signals from, and sends the digitized receiver signals to, instrumentation on the surface via an armored multi-conductor cable. The cable is wound onto the drum of a winch and is used to support the probe. Cable travel is measured to provide probe depth data using a sheave of known circumference fitted with a digital rotary encoder.

The entire probe is suspended in the boring by the cable, therefore, source motion is not coupled directly to the boring walls; rather, the source motion creates a horizontally propagating impulsive pressure wave in the fluid filling the boring and surrounding the source. This pressure wave is converted to P and  $S_H$ -waves in the surrounding soil and rock as it impinges upon the wall of the borehole. These waves propagate through the soil and rock surrounding the borehole, in turn causing a pressure wave to be generated in the fluid surrounding the receivers as the soil waves

pass their location. Separation of the P and S<sub>H</sub>-waves at the receivers is performed using the following steps:

1. Orientation of the horizontal receivers is maintained parallel to the axis of the source, maximizing the amplitude of the recorded S<sub>H</sub> -wave signals.
2. At each depth, S<sub>H</sub>-wave signals are recorded with the source actuated in opposite directions, producing S<sub>H</sub>-wave signals of opposite polarity, providing a characteristic S<sub>H</sub>-wave signature distinct from the P-wave signal.
3. The 6.3 foot separation of source and receiver 1 permits the P-wave signal to pass and damp significantly before the slower S<sub>H</sub>-wave signal arrives at the receiver.
4. In saturated soils, the received P-wave signal is typically of much higher frequency than the received S<sub>H</sub>-wave signal, permitting additional separation of the two signals by low pass filtering.
5. Direct arrival of the original pressure pulse in the fluid is not detected at the receivers because the wavelength of the pressure pulse in fluid is significantly greater than the dimension of the fluid annulus surrounding the probe (feet versus inches scale), preventing significant energy transmission through the fluid medium.

In operation, a distinct, repeatable pattern of impulses is generated at each depth as follows:

1. The source is fired in one direction producing dominantly horizontal shear with some vertical compression, and the signals from the horizontal receivers situated parallel to the axis of motion of the source are recorded.
2. The source is fired again in the opposite direction and the horizontal receiver signals are recorded.
3. The source is fired again and the vertical receiver signals are recorded. The repeated source pattern facilitates the picking of the P and S<sub>H</sub>-wave arrivals; reversal of the source changes the polarity of the S<sub>H</sub>-wave pattern but not the P-wave pattern.

The data from each receiver during each source activation is recorded as a different channel on the recording system. The Suspension PS system has six channels (two simultaneous recording channels), each with a 1024 sample record. The recorded data are displayed as six channels with a common time scale. Data are stored on disk for further processing.

Review of the displayed data on the recorder or computer screen allows the operator to set the gains, filters, delay time, pulse length (energy), and sample rate to optimize the quality of the data before recording. Verification of the calibration of the Suspension PS digital recorder is performed every twelve months using a NIST traceable frequency source and counter, as presented in Appendix B.

## MEASUREMENT PROCEDURES

### Suspension Velocity

One borehole was logged uncased and filled with drilling fluid. Measurements followed the *GEOVision* Procedure for P-S Suspension Seismic Velocity Logging, revision 1.5. Prior to the logging run, the probe was positioned with the top of the probe even with a stationary reference point. The electronic depth counter was set to the distance between the mid-point of the receiver and the top of the probe, minus the height of the stationary reference point, if any, verified with a tape measure, and recorded on the field logs. The probe was lowered to the bottom of the borehole, stopping at 1.3 foot (400 mm) intervals to collect data, as summarized in Table 2.

At each measurement depth the measurement sequence of two opposite horizontal records and one vertical record was performed, and the gains were adjusted as required. The data from each depth were viewed on the computer display, checked, and saved before moving to the next depth.

Upon completion of the measurements, the probe zero depth indication at the depth reference point was verified prior to removal from the boring.

## DATA ANALYSIS

### Suspension Velocity

Using the proprietary OYO program PSLOG.EXE version 1.0, the recorded digital waveforms were analyzed to locate the most prominent first minima, first maxima, or first break on the vertical axis records, indicating the arrival of P-wave energy. The difference in travel time between receiver 1 and receiver 2 (R1-R2) arrivals was used to calculate the P-wave velocity for that 1.0 meter segment of the soil column. When observable, P-wave arrivals on the horizontal axis records were used to verify the velocities determined from the vertical axis data. The time picks were then transferred into a Microsoft Excel<sup>®</sup> template to complete the velocity calculations based on the arrival time picks made in PSLOG.

The P-wave velocity over the 6.3-foot interval from source to receiver 1 (S-R1) was also picked using PSLOG, and calculated and plotted in Microsoft Excel<sup>®</sup>, for quality assurance of the velocity derived from the travel time between receivers. In this analysis, the depth values as recorded were increased by 4.8 feet to correspond to the mid-point of the 6.3-foot S-R1 interval. Travel times were obtained by picking the first break of the P-wave signal at receiver 1 and subtracting 0.35 milliseconds, the calculated and experimentally verified delay from source trigger pulse (beginning of record) to source impact. This delay corresponds to the duration of acceleration of the solenoid before impact.

As with the P-wave records, the recorded digital waveforms were analyzed to locate clear S<sub>H</sub>-wave pulses, as indicated by the presence of opposite polarity pulses on each pair of horizontal records. Ideally, the S<sub>H</sub>-wave signals from the 'normal' and 'reverse' source pulses are very nearly inverted images of each other. Digital Fast Fourier Transform – Inverse Fast Fourier Transform (FFT – IFFT) lowpass filtering was used to remove the higher frequency P-wave signal from the S<sub>H</sub>-wave signal. Different filter cutoffs were used to separate P- and S<sub>H</sub>-waves at different depths, ranging from 600 Hz in the slowest zones to 4000 Hz in the regions of highest velocity. At each depth, the filter frequency was selected to be at least twice the fundamental frequency of the S<sub>H</sub>-wave signal being filtered.

Generally, the first maxima were picked for the 'normal' signals and the first minima for the 'reverse' signals, although other points on the waveform were used if the first pulse was distorted. The absolute arrival time of the 'normal' and 'reverse' signals may vary by +/- 0.2 milliseconds, due to differences in the actuation time of the solenoid source caused by constant mechanical bias in the source or by boring inclination. This variation does not affect the R1-R2 velocity determinations, as the differential time is measured between arrivals of waves created by the same source actuation. The final velocity value is the average of the values obtained from the 'normal' and 'reverse' source actuations.

As with the P-wave data, S<sub>H</sub>-wave velocity calculated from the travel time over the 6.3-foot interval from source to receiver 1 was calculated and plotted for verification of the velocity derived from the travel time between receivers. In this analysis, the depth values were increased by 4.8 feet to correspond to the mid-point of the 6.3-foot S-R1 interval. Travel times were obtained by picking the first break of the S<sub>H</sub>-wave signal at the near receiver and subtracting 0.35 milliseconds, the calculated and experimentally verified delay from the beginning of the record at the source trigger pulse to source impact.

Poisson's Ratio,  $\nu$ , was calculated in the Microsoft Excel<sup>®</sup> template using the following formula:

$$\nu = \frac{\left(\frac{v_s}{v_p}\right)^2 - 0.5}{\left(\frac{v_s}{v_p}\right)^2 - 1.0}$$

Data and analyses were reviewed by a **GEOVision** California professional geophysicist or engineer as a component of the in-house data validation program.

Figure 2 shows an example of R1 - R2 measurements on a sample filtered suspension record. In Figure 2, the time difference over the 3.3 foot interval of 1.88 milliseconds for the horizontal signals is equivalent to an S<sub>H</sub>-wave velocity of 1745 feet/second. Whenever possible, time differences were determined from several phase points on the S<sub>H</sub>-waveform records to verify the data obtained from the first arrival of the S<sub>H</sub>-wave pulse. Figure 3 displays the same record before filtering of the S<sub>H</sub>-waveform record with a 1400 Hz FFT - IFFT digital lowpass filter, illustrating the presence of higher frequency P-wave energy at the beginning of the record, and distortion of the lower frequency S<sub>H</sub>-wave by residual P-wave signal.

## RESULTS

### Suspension Velocity

Suspension R1-R2 P- and S<sub>H</sub>-wave velocities for borehole BH-POT-02 are presented in Figure 4. The suspension velocity data presented in this figure are also presented in Table 3. The Microsoft Excel<sup>®</sup> analysis file is also provided in the data directory that accompanies this report.

P- and S<sub>H</sub>-wave velocity data from R1-R2 analysis and quality assurance analysis of S-R1 data are plotted together in Figure A-1 to aid in visual comparison. It should be noted that R1-R2 data are an average velocity over a 3.3-foot segment of the soil column; S-R1 data are an average over 6.3 feet, creating a significant smoothing relative to the R1-R2 plots. The S-R1 velocity data displayed in these figures are also presented in Table A-1 and are included in the Microsoft Excel<sup>®</sup> analysis file. The Microsoft Excel<sup>®</sup> analysis file also includes Poisson's Ratio calculations, tabulated data and plots.

# SUMMARY

## Discussion of Suspension Velocity Results

Suspension PS velocity data are ideally collected in an uncased, fluid filled boring drilled with rotary mud (rotary wash) methods, as was the case for this project.

Suspension PS velocity data quality is judged based upon 5 criteria.

	<b>Criteria</b>	<b>BH-POT-02</b>
<b>1</b>	Consistent data between receiver to receiver (R1 – R2) and source to receiver (S – R1) data.	Yes.
<b>2</b>	Consistency between data from adjacent depth intervals.	Yes
<b>3</b>	Consistent relationship between P-wave and SH -wave (excluding transition to saturated soils)	Yes Saturation occurs about 45 ft and top of rock is about 66 ft.
<b>4</b>	Clarity of P-wave and SH-wave onset, as well as damping of later oscillations.	This is very good data.
<b>5</b>	Consistency of profile between adjacent borings, if available.	Not Applicable

## **Quality Assurance**

These borehole geophysical measurements were performed using industry-standard or better methods for measurements and analyses. All work was performed under **GEOVision** quality assurance procedures, which include:

- Use of NIST-traceable calibrations, where applicable, for field and laboratory instrumentation
- Use of standard field data logs
- Independent review of calculations and results by a registered professional engineer, geologist, or geophysicist

## **Suspension Velocity Data Reliability**

P- and S<sub>H</sub>-wave velocity measurement using the Suspension Method gives average velocities over a 3.3-foot interval of depth. This high resolution results in the scatter of values shown in the graphs. Individual measurements are very reliable with estimated precision of +/- 5%. Depth indications are very reliable with estimated precision of +/- 0.2 feet. Standardized field procedures and quality assurance checks contribute to the reliability of these data.

## CERTIFICATION

All geophysical data, analysis, interpretations, conclusions, and recommendations in this document have been prepared under the supervision and review of a **GEOVision** California professional geophysicist or engineer.

Prepared by:



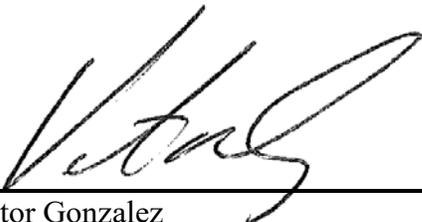
3/23/2018

---

Emily Feldman  
Senior Staff Geophysicist  
GEOVision Geophysical Services

Date

Reviewed and approved by



3/23/2018

---

Victor Gonzalez  
California Professional Geophysicist, PGp. 1074  
GEOVision Geophysical Services

Date

- \* This geophysical investigation was conducted under the supervision of a California Professional Geophysicist or Engineer using industry standard methods and equipment. A high degree of professionalism was maintained during all aspects of the project from the field investigation and data acquisition, through data processing, interpretation and reporting. All original field data files, field notes and observations, and other pertinent information are maintained in the project files and are available for the client to review for a period of at least one year.

A professional geophysicist's certification of interpreted geophysical conditions comprises a declaration of his/her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations or ordinances.

Table 1. Boring locations and logging dates

BORING DESIGNATION	DATES LOGGED	LOCATION <sup>(1)</sup>		ELEVATION (FEET)
		LATITUDE	LONGITUDE	
BH-POT-02	3/15/2018			

<sup>(1)</sup> Coordinates not available at time of report

Table 2. Logging dates and depth ranges

BORING NUMBER	TOOL AND RUN NUMBER	DEPTH RANGE (FEET)	CASED OR UNCASED	SAMPLE INTERVAL (FEET)	DATE LOGGED
BH-POT-02	SUSPENSION DOWN01	3.94 – 107.61	UNCASED	1.31	3/15/2018

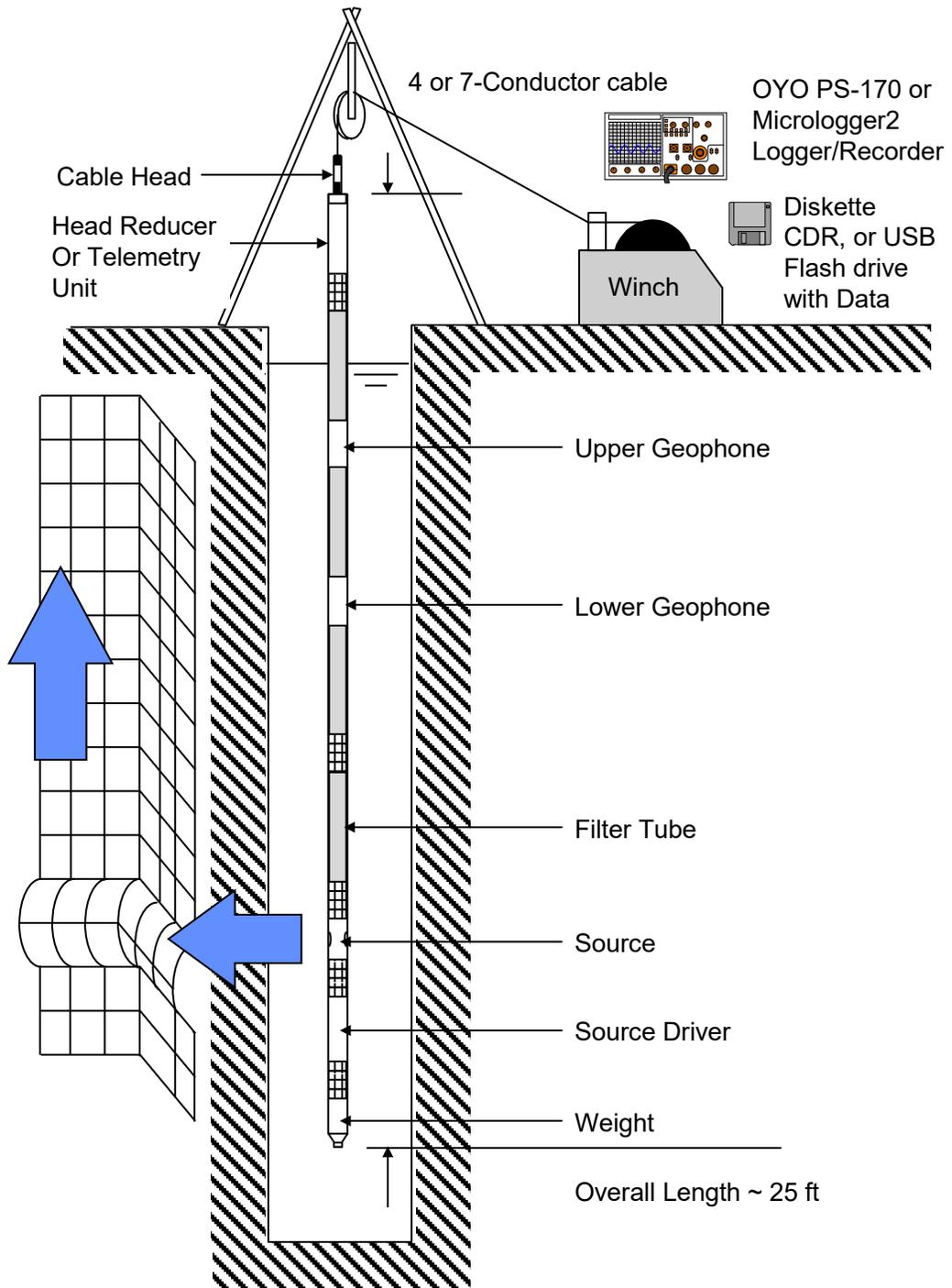


Figure 1: Concept illustration of P-S logging system

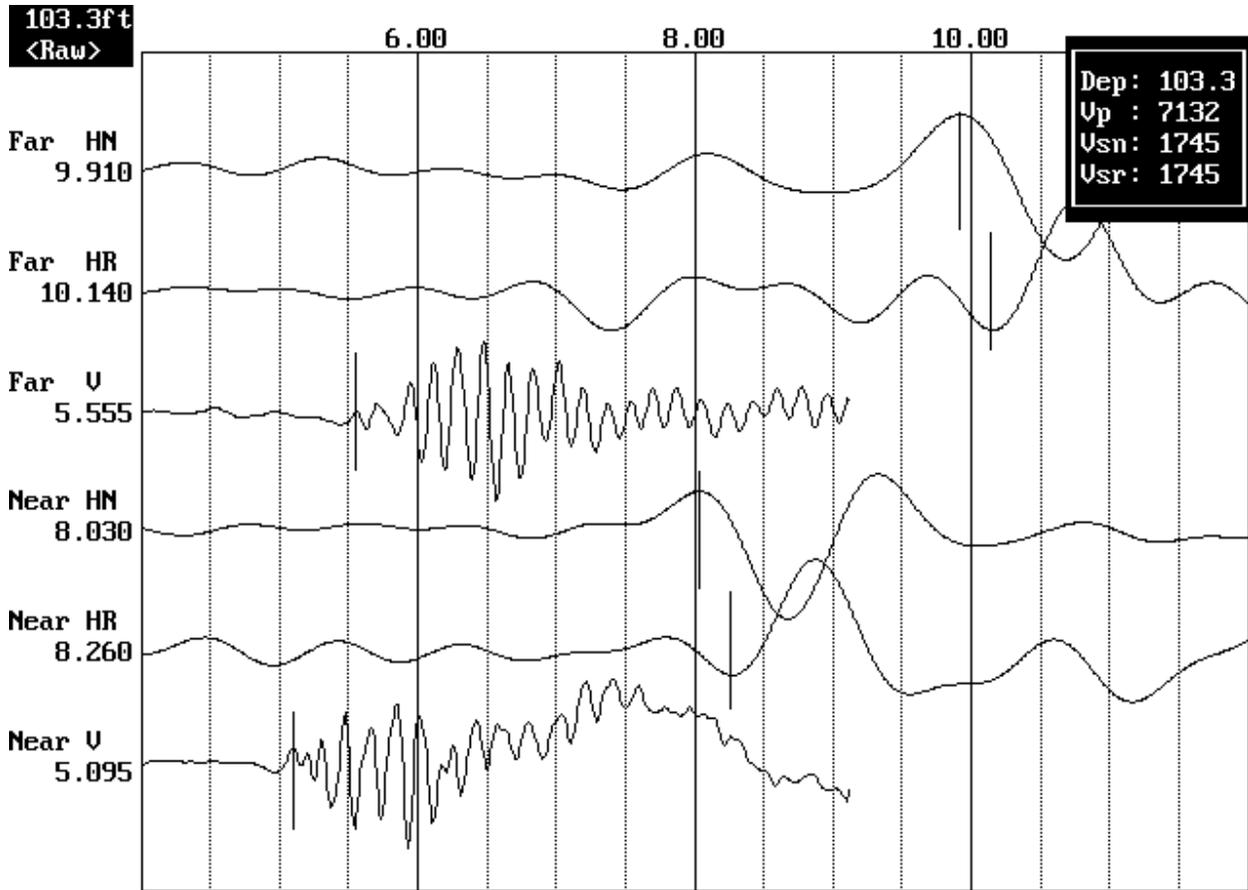


Figure 2: Example of filtered (1400 Hz lowpass) suspension record

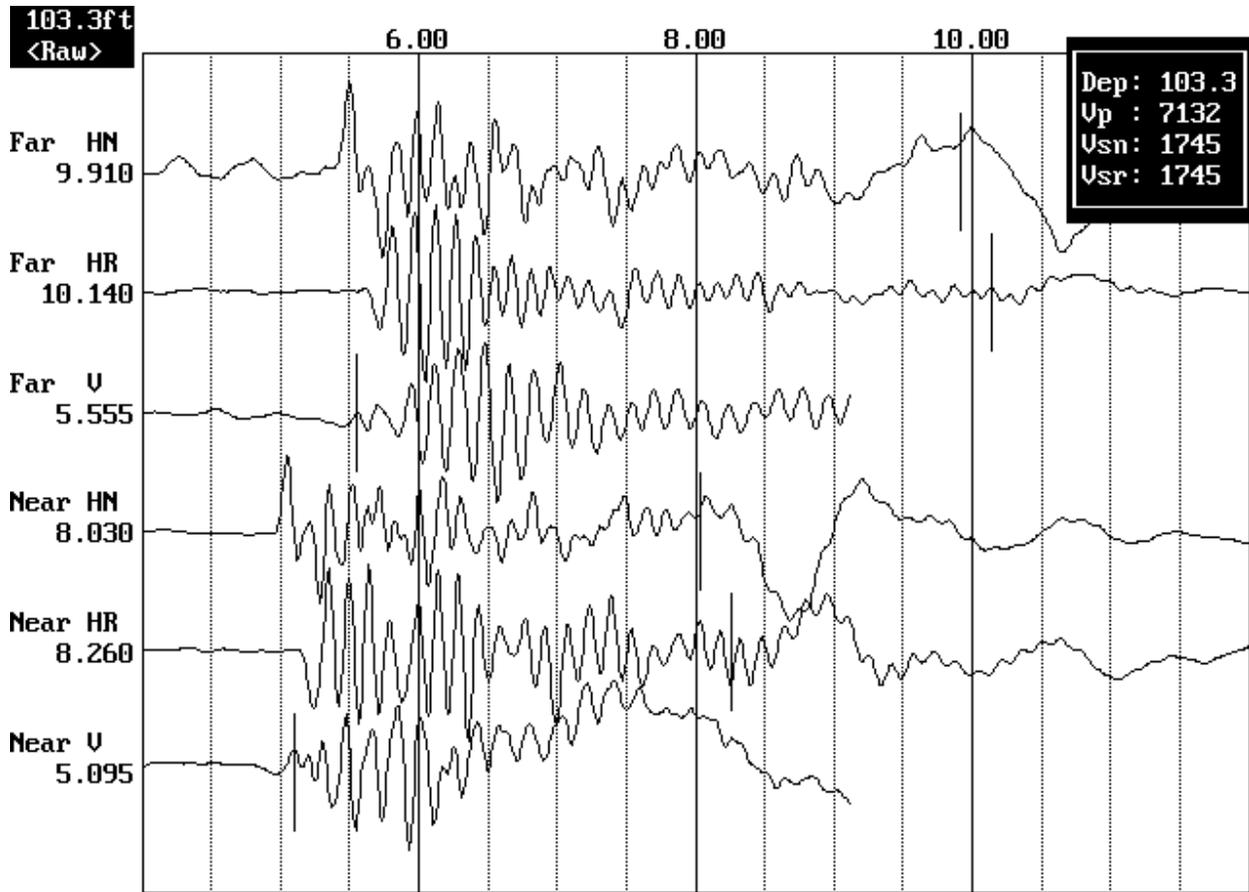


Figure 3. Example of unfiltered suspension record

### SF Potrero Borehole BH-POT-02 Receiver to Receiver $V_s$ and $V_p$ Analysis

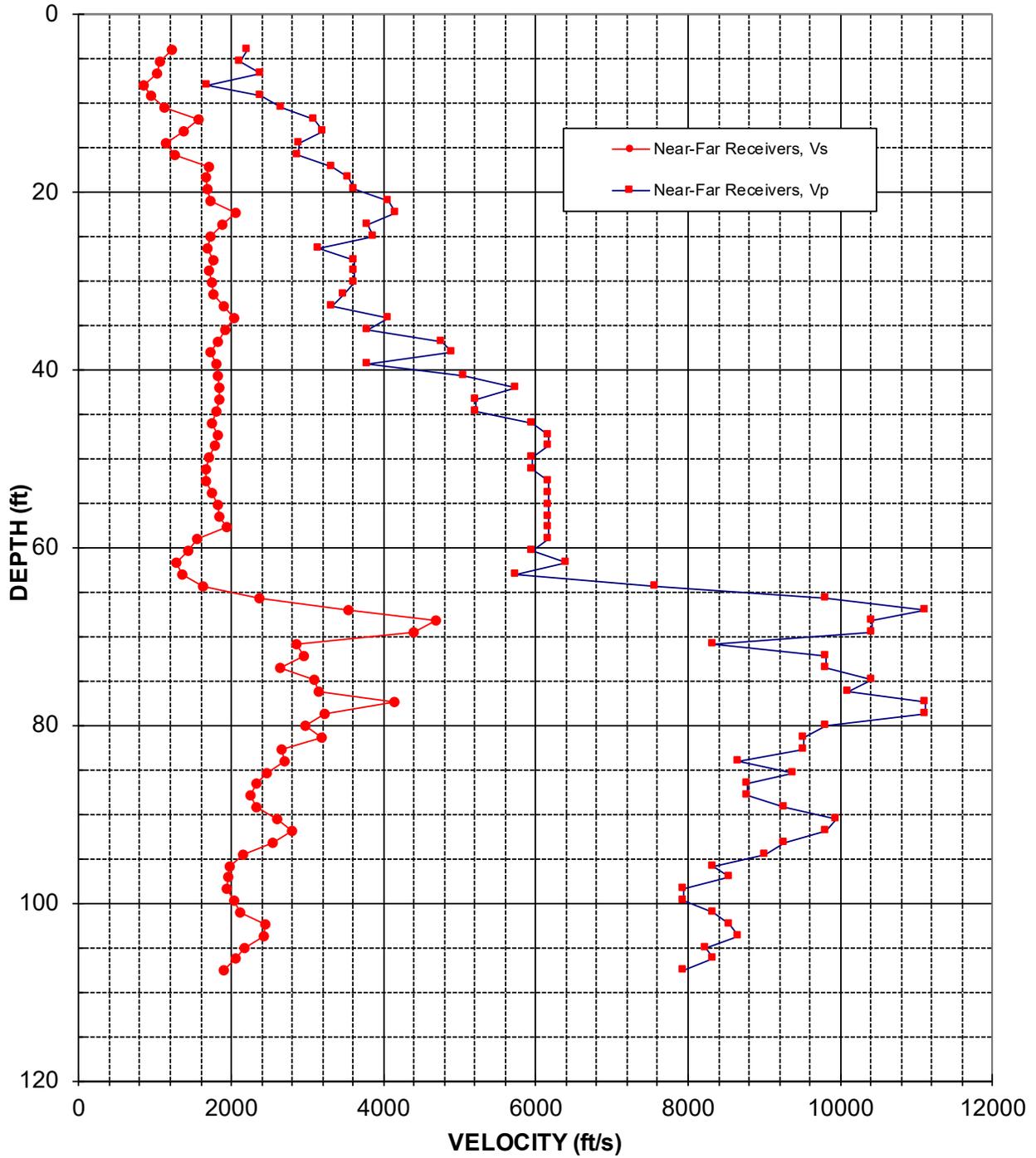


Figure 4: Boring BH-POT-02, Suspension R1-R2 P- and  $S_H$ -wave velocities

Table 3. Boring BH-POT-02, Suspension R1-R2 depths and P- and S<sub>H</sub>-wave velocities

**Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio  
Based on Receiver-to-Receiver Travel Time Data - Borehole BH-POT-02**

American Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V <sub>s</sub>	V <sub>p</sub>	
(ft)	(ft/s)	(ft/s)	
3.9	1210	2220	0.29
5.3	1070	2110	0.33
6.6	1030	2380	0.39
7.9	850	1680	0.33
9.2	940	2380	0.41
10.5	1130	2670	0.39
11.8	1570	3090	0.33
13.1	1370	3210	0.39
14.4	1140	2900	0.41
15.8	1260	2870	0.38
17.1	1710	3330	0.32
18.4	1670	3550	0.36
19.7	1690	3620	0.36
21.0	1720	4070	0.39
22.3	2060	4170	0.34
23.6	1870	3790	0.34
24.9	1720	3880	0.38
26.3	1680	3140	0.30
27.6	1770	3620	0.34
28.9	1700	3620	0.36
30.2	1740	3620	0.35
31.5	1770	3470	0.32
32.8	1900	3330	0.26
34.1	2040	4070	0.33
35.4	1920	3790	0.33
36.8	1830	4760	0.41
38.1	1720	4900	0.43
39.4	1810	3790	0.35
40.7	1820	5050	0.43
42.0	1850	5750	0.44
43.3	1840	5210	0.43
44.6	1800	5210	0.43
45.9	1740	5950	0.45
47.2	1830	6170	0.45
48.6	1780	6170	0.45
49.9	1710	5950	0.46
51.2	1680	5950	0.46

Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V <sub>s</sub>	V <sub>p</sub>	
(m)	(m/s)	(m/s)	
1.2	370	680	0.29
1.6	330	640	0.33
2.0	310	730	0.39
2.4	260	510	0.33
2.8	290	730	0.41
3.2	340	810	0.39
3.6	480	940	0.33
4.0	420	980	0.39
4.4	350	880	0.41
4.8	380	880	0.38
5.2	520	1020	0.32
5.6	510	1080	0.36
6.0	520	1100	0.36
6.4	520	1240	0.39
6.8	630	1270	0.34
7.2	570	1150	0.34
7.6	520	1180	0.38
8.0	510	960	0.30
8.4	540	1100	0.34
8.8	520	1100	0.36
9.2	530	1100	0.35
9.6	540	1060	0.32
10.0	580	1020	0.26
10.4	620	1240	0.33
10.8	580	1150	0.33
11.2	560	1450	0.41
11.6	520	1490	0.43
12.0	550	1150	0.35
12.4	560	1540	0.43
12.8	560	1750	0.44
13.2	560	1590	0.43
13.6	550	1590	0.43
14.0	530	1810	0.45
14.4	560	1880	0.45
14.8	540	1880	0.45
15.2	520	1810	0.46
15.6	510	1810	0.46

**Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio  
Based on Receiver-to-Receiver Travel Time Data - Borehole BH-POT-02**

American Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V <sub>s</sub>	V <sub>p</sub>	
(ft)	(ft/s)	(ft/s)	
52.5	1680	6170	0.46
53.8	1750	6170	0.46
55.1	1830	6170	0.45
56.4	1850	6170	0.45
57.7	1950	6170	0.44
59.1	1540	6170	0.47
60.4	1440	5950	0.47
61.7	1270	6410	0.48
63.0	1350	5750	0.47
64.3	1630	7580	0.48
65.6	2360	9800	0.47
66.9	3550	11110	0.44
68.2	4690	10420	0.37
69.6	4390	10420	0.39
70.9	2850	8330	0.43
72.2	2950	9800	0.45
73.5	2650	9800	0.46
74.8	3090	10420	0.45
76.1	3140	10100	0.45
77.4	4140	11110	0.42
78.7	3220	11110	0.45
80.1	2980	9800	0.45
81.4	3190	9520	0.44
82.7	2670	9520	0.46
84.0	2700	8660	0.45
85.3	2470	9390	0.46
86.6	2320	8770	0.46
87.9	2250	8770	0.46
89.2	2330	9260	0.47
90.6	2600	9950	0.46
91.9	2800	9800	0.46
93.2	2540	9260	0.46
94.5	2160	9010	0.47
95.8	1980	8330	0.47
97.1	1970	8550	0.47
98.4	1950	7940	0.47
99.7	2040	7940	0.46
101.1	2120	8330	0.47
102.4	2450	8550	0.46
103.7	2430	8660	0.46

Metric Units			
Depth at Midpoint Between Receivers	Velocity		Poisson's Ratio
	V <sub>s</sub>	V <sub>p</sub>	
(m)	(m/s)	(m/s)	
16.0	510	1880	0.46
16.4	530	1880	0.46
16.8	560	1880	0.45
17.2	560	1880	0.45
17.6	590	1880	0.44
18.0	470	1880	0.47
18.4	440	1810	0.47
18.8	390	1950	0.48
19.2	410	1750	0.47
19.6	500	2310	0.48
20.0	720	2990	0.47
20.4	1080	3390	0.44
20.8	1430	3180	0.37
21.2	1340	3180	0.39
21.6	870	2540	0.43
22.0	900	2990	0.45
22.4	810	2990	0.46
22.8	940	3180	0.45
23.2	960	3080	0.45
23.6	1260	3390	0.42
24.0	980	3390	0.45
24.4	910	2990	0.45
24.8	970	2900	0.44
25.2	810	2900	0.46
25.6	820	2640	0.45
26.0	750	2860	0.46
26.4	710	2670	0.46
26.8	690	2670	0.46
27.2	710	2820	0.47
27.6	790	3030	0.46
28.0	850	2990	0.46
28.4	780	2820	0.46
28.8	660	2750	0.47
29.2	600	2540	0.47
29.6	600	2610	0.47
30.0	590	2420	0.47
30.4	620	2420	0.46
30.8	650	2540	0.47
31.2	750	2610	0.46
31.6	740	2640	0.46

**Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio  
Based on Receiver-to-Receiver Travel Time Data - Borehole BH-POT-02**

<b>American Units</b>			
<b>Depth at Midpoint Between Receivers</b>	<b>Velocity</b>		<b>Poisson's Ratio</b>
	<b>V<sub>s</sub></b>	<b>V<sub>p</sub></b>	
(ft)	(ft/s)	(ft/s)	
105.0	2160	8230	0.46
106.3	2060	8330	0.47
107.6	1900	7940	0.47

<b>Metric Units</b>			
<b>Depth at Midpoint Between Receivers</b>	<b>Velocity</b>		<b>Poisson's Ratio</b>
	<b>V<sub>s</sub></b>	<b>V<sub>p</sub></b>	
(m)	(m/s)	(m/s)	
32.0	660	2510	0.46
32.4	630	2540	0.47
32.8	580	2420	0.47

## **APPENDIX A**

# **SUSPENSION VELOCITY MEASUREMENT QUALITY ASSURANCE SUSPENSION SOURCE TO RECEIVER ANALYSIS RESULTS**

### SF Potrero Borehole BH-POT-02 Source to Receiver and Receiver to Receiver Analysis

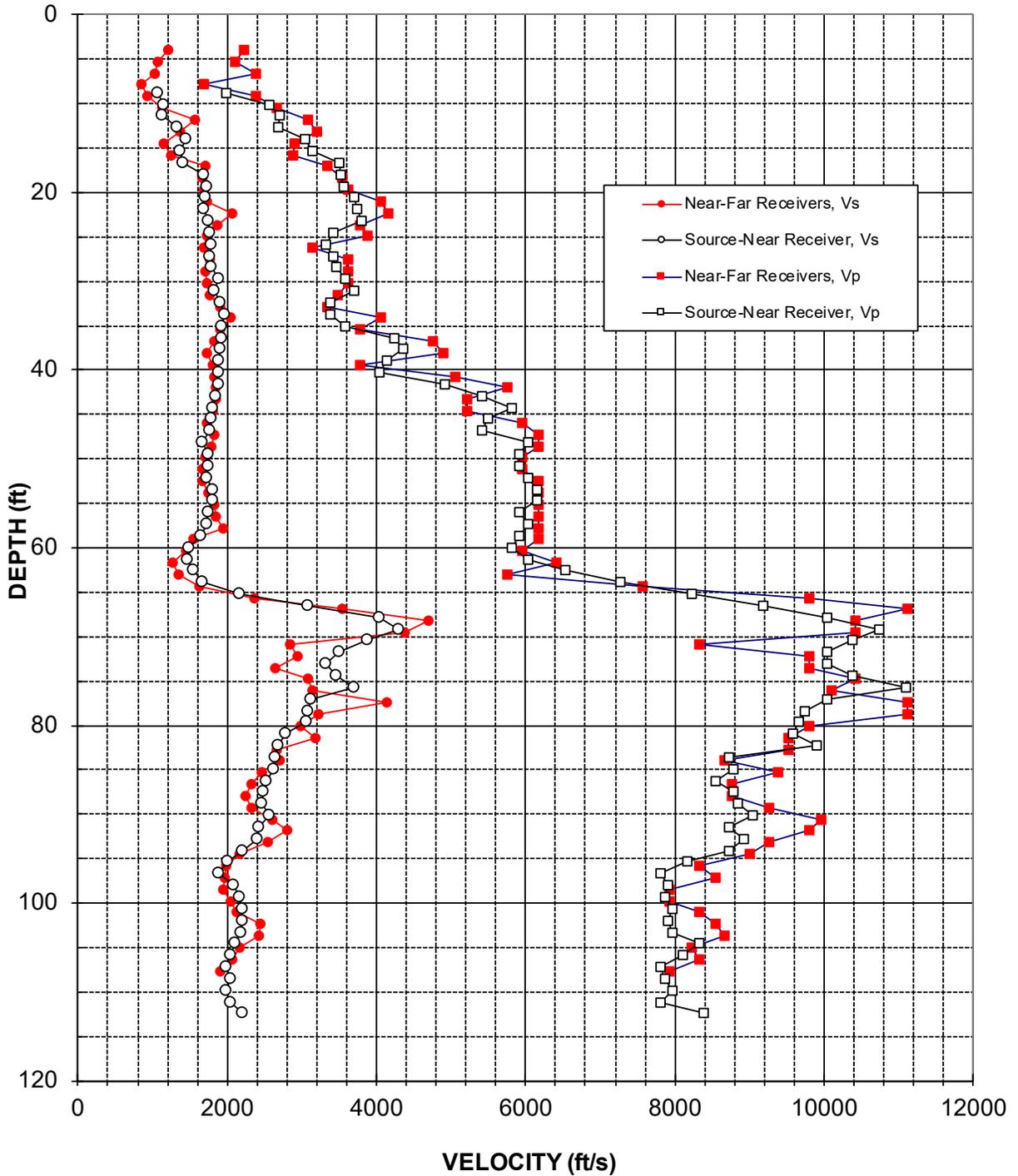


Figure A-1: Boring BH-POT-02, Suspension S-R1 P- and S<sub>H</sub>-wave velocities

Table A-1. Boring BH-POT-02, S - R1 quality assurance analysis P- and S<sub>H</sub>-wave data

**Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio  
Based on Source-to-Receiver Travel Time Data - Borehole BH-POT-02**

American Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V <sub>s</sub>	V <sub>p</sub>	
(ft)	(ft/s)	(ft/s)	
8.8	1070	1980	0.30
10.1	1160	2560	0.37
11.4	1140	2710	0.39
12.7	1330	2690	0.34
14.0	1450	3040	0.35
15.3	1370	3130	0.38
16.6	1400	3500	0.40
18.0	1680	3520	0.35
19.3	1720	3560	0.35
20.6	1700	3700	0.37
21.9	1680	3750	0.37
23.2	1750	3790	0.36
24.5	1770	3420	0.32
25.8	1780	3310	0.30
27.1	1760	3420	0.32
28.5	1780	3460	0.32
29.8	1900	3580	0.30
31.1	1830	3700	0.34
32.4	1910	3390	0.27
33.7	1960	3390	0.25
35.0	1940	3580	0.29
36.3	1940	4250	0.37
37.6	1910	4370	0.38
39.0	1890	4140	0.37
40.3	1890	4030	0.36
41.6	1880	4910	0.41
42.9	1860	5410	0.43
44.2	1800	5810	0.45
45.5	1790	5500	0.44
46.8	1760	5410	0.44
48.1	1670	6030	0.46
49.5	1750	5920	0.45
50.8	1750	5920	0.45
52.1	1720	6030	0.46
53.4	1800	6150	0.45
54.7	1810	6150	0.45
56.0	1750	5920	0.45
57.3	1720	6030	0.46
58.6	1640	5920	0.46

Metric Units			
Depth at Midpoint Between Source and Near Receiver	Velocity		Poisson's Ratio
	V <sub>s</sub>	V <sub>p</sub>	
(m)	(m/s)	(m/s)	
2.7	330	600	0.30
3.1	350	780	0.37
3.5	350	820	0.39
3.9	400	820	0.34
4.3	440	930	0.35
4.7	420	960	0.38
5.1	430	1070	0.40
5.5	510	1070	0.35
5.9	530	1080	0.35
6.3	520	1130	0.37
6.7	510	1140	0.37
7.1	530	1160	0.36
7.5	540	1040	0.32
7.9	540	1010	0.30
8.3	540	1040	0.32
8.7	540	1050	0.32
9.1	580	1090	0.30
9.5	560	1130	0.34
9.9	580	1030	0.27
10.3	600	1030	0.25
10.7	590	1090	0.29
11.1	590	1290	0.37
11.5	580	1330	0.38
11.9	580	1260	0.37
12.3	580	1230	0.36
12.7	570	1500	0.41
13.1	570	1650	0.43
13.5	550	1770	0.45
13.9	550	1680	0.44
14.3	540	1650	0.44
14.7	510	1840	0.46
15.1	530	1800	0.45
15.5	530	1800	0.45
15.9	530	1840	0.46
16.3	550	1870	0.45
16.7	550	1870	0.45
17.1	530	1800	0.45
17.5	530	1840	0.46
17.9	500	1800	0.46

**Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio  
Based on Source-to-Receiver Travel Time Data - Borehole BH-POT-02**

<b>American Units</b>			
<b>Depth at Midpoint Between Source and Near Receiver</b>	<b>Velocity</b>		<b>Poisson's Ratio</b>
	<b>V<sub>s</sub></b>	<b>V<sub>p</sub></b>	
(ft)	(ft/s)	(ft/s)	
60.0	1490	5810	0.46
61.3	1460	6030	0.47
62.6	1540	6530	0.47
63.9	1670	7280	0.47
65.2	2180	8220	0.46
66.5	3090	9170	0.44
67.8	4030	10050	0.40
69.1	4310	10730	0.40
70.5	3880	10380	0.42
71.8	3500	10050	0.43
73.1	3310	10050	0.44
74.4	3460	10380	0.44
75.7	3700	11110	0.44
77.0	3120	10050	0.45
78.3	3090	9740	0.44
79.6	3060	9660	0.44
81.0	2790	9590	0.45
82.3	2690	9890	0.46
83.6	2650	8730	0.45
84.9	2630	8790	0.45
86.2	2520	8550	0.45
87.5	2480	8790	0.46
88.8	2460	8850	0.46
90.1	2560	9040	0.46
91.4	2420	8730	0.46
92.8	2400	8920	0.46
94.1	2200	8730	0.47
95.4	2020	8170	0.47
96.7	1900	7810	0.47
98.0	2080	7910	0.46
99.3	2160	7860	0.46
100.6	2210	7960	0.46
101.9	2210	7910	0.46
103.3	2180	7960	0.46
104.6	2110	8330	0.47
105.9	2060	8120	0.47
107.2	1990	7810	0.47
108.5	2060	7860	0.46
109.8	1990	7960	0.47
111.1	2060	7810	0.46

<b>Metric Units</b>			
<b>Depth at Midpoint Between Source and Near Receiver</b>	<b>Velocity</b>		<b>Poisson's Ratio</b>
	<b>V<sub>s</sub></b>	<b>V<sub>p</sub></b>	
(m)	(m/s)	(m/s)	
18.3	450	1770	0.46
18.7	450	1840	0.47
19.1	470	1990	0.47
19.5	510	2220	0.47
19.9	660	2510	0.46
20.3	940	2800	0.44
20.7	1230	3060	0.40
21.1	1310	3270	0.40
21.5	1180	3160	0.42
21.9	1070	3060	0.43
22.3	1010	3060	0.44
22.7	1050	3160	0.44
23.1	1130	3380	0.44
23.5	950	3060	0.45
23.9	940	2970	0.44
24.3	930	2950	0.44
24.7	850	2920	0.45
25.1	820	3010	0.46
25.5	810	2660	0.45
25.9	800	2680	0.45
26.3	770	2610	0.45
26.7	760	2680	0.46
27.1	750	2700	0.46
27.5	780	2760	0.46
27.9	740	2660	0.46
28.3	730	2720	0.46
28.7	670	2660	0.47
29.1	610	2490	0.47
29.5	580	2380	0.47
29.9	630	2410	0.46
30.3	660	2400	0.46
30.7	670	2430	0.46
31.1	670	2410	0.46
31.5	670	2430	0.46
31.9	640	2540	0.47
32.3	630	2470	0.47
32.7	610	2380	0.47
33.1	630	2400	0.46
33.5	610	2430	0.47
33.9	630	2380	0.46

**Summary of Compressional Wave Velocity, Shear Wave Velocity, and Poisson's Ratio  
Based on Source-to-Receiver Travel Time Data - Borehole BH-POT-02**

<b>American Units</b>			
<b>Depth at Midpoint Between Source and Near Receiver</b>	<b>Velocity</b>		<b>Poisson's Ratio</b>
	<b>V<sub>s</sub></b>	<b>V<sub>p</sub></b>	
(ft)	(ft/s)	(ft/s)	
112.4	2200	8380	0.46

<b>Metric Units</b>			
<b>Depth at Midpoint Between Source and Near Receiver</b>	<b>Velocity</b>		<b>Poisson's Ratio</b>
	<b>V<sub>s</sub></b>	<b>V<sub>p</sub></b>	
(m)	(m/s)	(m/s)	
34.3	670	2560	0.46

**APPENDIX B**

**BORING GEOPHYSICAL LOGGING**

**SYSTEMS - NIST TRACEABLE**

**CALIBRATION RECORDS**



MICRO PRECISION CALIBRATION, INC  
 2165 N. Glassell St.,  
 Orange, CA 92865  
 714-901-5659



# Certificate of Calibration

**Date:** Feb 5, 2018

**Cert No.** 512200813241307

**Customer:**

GEOVISION  
 1124 OLYMPIC DRIVE  
 CORONA CA 92881

MPC Control #: BG9697  
 Asset ID: 19029  
 Gage Type: LOGGER  
 Manufacturer: OYO  
 Model Number: 3331-A  
 Size: N/A  
 Temp/RH: 72.0°F / 54.0%  
 Location: Calibration performed at MPC facility

Work Order #: LA-90038210  
 Purchase Order #: OH-180202-01  
 Serial Number: 19029  
 Department: N/A  
 Performed By: TYLER MCKEEN  
 Received Condition: IN TOLERANCE  
 Returned Condition: IN TOLERANCE  
 Cal. Date: February 02, 2018  
 Cal. Interval: 12 MONTHS  
 Cal. Due Date: February 02, 2019

**Calibration Notes:**

See Attached Data Sheet ( 1 Page )

Calibrated IAW customer supplied data form Rev 2.1  
 Frequency measurement uncertainty = 0.0005 Hz  
 Unit calibrated with Panasonic Toughbook CF-29 Ser#: 4FKSA41798  
 Calibrated to 4:1 accuracy ratio.

**Standards Used to Calibrate Equipment**

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
BD7715	UNIVERSAL COUNTER	53131A	3416A05377	HEWLETT PACKARD	Nov 30, 2018	512200813230072
LAS0018	ARB / FUNC GENERATOR	33250A	US40001522	AGILENT TECHNOLOGIES	Dec 31, 2018	512200812632023
DB8748	GPS TIME AND FREQUENCY RECEIVER	58503A	3625A01225	HEWLETT PACKARD	Jun 16, 2019	512200812919221

**Procedures Used in this Event**

Procedure Name	Description
GEOVISION SEISMIC	Seismic Logger/Recorder Calibration Procedure, Rev. 2.1

Calibrating Technician:

TYLER MCKEEN

QC Approval:

JIM WILLIAMS

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA's Publication and NIST Technical Note 1297, 1994 Edition. Services rendered comply with ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, ANSI/NCSL Z540.3-2006, MPC Quality Manual, MPC CSD and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. This report may not be reproduced in part or in a whole without the prior written approval of the issuing MPC lab.





## REPORT

# SURFACE WAVE MEASUREMENTS

## MTA POTRERO FACILITY SAN FRANCISCO, CALIFORNIA

**GEOVision** Project No. 18113

*Prepared for*

Arup, Inc.  
560 Mission Street, Suite 700  
San Francisco, CA 94105  
(415) 957-9445

*Prepared by*

**GEOVision** Geophysical Services, Inc.  
1124 Olympic Drive  
Corona, California 92881  
(951) 549-1234

Report 18113-02

May 2, 2018

# TABLE OF CONTENTS

1	INTRODUCTION.....	1
2	OVERVIEW OF THE SURFACE WAVE METHODS.....	2
3	FIELD PROCEDURES.....	6
4	DATA REDUCTION AND MODELING.....	7
5	INTERPRETATION AND RESULTS.....	10
6	CONCLUSIONS.....	12
7	REFERENCES.....	13
8	CERTIFICATION.....	15

## APPENDIX

Appendix A Technical Notes

## LIST OF TABLES

Table 1 Location of Geophysical Arrays

## LIST OF FIGURES

Figure 1 Site Map  
Figure 2 Sample 1D Surface Wave Model - Line 4 Distance 197 ft  
Figure 3 Line 1: S-Wave Velocity Model  
Figure 4 Line 2: S-Wave Velocity Model  
Figure 5 Line 3: S-Wave Velocity Model  
Figure 6 Line 4: S-Wave Velocity Model  
Figure 7 HVSR Data – Stations HV1 to HV4  
Figure 8 HVSR Data – Stations HV5 to HV7

# 1 INTRODUCTION

In-situ seismic measurements using active and passive surface wave techniques were performed at the proposed locations of the MTA Potrero Facility, San Francisco, California from March 13<sup>th</sup> to March 16<sup>th</sup>, 2018. The primary purpose of the surface geophysical investigation was to map depth to bedrock beneath four seismic lines designated as Lines 1 through 4. The secondary purpose of the investigation was to provide a shear (S) wave velocity of the bedrock and overlying sediments and estimate the average S-wave velocity of the upper 30 m ( $V_{S30}$ ). The active surface wave technique utilized during this investigation consisted of the multi-channel analysis of surface waves (MASW) method. The passive surface wave techniques consisted of the horizontal over vertical spectral ratio (HVSr), array microtremor, and refraction microtremor methods. Due to a thick surficial layer of asphalt and concrete, it was determined in the field that seismic refraction would not yield reliable results at the site. The geology in the vicinity of the seismic lines was expected to consist of sediments overlaying Franciscan Complex bedrock. The locations of the active and passive surface wave arrays are shown on Figure 1 and in Table 1.

$V_{S30}$  is used in the NEHRP provisions and the Uniform Building Code (UBC) to separate sites into classes for earthquake engineering design (BSSC, 1994). The average shear wave velocity of the upper 100 ft ( $V_{S100ft}$ ) is used in the International Building Code (IBC) for site classification. These site classes are as follows:

- Class A – hard rock –  $V_{S30} > 1500$  m/s (UBC) or  $V_{S100ft} > 5,000$  ft/s (IBC)
- Class B – rock –  $760 < V_{S30} \leq 1500$  m/s (UBC) or  $2,500 < V_{S100ft} \leq 5,000$  ft/s (IBC)
- Class C – very dense soil and soft rock –  $360 < V_{S30} \leq 760$  m/s (UBC)  
or  $1,200 < V_{S100ft} \leq 2,500$  ft/s (IBC)
- Class D – stiff soil –  $180 < V_{S30} \leq 360$  m/s (UBC) or  $600 < V_{S100ft} \leq 1,200$  ft/s (IBC)
- Class E – soft soil –  $V_{S30} < 180$  m/s (UBC) or  $V_{S100ft} < 600$  ft/s (IBC)
- Class F – soils requiring site-specific evaluation

At many sites, active surface wave techniques (MASW) with the utilization of portable energy sources, such as hammers and weight drops, are sufficient to obtain a 30 m (100 ft) S-wave velocity sounding. At sites with high ambient noise levels and/or very soft soils, these energy sources may not be sufficient to image to 30 m and a larger energy source, such as a bulldozer, is necessary. Alternatively, passive surface wave techniques, such as the array microtremor technique or the refraction microtremor method of Louie (2001), can be used to extend the depth of investigation at sites that have adequate ambient noise conditions. It should be noted that two-dimensional passive surface wave arrays (e.g. triangular, circular, or L-shaped arrays) will perform better than linear arrays. However due to the expected high degree of lateral velocity variability and site constraints, two-dimensional passive surface wave arrays were not feasible.

This report contains the results of the active and passive surface wave measurements conducted at the site. An overview of the surface wave methods is given in Section 2. Field and data reduction procedures are discussed in Sections 3 and 4, respectively. Interpretation and results are presented in Section 5 and Section 6 presents our conclusions. References and our professional certification are presented in Sections 7 and 8, respectively.

## 2 OVERVIEW OF THE SURFACE WAVE METHODS

A discussion of active and passive surface wave methods is provided in the technical note included as Appendix A. Active surface wave techniques include the spectral analysis of surface waves (SASW) and multi-channel array surface wave (MASW) methods. Passive surface wave techniques include the array and refraction microtremor methods.

The basis of surface wave methods is the dispersive characteristic of Rayleigh and Love waves when propagating in a layered medium. The Rayleigh wave phase velocity,  $V_R$ , depends primarily on the material properties ( $V_S$ , mass density and Poisson's ratio or compression wave velocity) over a depth of approximately one wavelength. The Love wave phase velocity,  $V_L$ , depends primarily on  $V_S$  and mass density. Rayleigh and Love wave propagation are also affected by damping or seismic quality factor ( $Q$ ).

Waves of different wavelengths,  $\lambda$ , (or frequencies,  $f$ ) sample different depths. As a result of the variance in the shear stiffness of the layers, waves with different wavelengths travel at different phase velocities; hence, dispersion. A surface wave dispersion curve (dispersion curve) is the variation of  $V_R$  or  $V_L$  with  $\lambda$  or  $f$ .

The SASW and MASW methods are in-situ seismic method for determining shear wave velocity ( $V_S$ ) profiles (Stokoe et al., 1994; Stokoe et al., 1989; Park et al., 1999a and 1999b, Foti, 2000). Surface wave techniques are non-invasive and non-destructive, with all testing performed on the ground surface at strain levels in the soil in the elastic range ( $< 0.001\%$ ). SASW testing consists of collecting surface wave phase data in the field, generating the dispersion curve, and then using iterative forward or inverse modeling to calculate the shear stiffness profile. MASW testing consists of collecting multi-channel seismic data in the field, applying a wavefield transform to obtain the dispersion curve, and data modeling.

A detailed description of the SASW field procedure is given in Joh, 1996. A vertical dynamic load is used to generate horizontally-propagating Rayleigh waves and a horizontal force is used to generate Love waves. The ground motions are monitored by two, or more, vertical (Rayleigh wave) or horizontal (Love wave) receivers and recorded by the data acquisition system capable of performing both time and frequency-domain calculations. Theoretical, as well as practical considerations, such as attenuation, necessitate the use of several receiver spacings to generate the dispersion curve over the wavelength range required to evaluate the stiffness profile. To minimize phase shifts due to differences in receiver coupling and subsurface variability, the source location is reversed. To develop a  $V_S$  model to a 30 meter depth using Rayleigh wave methods, energy sources typically include: small hammers (rock hammer or 3 lb hammer) for short receiver intervals; 10 to 20 lb sledgehammers for intermediate separations, and accelerated weight drops (AWD) or an electromechanical shaker for larger spacings. More energetic sources, such as bulldozers or seismic vibrators (Vibroseis<sup>TM</sup>), can be used to conduct characterize velocity structure to depths of 100 m or more. Energy sources for shallow imaging using Love waves include a hammer and horizontal traction plank, portable hammer impact aluminum source, and inclined or horizontal accelerated weight drop systems. Energy sources for deeper imaging using Love waves include horizontal seismic vibrators. Generally, high frequency (short wavelength) surface waves are recorded across receiver pairs spaced at short intervals, whereas low frequency (long wavelength) surface waves require greater spacing between

receivers. Dispersion data averaged across greater distances are often smoother because effects of localized heterogeneities are averaged.

After the time-domain motions from the two receivers are converted to frequency-domain records using the Fast Fourier Transform, the cross power spectrum and coherence are calculated. The phase of the cross power spectrum,  $\phi_w(f)$ , represents the phase differences between the two receivers as the wave train propagates past them. It ranges from  $-\pi$  to  $\pi$  in a wrapped form and must be unwrapped through an interactive process called masking. Phase jumps are specified, near-field data (wavelengths longer than two times the distance from the source to first receiver) and low-coherence data are removed. The experimental dispersion curve is calculated from the unwrapped phase angle and the distance between receivers by:

$$V_{R/L} = f * d_2 / (\Delta\phi / 360^\circ)$$

where  $V_R$  = Rayleigh wave phase velocity  
 $V_L$  = Love wave phase velocity  
 $f$  = frequency  
 $d_2$  = distance between receivers  
 $\Delta\phi$  = the phase difference in degrees

A detailed description of the MASW method is given by Park, 1999a and 1999b. Ground motions are recorded by 24 or more geophones spaced 1 to 3 m apart and aligned in a linear array and connected to a seismograph. Energy sources are the same as those outlined above for SASW testing. When applying the MASW technique to develop a one-dimensional (1-D)  $V_S$  model, the surface-wave data preferably is acquired using multiple-source offsets at both ends of the array. Rayleigh and Love wave MASW acquisition can easily be combined with P- and S-wave seismic refraction acquisition, respectively. A wavefield transform is applied to the time-history data to convert the seismic record from time-offset space to phase velocity-frequency space in which the surface-wave dispersion curve can be easily identified. Common wave-field transforms include the frequency-wavenumber (f-k) transform, slant-stack transform ( $\tau$ -p), frequency domain beamformer, and phase-shift transform.

A detailed discussion of the array microtremor method can be found in Okada, 2003. This technique uses 4, or more receivers aligned in a 2-dimensional array. Triangle, circle, semi-circle, and "L" shaped arrays are commonly used, although any 2-dimensional arrangement of receivers can be used. For investigation of the upper 100 m, receivers typically consist of 1 to 4.5 Hz geophones. The triangle array, which consists of several embedded equilateral triangles, is often used as it provides good results with a relatively small number of geophones. With this array, the outer side of the triangle should be at least equal to the desired depth of investigation. The "L" array is useful at sites located at the corner of perpendicular intersecting streets. Typically 20, or more, 30-second noise records are acquired for analysis. The surface wave dispersion curve is typically estimated from array microtremor data using various f-k methods such as beam-forming (Lacoss, *et al.*, 1969) and maximum-likelihood (Capon, 1969); and the spatial-autocorrelation (SPAC) method, which was originally based on work by Aki, 1957. The SPAC method has since been extended and modified (Ling and Okada, 1993 and Ohori *et al.*, 2002) to permit the use of noncircular arrays, and is now collectively referred to as extended spatial autocorrelation (ESPAC or ESAC).

The refraction microtremor technique (ReMi™), a detailed description of which can be found in Louie, 2001, differs from the more established array microtremor technique in that it uses a linear receiver array rather than a two dimensional array. Unlike the SASW method, which uses an active energy source (i.e. hammer), the microtremor technique records background noise emanating from ocean wave activity, wind noise, traffic, industrial activity, construction, etc. Refraction microtremor field procedures typically consist of laying out a linear array of 24, or more, 4.5 Hz geophones and recording 20, or more, 30 second noise records. These noise records are reduced using the software package SeisOpt® ReMi™ v2.0 by Optim™ Software and Data Services. This package is used to generate and combine the slowness (p) – frequency (f) transform of the noise records. The surface wave dispersion curve is picked at the lower envelope of the surface wave energy identified in the p-f spectrum. It should be noted that other data reduction techniques such as seismic interferometry and extended spatial autocorrelation (ESAC) can also be used to extract surface wave dispersion curves from linear array, passive surface wave data.

The horizontal-to-vertical spectral ratio (H/V spectral ratio or HVSR) technique was first introduced by Nogoshi and Igarashi (1971) and popularized by Nakamura (1989). This technique utilizes single-station recordings of ambient vibrations (microtremor or noise) made with a three-component seismometer. In this method, the ratio of the Fourier amplitude spectra of the horizontal and vertical components is calculated to determine the frequency of the maximum HVSR response (HVSR peak frequency), commonly accepted as an approximation of the fundamental frequency ( $f_0$ ) of the sediment column overlying bedrock. The HVSR peak frequency associated with bedrock is a function of the bedrock depth and S-wave velocity of the sediments overlying bedrock. The theoretical HVSR response can be calculated for an S-wave velocity model using modeling schemes based on surface wave ellipticity, vertically propagating body waves, or diffuse wavefields containing body and surface waves. The HVSR frequency peak can also be estimated using the quarter-wavelength approximation:

$$f_0 = \frac{\bar{V}_S}{4z}$$

where  $f_0$  is the site fundamental frequency and  $\bar{V}_S$  is the average shear-wave velocity of the soil column overlying bedrock at depth  $z$ .

The active and passive surface wave techniques complement one another as outlined below:

- SASW/MASW techniques image the shallow velocity structure which cannot be imaged by the microtremor technique and is needed for an accurate  $V_{S30}/V_{S100ft}$  estimate.
- Microtremor techniques work best in noisy environments where SASW/MASW depth investigation may be limited.
- In a noisy environment the microtremor technique will usually extend the depth of an SASW/MASW sounding.
- The degree of fit in the overlapping portion of the dispersion curves from the two techniques provides a level of confidence in the results.

The dispersion curves generated from the active and passive surface wave soundings are generally combined and modeled using iterative forward and inverse modeling routines. The

final model profile is assumed to represent actual site conditions. Several options exist for the Rayleigh wave forward solution: a formulation that takes into account only fundamental-mode Rayleigh wave motion; one that includes all stress waves and incorporates receiver geometry in an SASW test named the 3-D solution (Roesset et al., 1991); one that computes an effective mode for an MASW test but assumes a plane Rayleigh wave and no body wave effects and a multi-mode solution that models different Rayleigh wave modes. Both fundamental mode and multi-mode forward solutions are available for modeling of Love wave data.

The theoretical model used to interpret the dispersion assumes horizontally layered, laterally invariant, homogeneous-isotropic material. Although these conditions are seldom strictly met at a site, the results of active and/or passive surface wave testing provide a good “global” estimate of the material properties along the array. The results may be more representative of the site than a borehole “point” estimate.

It may not always be possible to develop a coherent, fundamental mode dispersion curve over sufficient frequency range for modeling from MASW or SASW data due to dominant higher modes with the higher modes not clearly identifiable for multi-mode modeling. It may, however, be possible to identify the Rayleigh wave phase velocity of the fundamental mode at 40 m wavelength ( $V_{R40}$ ) in which case  $V_{S30}$  can at least be estimated using the Brown et al., 2000 relationship:

$$V_{S30} = 1.045V_{R40}$$

This relationship was established based on statistical analysis of a large number of surface wave data sets from sites with control by velocities measured in nearby boreholes and has been further tested by Martin and Diehl, 2004, and Albarello and Gargani, 2010.

As with all surface geophysical methods, inversion of surface wave dispersion data does not yield a unique  $V_S$  model and there are multiple possible solutions that may equally well fit the experimental data. Based on our experience at other sites, the shear wave velocity models ( $V_S$  and layer thicknesses) determined by surface wave testing are within 20% of the velocities and layer thicknesses that would be determined by other seismic methods [Brown, 1998]. The average velocity of the upper 30 m or 100 ft, however, is much more accurate, often to better than 5%, because it is not sensitive to the layering in the model.  $V_{S30}$  does not appear to suffer from the non-uniqueness inherent in  $V_S$  models derived from surface wave dispersion curves (Martin et al., 2006, Comina et al., 2011). Therefore,  $V_{S30}$  is more accurately estimated from inversion of surface wave dispersion data than the resulting  $V_S$  models.

### 3 FIELD PROCEDURES

Four (4) profiles were established at the site and designated as Lines 1 through 4. The endpoints of the geophysical profiles were marked in the field and surveyed by **GEOVision** staff using a Trimble ProXRS GPS with OmniStar submeter corrections. All geophone and shot point locations were measured using a 100 meter tape measure. The locations of the geophysical traverses are presented in Figure 1 and tabulated in Table 1. Active surface wave data were acquired using the MASW technique. Passive surface wave data were acquired using the array and refraction microtremor method. HVSR measurements were made near borehole locations and nominally at the center of the surface wave arrays.

A typical MASW field layout is shown in Appendix A. MASW equipment used during this investigation consisted of two Geometrics Geode signal enhancement seismographs, 4.5 Hz vertical geophones, seismic cable, 20 lb sledgehammer, and an aluminum plate. MASW data were acquired along linear arrays of 48 geophones spaced 1.5 to 2.5 m apart. Shot points were located up to 9 m from the end geophone locations, as space was available and at every second geophone interval along the array. The 20 lb sledgehammer was used for the offset source locations and interior source locations. Data from the transient impacts (hammers) were averaged 5 times, or more, to improve the signal-to-noise ratio. Photographs of typical MASW equipment are presented in Appendix A. All seismic records were stored on a laptop computer with file names and acquisition parameters documented on a field log.

The passive surface wave equipment consisted of two Geometrics Geode signal enhancement seismographs, 4.5 Hz vertical geophones, and seismic cables. Passive surface wave data were acquired along linear arrays of 48, 4.5 Hz geophones coincident with the MASW arrays. Ambient noise measurements were made along these arrays for at least 30 minutes at a 2 ms sample rate (60+, 30 second records). All passive surface wave data were stored on a laptop computer for later processing. The field geometry and associated files names were documented in field data acquisition forms.

HVSR data were acquired at a seven locations on site (Figure 1) utilizing either a Nanometrics Trillium Compact 120 second seismometer coupled to a Nanometrics Centaur data acquisition unit (referred to herein as Trillium) and a Micromed Tromino® ENGY (herein referred to as Tromino). Microtremor measurements were made for at least 30 minutes at each measurement location with data recorded at 100 samples per second with the Trillium and 128 samples per second with the Tromino. Microtremor data were stored in the data acquisition system and downloaded as Miniseed or ASCII format files at the end of data acquisition.

## 4 DATA REDUCTION AND MODELING

HVSR data were reduced using the Geopsy Version 2.9.1 software package (<http://www.geopsy.org>) developed by Marc Wathelet, ISTERre, Grenoble, France with the help of many other researchers.

Microtremor data recorded by the Trillium were exported to miniseed format and the Tromino data were exported to an ASCII file using the software package Grilla, provided with the instrument. The data file was then loaded into the Geopsy software package, where data file columns containing the vertical and horizontal (north and east) components and the sample rate were specified. HVSR was typically calculated over a frequency range dependent upon the observed site response and using a time window length of 90 s. Time windows were automatically picked. Fourier amplitude spectra were calculated after applying a 5% cosine taper and smoothed by the Konno and Ohmachi filter with a smoothing coefficient value of 40. The vertical amplitude spectra were divided by the root-mean-square (RMS) of the horizontal amplitude spectra to calculate the HVSR for each time window and the average HVSR. Time windows containing clear transients (nearby foot or vehicular traffic) or yielding poor quality results were then deleted and the computations repeated. The average HVSR peak frequency and standard deviation from all time windows used for analysis were computed and presented along with the standard deviation of the HVSR amplitudes for all time windows.

The 2D MASW data were reduced using the software Seisimager/SW developed by Geometrics, Inc. and Seismic Pro Surface V8 developed by Geogiga using the following steps:

- Input all seismic records collected along a profile and geometry into Seisimager.
- Calculate cross correlation of all pairs of receivers over a multiple user-defined offset ranges and sort by the midpoint of the receiver a pair.
- Combine cross correlations gathers with different receiver spacings, specific offset range, and a common midpoint at 15 or 16 m (~50 ft) intervals along each profile, outputting the data file.
- Input common midpoint cross correlation gather seismic records into Seismic Pro Surface software.
- Apply wavefield transform to seismic record to convert the data from time – offset to phase velocity – frequency space.
- Identify and pick Rayleigh wave dispersion curve.
- Repeat for all shot records.
- Apply near-field criteria (maximum wavelength equal 1 to 1.3 times the source to midpoint of receiver array distance).
- Merge multiple dispersion curves associated with the same receiver midpoint (i.e. position along the profile at 15 or 16 m (~50 ft) intervals) but different offset ranges used for the cross correlation gathers, as necessary.

Array and refraction microtremor data were extracted along 30 m intervals of the seismic lines which were approximately centered at the midpoint of the MASW cross correlation gathers. The array microtremor data were reduced using the software Seisimager SW developed by Oyo Corporation/Geometrics, Inc. and the following steps:

- Input all seismic records for a dataset into software.
- Load geometry (x and y positions) for each channel in seismic records.
- Calculate the SPAC coefficients for each seismic record and average.
- For each frequency calculate the RMS error between the SPAC coefficients and a Bessel function of the first kind and order zero over a user defined phase velocity range and velocity step.
- Plot an image of RMS error as a function for frequency (f) and phase velocity (v).
- Identify and pick the dispersion curve as the continuous trend on the f-v image with the lowest RMS error.
- Convert dispersion curves to appropriate format for modeling.
- Combine multiple passive dispersion curves, as appropriate.
- Calculate a representative dispersion curve for the passive dispersion data using a moving average polynomial curve fitting routine.

The refraction microtremor data were reduced using the Optim™ Software and Data Services SeisOpt® ReMi™ v5.0 data analysis package. Data reduction steps included the following:

- Conversion of SEG-2 format field files to SEG-Y format.
- Data preprocessing which includes trace-equalization gaining and DC offset removal.
- Erasing receiver geometry present in the file header.
- Computing the velocity spectrum of each record by p-f transformation.
- Combining the individual p-f transforms into one image.
- Picking and saving the velocity spectrum image.
- Reformat dispersion data to input format for modeling software.

The Rayleigh wave dispersion curves from various coincident data sets were combined (all MASW and passive dispersion data for a 1D sounding or all data with the midpoint of the receiver array over a user defined position range along a profile) to form a composite dispersion curve. Composite dispersion curves were generated at 15 m intervals along Lines 1, 3, and 4, and at 16 m intervals along Line 2. A total of 20 composite dispersion curves were developed for modeling along the profiles. A representative dispersion curve was calculated for each composite dispersion curve using the moving average polynomial curve fitting routine in the software package WinSASW V3.

An iterative forward and inverse modeling process was used to generate an S-wave velocity model for each representative dispersion curve. During this process an initial velocity model was generated based on general characteristics of the dispersion curve. The dispersion curve for this model was then calculated and compared to the observed dispersion curves. Adjustments were then made to the model parameters (layer thickness and  $V_S$ ) manually (forward modeling) and automatically (inverse modeling) until an acceptable agreement with the observed data was obtained. Rayleigh wave dispersion data were modeled using the fundamental and effective mode forward and inverse modeling routine in the WinSASW V3 software package.

Data inputs into the Rayleigh wave modeling software include layer thickness, S-wave velocity, P-wave velocity, and mass density. Because the primary purpose of this investigation was to

develop 2D images of velocity structure along several profiles, models had about twice the number of layers typically used for modeling.

P-wave velocity and mass density only have a very small influence (i.e. less than 10%) on the S-wave velocity model generated from a surface wave dispersion curve. However, realistic assumptions for P-wave velocity, which is significantly impacted by the location of the saturated zone, and mass density will slightly improve the accuracy of the S-wave velocity model.

Constant mass density values of 1.9 to 2.2 g/cm<sup>3</sup> were used in the profile for subsurface soils/rock depending on P- and S-wave velocity. Within the normal range encountered in geotechnical engineering, variation in mass density has a negligible ( $\pm 2\%$ ) affect on the estimated  $V_S$  from surface wave dispersion data. During modeling of Rayleigh wave dispersion data, the compression wave velocity,  $V_P$ , for unsaturated sediments was estimated using a Poisson's ratio,  $\nu$ , of 0.3 and the relationship:

$$V_P = V_S [(2(1-\nu))/(1-2\nu)]^{0.5}$$

Poisson's ratio has a larger affect than density on the estimated  $V_S$  from Rayleigh wave dispersion data. Achenbach (1973) provides approximate relationship between Rayleigh wave velocity ( $V_R$ ),  $V_S$  and  $\nu$ :

$$V_R = V_S [(0.862 + 1.14 \nu)/(1 + \nu)]$$

Using this relationship, it can be shown that  $V_S$  derived from  $V_R$  only varies by about 10% over possible 0 to 0.5 range for Poisson's ratio where:

$$\begin{aligned} V_S &= 1.16V_R \text{ for } \nu = 0 \\ V_S &= 1.05V_R \text{ for } \nu = 0.5 \end{aligned}$$

The realistic range of the Poisson's ratio for typical unsaturated sediments is about 0.25 to 0.35. Over this range,  $V_S$  derived from modeling of Rayleigh wave dispersion data will vary by about 5%. An intermediate Poisson's ratio of 0.3 was selected for modeling to minimize any error associated with the assumed Poisson's ratio.

To reduce errors associated with expected high Poisson's ratio of saturated sediments, the saturated zone was anchored at an assumed depth of about 33 ft, based on borehole data provided by Arup, Inc., when modeling the surface wave dispersion data. Poisson's ratio of the saturated zone was set to about 0.46 depending on the modeled S-wave velocity (e.g. higher velocity sediments expected to have a lower Poisson's ratio in the saturated zone).

## 5 INTERPRETATION AND RESULTS

S-wave velocity models were developed at nominal 50 ft intervals along each profile. A sample of the developed 1D S-wave velocity model is presented as Figure 2. The velocity models were combined and color enhanced contour maps developed to present the S-wave velocity structure beneath each profile. S-wave velocity models for Lines 1 to 4 are presented in Figures 3, 4, 5, and 6, respectively.

The Rayleigh wave phase velocities from the shallower MASW and deeper passive surface wave measurements were generally found to be in good agreement in the region of overlapping wavelengths as shown on Figure 2. The velocity models developed for each representative dispersion curve reflect the average velocity structure beneath the arrays. For MASW and passive surface wave data collected along Lines 1 to 4, the velocity models generally reflect the average velocity structure beneath approximate 100 ft segments of the profiles centered on the measurement locations, which was necessary to achieve the desired depth of investigation. It should be noted that the  $V_S$  models only shown to approximately 50 ft from the end locations of the seismic lines. Depth of investigation of the models is about 100 ft.

The S-wave velocity of the Franciscan complex is not well constrained by the surface wave  $V_S$  models. The PS Suspension log from **GEOVision** Report 18113-01 indicates that the velocity of the Franciscan complex may be highly variable and contain velocity inversions (higher velocity material overlying lower velocity material) at this site. Surface wave techniques cannot resolve such structures at depth and, therefore, velocities are likely more representative of the rocks average velocity structure. The resolution decreases gradually with depth due to the loss of sensitivity of the dispersion curve to changes in  $V_S$  at greater depth. The surface wave  $V_S$  models should only be used to determine the approximate depth Franciscan complex. The surface wave phase velocity data was degraded in the northwestern portion of the site where bedrock is shallowest due to probable higher modes influence on the surface wave phase velocity data.

In general, the subsurface velocity structure consists of the surficial layer of sediments with a S-wave velocity of about 1,200 ft/s or less. Followed by a thicker zone of sediments with a S-wave velocity ranging from greater than 1,200 ft/s to 1,800 ft/s. The top of Franciscan complex bedrock corresponds with the 2,000 to 2,200 ft/s velocity contours and have been interpreted to approximately track the 2,000 ft/s contour shown on S-wave velocity models for discussion purposes. The contact of the sediments and Franciscan generally deepens to the south and west along the  $V_S$  profiles.

The  $V_S$  model for Line 1 is presented as Figure 3. Seismic velocity increases to 2,000 ft/s at a depth of about 38 ft beneath western end of the model, about 22 ft beneath the central portion of the model, and 19 ft beneath the eastern portion of the model. The average S-wave velocity of the upper 30 m ( $V_{S30}$ ) ranges from about 566 at the western portion to 743 ft/s at the eastern portion of the model.

The  $V_S$  model for Line 2 is presented as Figure 4. Seismic velocity increases to 2,000 ft/s at a depth of about 40 ft beneath southern end of the model, about 30 ft beneath the central portion of the model, and 18 ft beneath the northern end of the model. The average S-wave velocity of the

upper 30 m ranges from about 567 at the southern portion of the model to 705 ft/s at the northern portion of the model.

The  $V_S$  model for Line 3 is presented as Figure 5. Seismic velocity increases to 2,000 ft/s at a depth of about 65 ft beneath western end of the model, about 56 ft beneath the central portion of the model, and 47 ft beneath the eastern end of the model. The average S-wave velocity of the upper 30 m ranges from about 479 at the western portion of the model to 516 ft/s at the eastern portion of the model.

The  $V_S$  model for Line 4 is presented as Figure 6. Seismic velocity increases to 2,000 ft/s at a depth of about 69 ft beneath southern end of the model, about 57 ft beneath the central portion of the model, and 48 ft beneath the northern end of the model. The average S-wave velocity of the upper 30 m ranges from about 478 at the southern portion of the model to 552 ft/s at the northern portion of the model.

The observed HVSR data for locations HV1 to HV7 are presented in Figures 7 and 8. The HVSR data collected at the seven locations are very similar, indicating that even the more subtle features likely have geologic origin. The dominant feature in the HVSR data is a high amplitude peak at a frequency of ranging from about 1.8 to 2.1 Hz, which is likely associated with an S-wave velocity structure at a greater depth than the sediment and Franciscan complex contact. However, the HVSR peak frequency is an approximation of the fundamental site frequency and is likely related to Franciscan becoming competent bedrock. Additionally, there is subtle, lower amplitude, high frequency HVSR peak at a frequency of range of about 10 to 12 Hz observed at HV4, HV5, and HV7. This peak may be related to the increase in S-wave velocity associated with the top of shallow Franciscan complex along this portion of the site.

## 6 CONCLUSIONS

Active and passive surface wave measurements were performed at the proposed locations of the MTA Potrero Facility, San Francisco, California. The primary purpose of the surface geophysical investigation was to map depth to bedrock beneath four seismic lines designated as Lines 1 through 4. The secondary purpose of the investigation was to provide a shear (S) wave velocity of the bedrock and overlying sediments and estimate the average S-wave velocity of the upper 30 m ( $V_{S30}$ ). The active surface wave technique utilized during this investigation consisted of the multi-channel analysis of surface waves (MASW) method. The passive surface wave techniques consisted of the horizontal over vertical spectral ratio (HVSR), array microtremor, and refraction microtremor methods. The locations of the geophysical testing arrays are presented in Figure 1 and Table 1.

Color enhanced contour maps were developed to present the S-wave velocity structure beneath each profile. S-wave velocity models for Lines 1 to 4 are presented in Figures 3, 4, 5, and 6, respectively. The top of Franciscan complex bedrock is interpreted to approximately correspond to the 2,000 to 2,200 ft/s velocity contours shown on S-wave velocity models. The contact of the sediments and Franciscan generally deepens to the south and west along the  $V_S$  profiles. The velocities of the Franciscan complex may be highly variable and contain velocity inversions at this site. Therefore, velocities of the Franciscan derived from the surface wave techniques likely are more representative of the average rock velocities. Depth of investigation of the models is about 100 ft.

Observed HVSR data are presented as Figures 7 and 8. The dominant feature in the HVSR data is a high amplitude peak at a frequency of ranging from about 1.8 to 2.1 Hz, which is likely associated with an S-wave velocity structure at a greater depth than the sediment and Franciscan complex contact. However, the HVSR peak frequency is related to the fundamental site frequency which is likely related to Franciscan becoming competent bedrock at depth beneath the site.

The average S-wave velocity of the upper 30 m ( $V_{S30}$ ) ranges from about 478 to 743 ft/s. Therefore, according to the Uniform and International Building Codes, the area in the vicinity of the surface wave arrays is classified as Class C, very dense soil and soft rock.

## 7 REFERENCES

- Achenbach, J.D., 1973, *Wave Propagation in Elastic Solids*, Elsevier, Amsterdam, The Netherlands.
- Aki, K. (1957). Space and time spectra of stationary stochastic waves, with special reference to microtremors. *Bull. Earthq. Inst. Univ. Tokyo*, v. 35, pp. 415–457.
- Albarello, D. and G. Gargani, 2010, “Providing NEHRP soil classification from the direct interpretation of effective Rayleigh-wave dispersion curves”, *Bulletin of the Seismological Society of America*, Vol. 100, No. 6, p 3284-3294.
- Brown, L.T., 1998, “Comparison of  $V_S$  profiles from SASW and borehole measurements at strong motion sites in Southern California”, Master’s thesis, University of Texas, Austin.
- Brown, L. T., Diehl, J. G., and R. L. Nigbor (2000). A simplified method to measure average shear-wave velocity in the top 30 m ( $V_{S,30}$ ), Proc. 6<sup>th</sup> International Conference on Seismic Zonation, pp. 1–6.
- BSSC, 2003, *NEHRP recommended provisions for seismic regulations for new buildings and other structure (FEMA 450), Part I: Provisions*, Building Seismic Safety Council, Federal Emergency Management Agency, Washington D.C.
- Capon, J. (1969). High-resolution frequency-wavenumber spectrum analysis, Proc. Institute of Electrical and Electronics Engineers (IEEE), v. 57, no. 8, pp. 1408–1418.
- Comina, C., S. Foti, D. Boiero, and L. V. Socco (2011). Reliability of  $V_{S,30}$  evaluation from surface-wave tests, *J. Geotech. Geoenviron. Eng.*, pp. 579–586.
- Foti, S., 2000, “Multistation Methods for Geotechnical Characterization using Surface Waves”, Ph.D. Dissertation, Politecnico di Torino, Italy.
- García-Jerez A, Piña-Flores J, Sánchez-Sesma F, Luzón, F, Perton, M, 2016, A computer code for forward computation and inversion of the H/V spectral ratio under the diffuse field assumption, *Computers & Geosciences*, In Press.
- Imai, T., Fumoto, H., and Yokota, K., 1976, “P- and S-Wave Velocities in Subsurface Layers of Ground in Japan”, Oyo Corporation Technical Note N-14.
- International Committee of Building Officials, 2000 International Building Code, ICC, Hauppauge, NY, Section 1615.1.1
- Joh, S.H., 1996, “Advances in interpretation and analysis techniques for spectral-analysis-of-surface-waves (SASW) measurements”, Ph.D. Dissertation, University of Texas, Austin.
- Joh, S.H., 2002, “WinSASW V2.0, Data Interpretation and Analysis for SASW Measurements”, Department of Civil Engineering, Chung-Ang University, Anseong, Korea.
- Lacoss, R. T., E. J. Kelly and M. N. Toksöz (1969). Estimation of seismic noise structure using arrays, *Geophysics*, v. 34, pp. 21-38.
- Ling, S. and H. Okada (1993). An extended use of the spatial correlation technique for the estimation of geological structure using microtremors, Proc. the 89<sup>th</sup> Conference Society of Exploration Geophysicists Japan (SEGJ), pp. 44–48 (in Japanese).

- Louie, J.N., 2001, “Faster, Better: Shear-Wave Velocity to 100 Meters Depth from Refraction Microtremor Arrays”, *Bulletin of the Seismological Society of America*, vol. 91, no. 2, p. 347-364.
- Martin, A. J. and J. G. Diehl, 2004, “Practical experience using a simplified procedure to measure average shear-wave velocity to a depth of 30 meters ( $V_{s30}$ )”, *Proceedings of the 13<sup>th</sup> World Conference on Earthquake Engineering*, Vancouver, B.C., Canada, August 1-6, 2004, Paper No. 952.
- Martin, A. J., J. B. Shawver and J. G. Diehl, 2006, “Combined use of Active and Passive Surface Wave Techniques for Cost Effective UBC/IBC Site Classification”, *Proceedings of the 8<sup>th</sup> National Conference on Earthquake Engineering*, San Francisco, California, Paper No. 1013.
- Nakamura Y, 1989, A method for dynamic characteristics estimation of subsurface using microtremor on the ground surface, *Quart. Reprt Rail. Tech. Res. Inst.*, Vol. 30, no. 1, p 25–33.
- Nogoshi M and Igarashi T, 1971, On the amplitude characteristics of microtremor (part 2), *J. Seismol. Soc. Japan*, Vol. 24, p 26–40 (in Japanese).
- Ohuri, M., A. Nobata, and K. Wakamatsu (2002). A comparison of ESAC and FK methods of estimating phase velocity using arbitrarily shaped microtremor arrays, *Bull. Seismol. Soc. Am.*, v. 92, no. 6, p. 2323–2332.
- Okada, H, 2003, “The Microtremor Survey Method,” Society of Exploration Geophysics Geophysical Monograph Series, Number 12, 135p.
- Park, C.B., Miller, R.D. and Xia, J., 1999a, “Multimodal analysis of high frequency surface waves”, *Proceedings of the Symposium on the Application of Geophysics to Engineering and Environmental Problems '99*, 115-121.
- Park, C.B., Miller, R.D. and Xia, J., 1999b, “Multichannel analysis of surface waves”, *Geophysics*, Vol 64, No. 3, 800-808.
- Rix, G.J., 1988, “Experimental study of factors affecting the spectral-analysis-of surface-waves method”, Ph.D. Dissertation, University of Texas, Austin.
- Roesset, J.M., Chang, D.W. and Stokoe, K.H., II, 1991, “Comparison of 2-D and 3-D Models for Analysis of Surface Wave Tests,” *Proceedings, 5<sup>th</sup> International Conference on Soil Dynamics and Earthquake Engineering*, Karlsruhe, Germany.
- Stokoe, K.H., II, Rix, G.L. and S. Nazarian, 1989, “In situ seismic testing with surface waves” *Proceedings, Twelfth International Conference on Soil Mechanics and Foundation Engineering, Vol. 1*, Rio de Janeiro, Brazil, pp. 330-334.
- Stokoe, K.H., II, Wright, S.G., Bay, J.A. and Roesset, J.M., 1994, “Characterization of Geotechnical Sites by SASW Method,” *ISSMFE Technical Committee 10 for XIII ICSMFE, Geophysical Characteristics of Sites*, A.A. Balkema Publishers/Rotterdam & Brookfield, Netherlands, pp. 146.

## 8 CERTIFICATION

All geophysical data, analysis, interpretations, conclusions, and recommendations in this document have been prepared under the supervision of and reviewed by a **GEOVision** California Professional Geophysicist.

Prepared by



---

David Carpenter  
California Professional Geophysicist, P.Gp. 1088  
**GEOVision** Geophysical Services



5/2/2018

Date

- \* This geophysical investigation was conducted under the supervision of a California Professional Geophysicist using industry standard methods and equipment. A high degree of professionalism was maintained during all aspects of the project from the field investigation and data acquisition, through data processing interpretation and reporting. All original field data files, field notes and observations, and other pertinent information are maintained in the project files and are available for the client to review for a period of at least one year.

A professional geophysicist's certification of interpreted geophysical conditions comprises a declaration of his/her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations or ordinances.

## **TABLES**

**TABLE 1 Location of Geophysical Arrays**

Location	Easting	Northing
Line 1, Distance = 0 ft	6,009,538	2,106,323
Line 1, Distance = 231 ft	6,009,769	2,106,332
Line 2, Distance = 0 ft	6,009,789	2,106,011
Line 2, Distance = 308 ft	6,009,771	2,106,320
Line 3, Distance = 0 ft	6,009,551	2,105,976
Line 3, Distance = 231 ft	6,009,782	2,105,992
Line 4, Distance = 0 ft	6,009,589	2,105,969
Line 4, Distance = 385 ft	6,009,573	2,106,354
HV1 Location	6,009,553	2,106,322
HV2 Location	6,009,611	2,106,020
HV3 Location	6,009,578	2,106,145
HV4 Location	6,009,717	2,106,243
HV5 Location	6,009,783	2,106,185
HV6 Location	6,009,663	2,106,323
HV7 Location	6,009,767	2,106,331

Note: Coordinates in California State Plane Coordinate System, NAD83 Zone 3 (0403), US Survey Feet.

## **FIGURES**



**Legend**

- Active and Passive Surface Wave Array
- H/V

**NOTES:**

1. California State Plane Coordinate System, NAD 83, Zone VI (0406), US Survey Feet
2. Base map source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

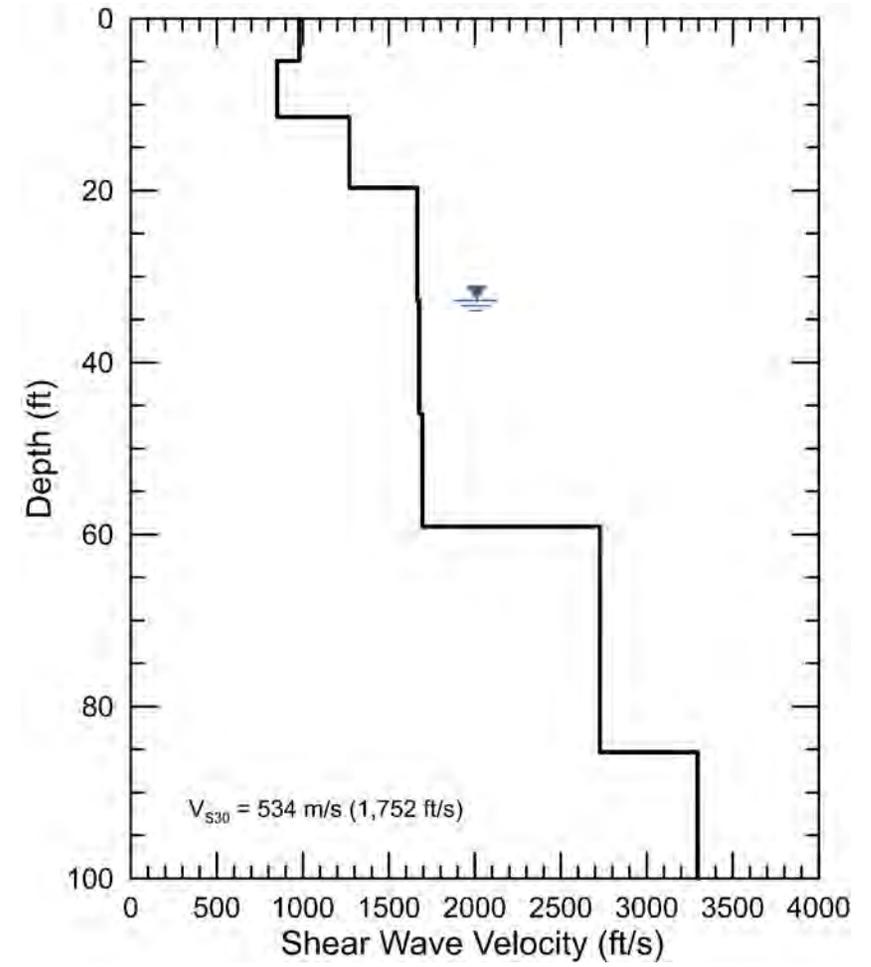
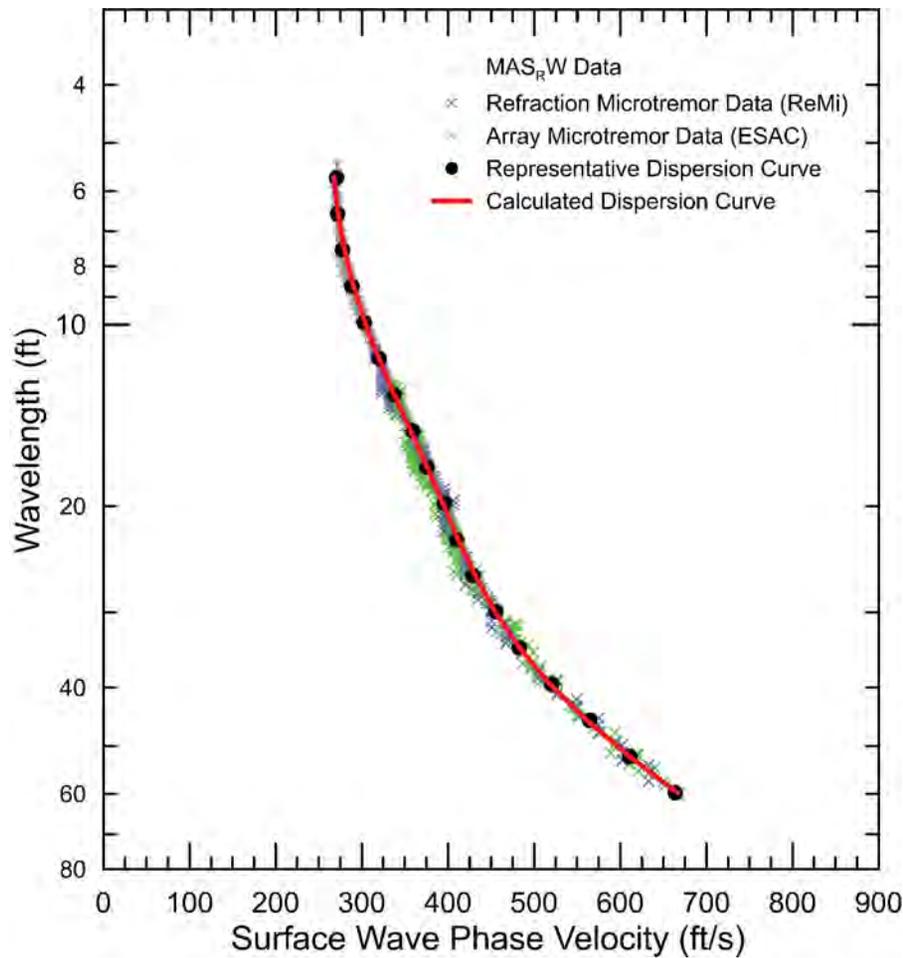


Date: 4/5/2018  
 GV Project: 17465  
 Developed by: D Carpenter  
 Drawn by: T Rodriguez  
 Approved by: A Martin  
 File Name: 18113\_1.MXD

**FIGURE 1  
SITE MAP**

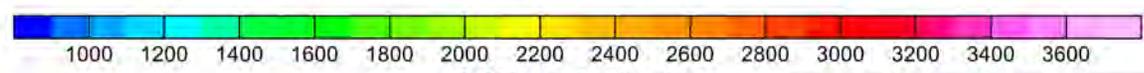
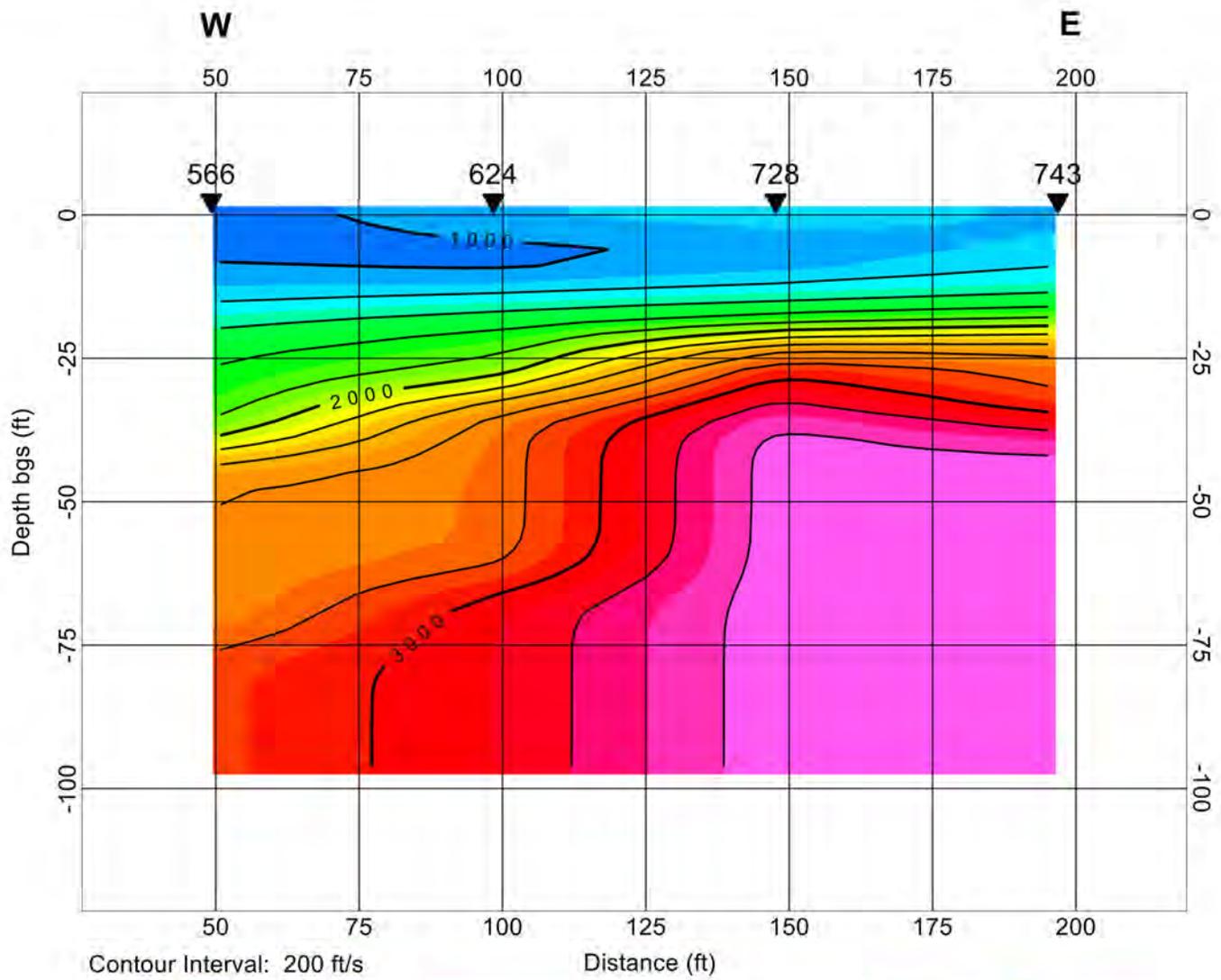
**SITE LOCATED AT  
MTA POTRERO SITE  
SAN FRANCISCO, CALIFORNIA**

**PREPARED FOR  
ARUP NORTH AMERICA LTD**



**Line 4 Distance 197 ft - Field, representative and calculated surface wave dispersion data (left) and associated  $V_s$  model (right)**

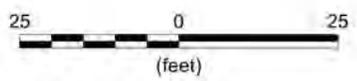
 Project No.: 18113 Date: May 1, 2018 Drawn By: D. Carpenter Approved By: D. Carpenter <small>File P:\Project Files\2018\18113-Arup San Fran...Report\Figure2.cdr</small>	Figure 2 Sample 1D Surface Wave Model - Line 4 Distance 197 ft Active and Passive Surface Wave Arrays
	MTA Potrero Site San Francisco, California
	Prepared for Arup, Inc.



**S-Wave Velocity**  
(ft/s)

**LEGEND**

743  
▼ Sounding Location and Vs30 (m/s)

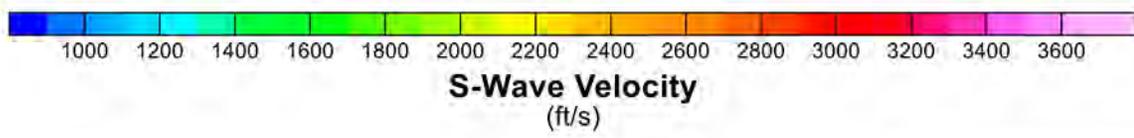
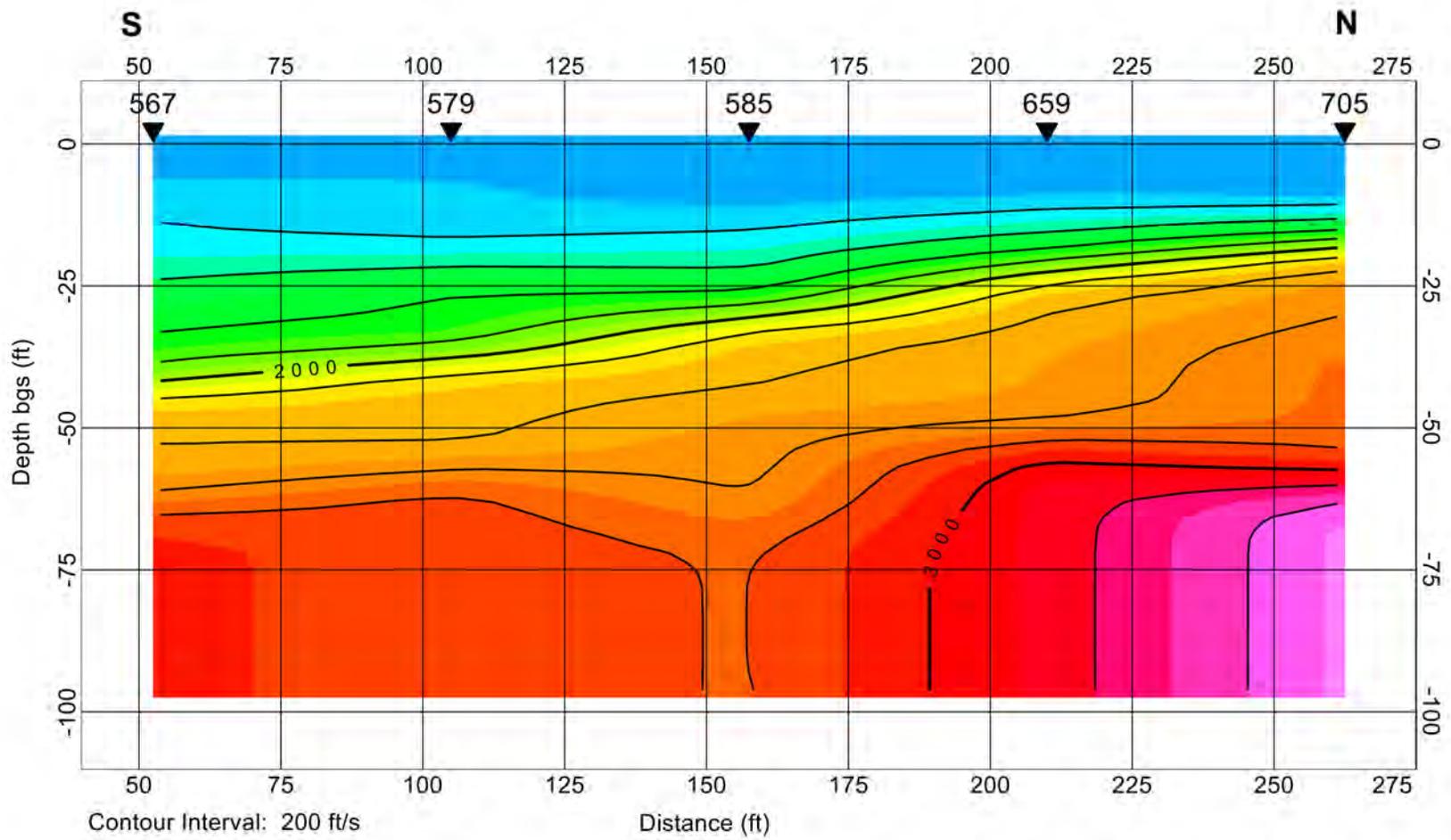


**Figure 3**

**Line 1: S-Wave Velocity Model**  
**GV Project No. 18113**

MTA Potrero Site  
San Francisco, CA

*Prepared for Arup, Inc.*



**LEGEND**

705  
▼ Sounding Location and Vs30 (m/s)

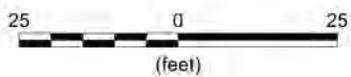
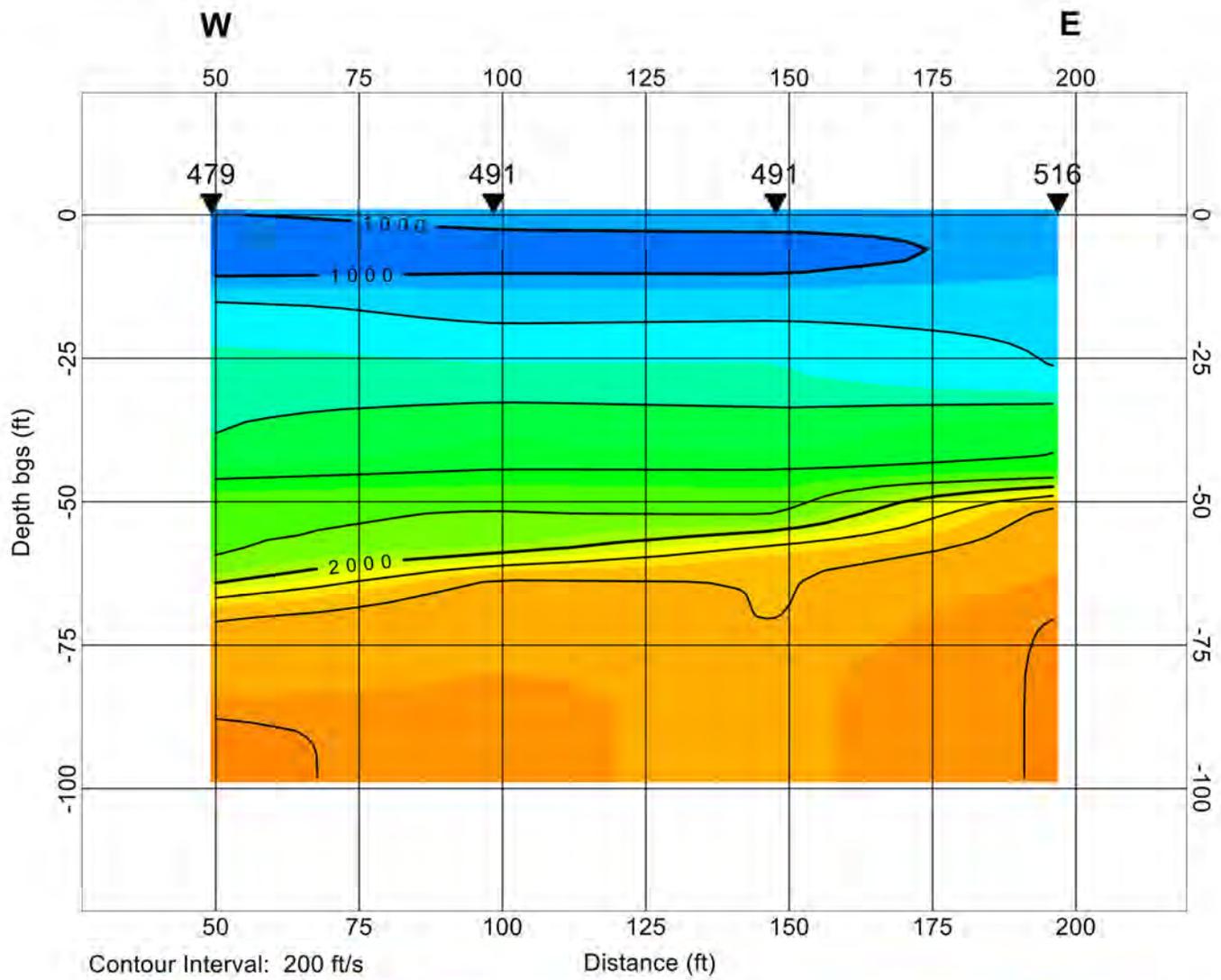
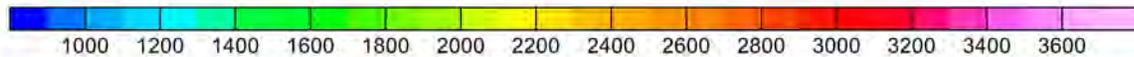


	Figure 4
	<b>Line 2: S-Wave Velocity Model</b> <b>GV Project No. 18113</b>
	MTA Potrero Site San Francisco, CA
	<b>Prepared for Arup, Inc.</b>



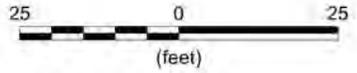
Contour Interval: 200 ft/s



**S-Wave Velocity**  
(ft/s)

**LEGEND**

552  
▼ Sounding Location and Vs30 (m/s)

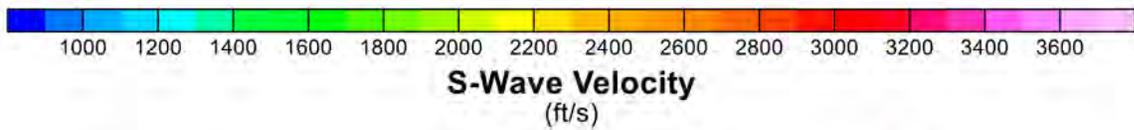
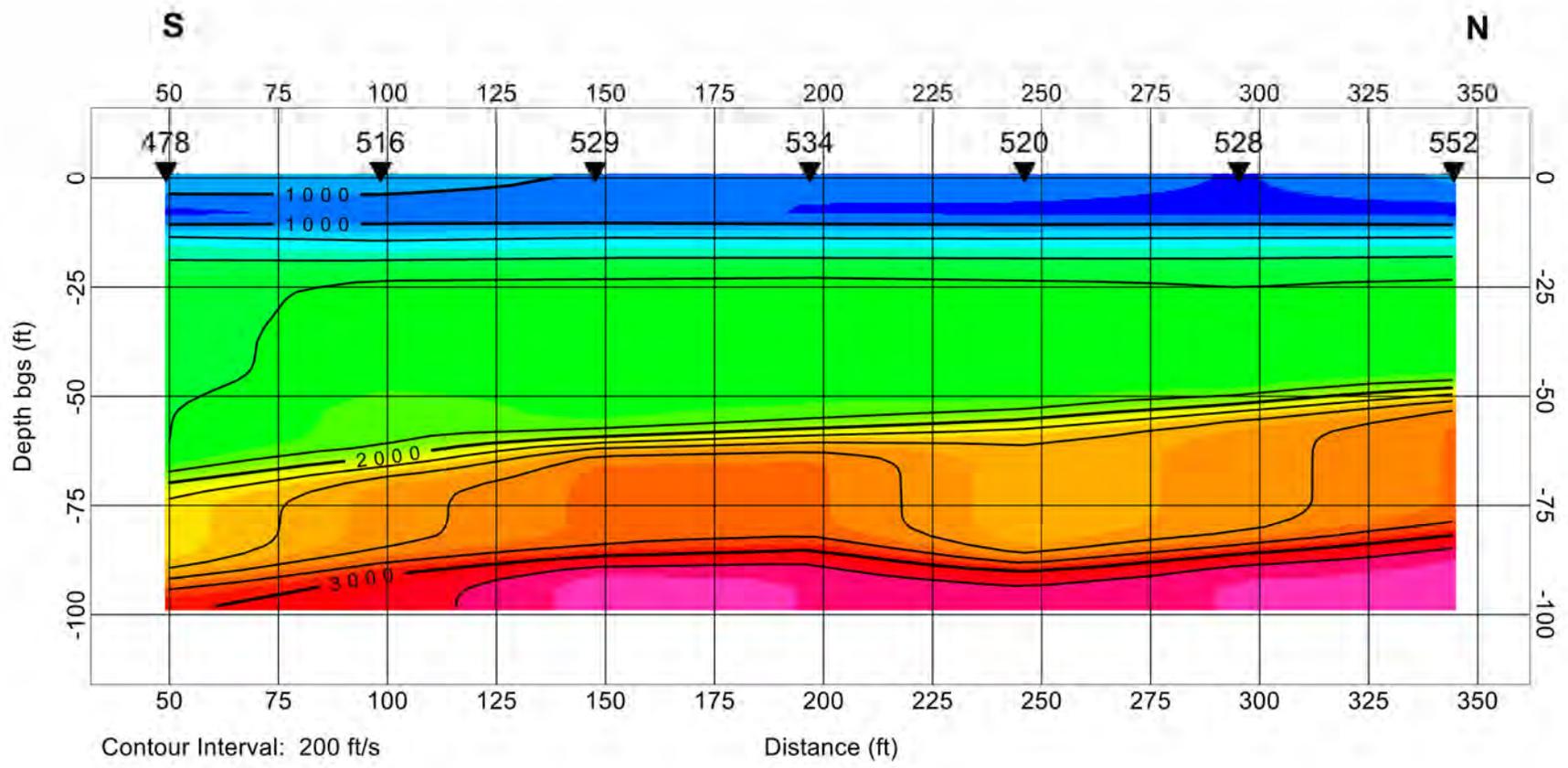


**Figure 5**

**Line 3: S-Wave Velocity Model**  
**GV Project No. 18113**

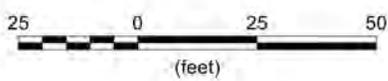
MTA Potrero Site  
San Francisco, CA

*Prepared for Arup, Inc.*

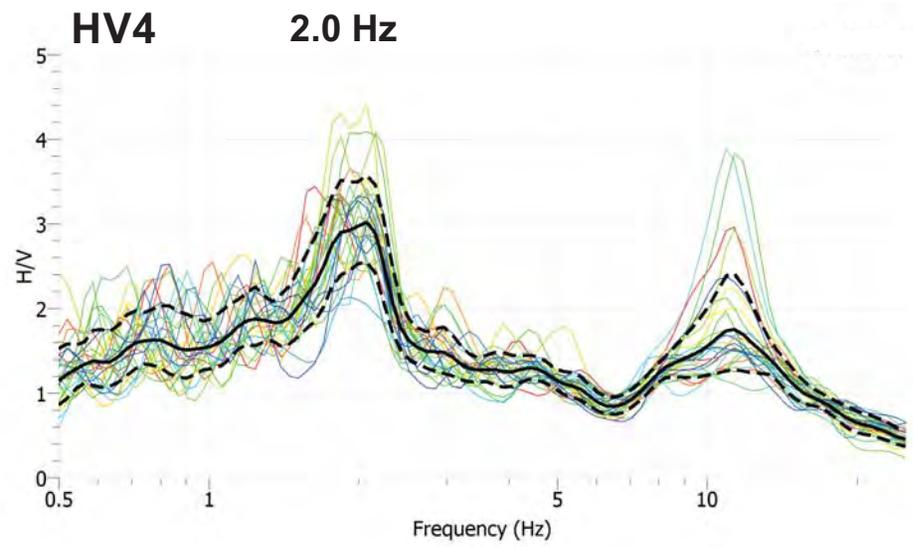
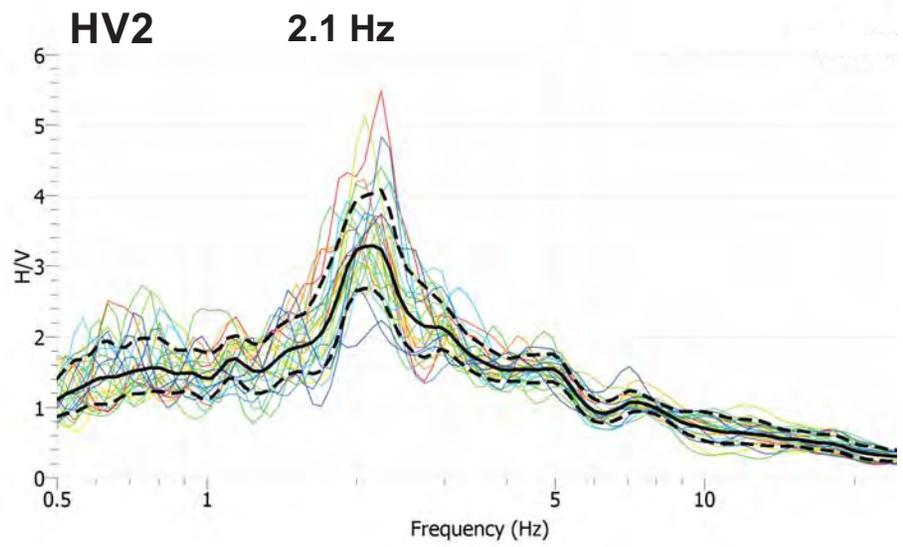
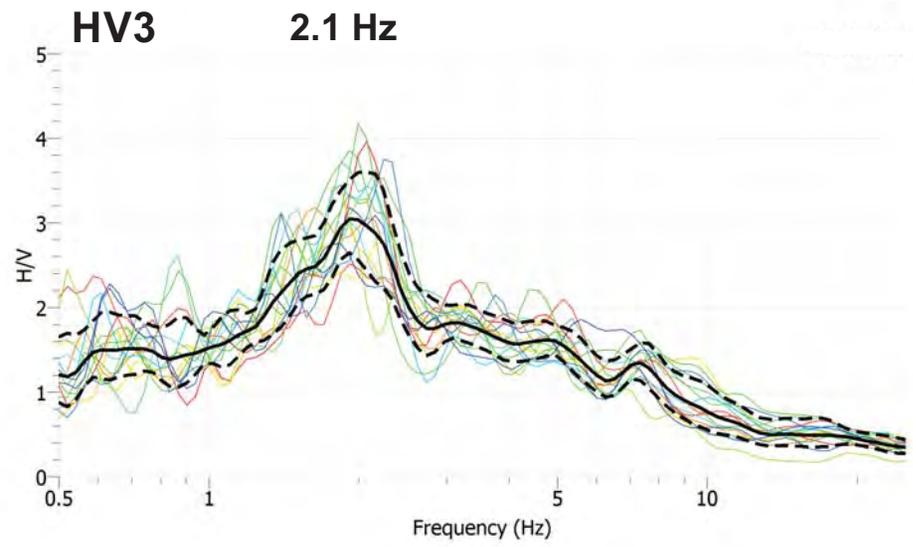
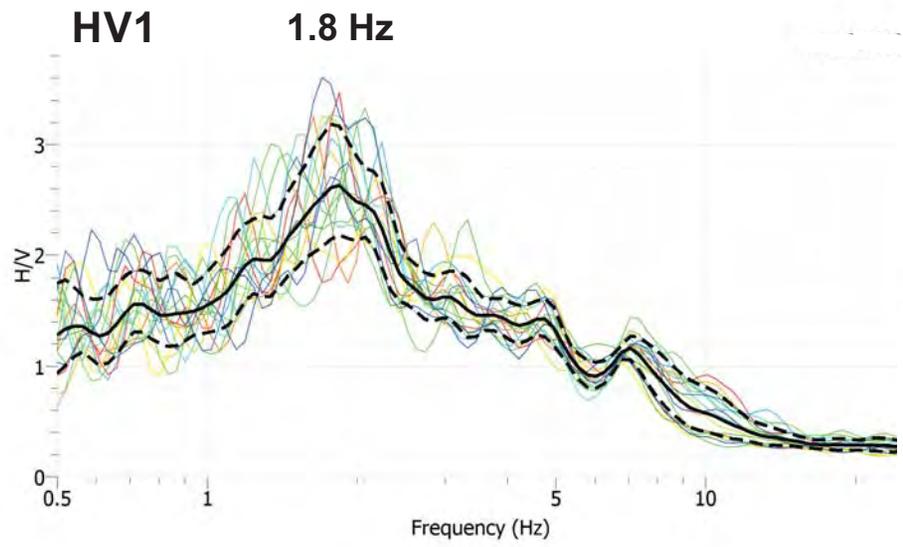


**LEGEND**

552  
 ▼ Sounding Location and Vs30 (m/s)



	<b>Figure 6</b>
	<b>Line 4: S-Wave Velocity Model GV Project No. 18113</b>
	MTA Potrero Site San Francisco, CA
	<b><i>Prepared for Arup, Inc.</i></b>

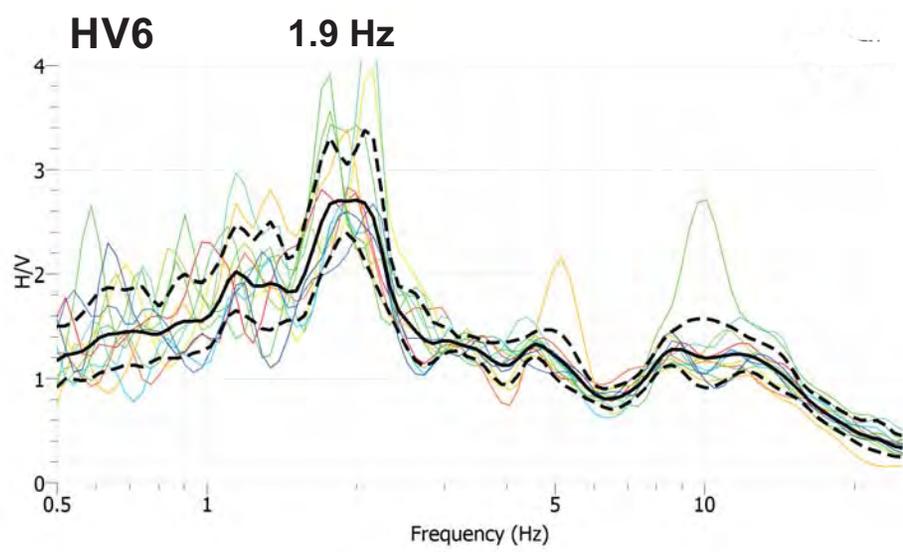
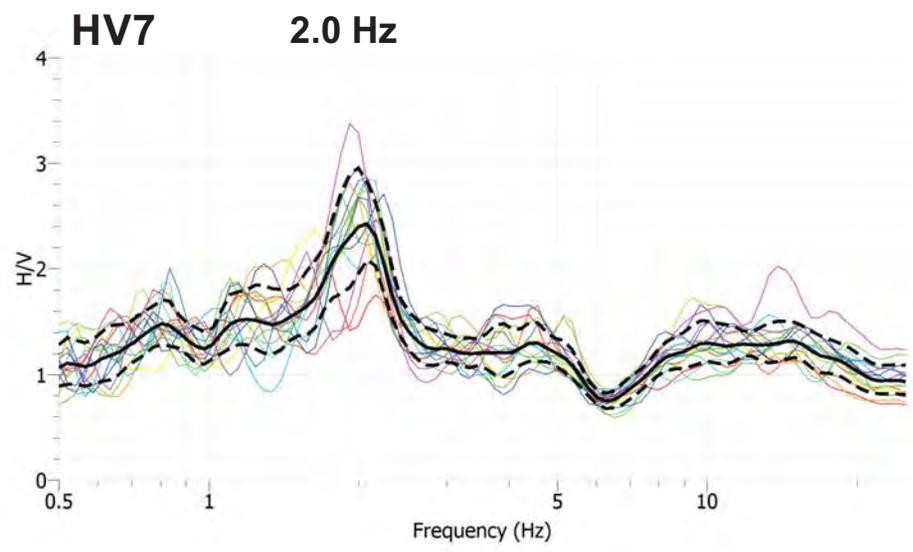
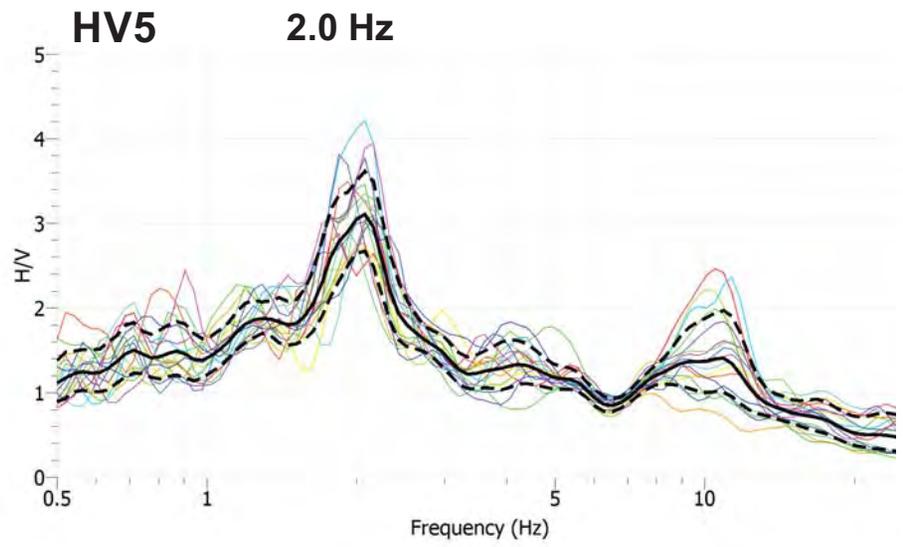


Project No.: 18113  
 Date: May 1, 2018  
 Drawn By: D. Carpenter  
 Approved By: A. Martin

File P:\\_Project Files\2018\18113-Arup San Fran\_-\_Report\Figure7.cdr

Figure 7  
 HVSR Data - Stations HV1 to HV4

Site Located at  
 MTA Potrero Facility  
 San Francisco, California  
 Prepared for  
 Arup, Inc.



 Project No.: 18113 Date: May 1, 2018 Drawn By: D. Carpenter Approved By: A. Martin <small>File P:\_Project Files\2018\18113-Arup San Fran_-_Report\Figure8.cdr</small>	Figure 8 HVSR Data - Stations HV5 to HV7
	Site Located at MTA Potrero Facility San Francisco, California
	Prepared for Arup, Inc.

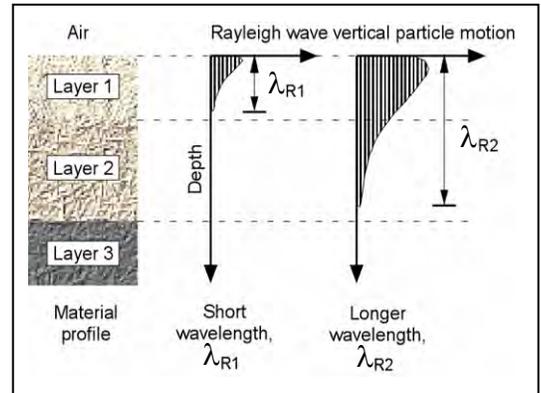
## **APPENDIX A**

# ACTIVE AND PASSIVE SURFACE WAVE TECHNIQUES



## Overview

Active and passive surface wave techniques are relatively new in-situ seismic methods for determining shear wave velocity ( $V_s$ ) profiles. Testing is performed on the ground surface, allowing for less costly measurements than with traditional borehole methods. The basis of surface wave techniques is the dispersive characteristic of Rayleigh waves when traveling through a layered medium. Rayleigh wave velocity is determined by the material properties (primarily shear wave velocity, but also to a lesser degree compression wave velocity and material density) of the subsurface to a depth of approximately 1 to 2 wavelengths. As shown in the adjacent diagram, longer wavelengths penetrate deeper and their velocity is affected by the material properties at greater depth. Surface wave testing consists of measuring the surface wave dispersion curve at a site and modeling it to obtain the corresponding shear wave velocity profile.



## Active Surface Wave Techniques

Active surface wave techniques measure surface waves generated by dynamic sources such as hammers, weight drops, electromechanical shakers, vibroseis and bulldozers. These techniques include the spectral analysis of surface waves (SASW) and multi-channel array surface wave (MASW) methods.



**Hammer Energy Sources**



**Accelerated Weight Drop**

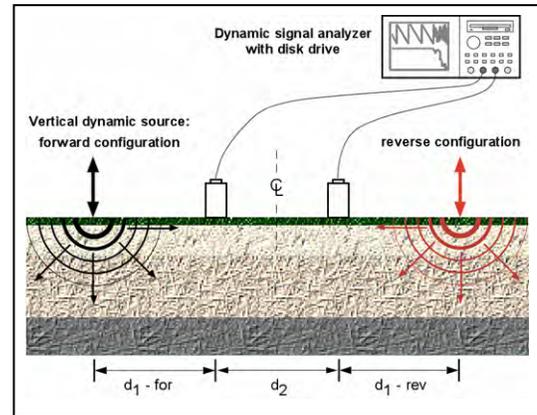


**Electromechanical Shaker**



**Bulldozer Energy Source**

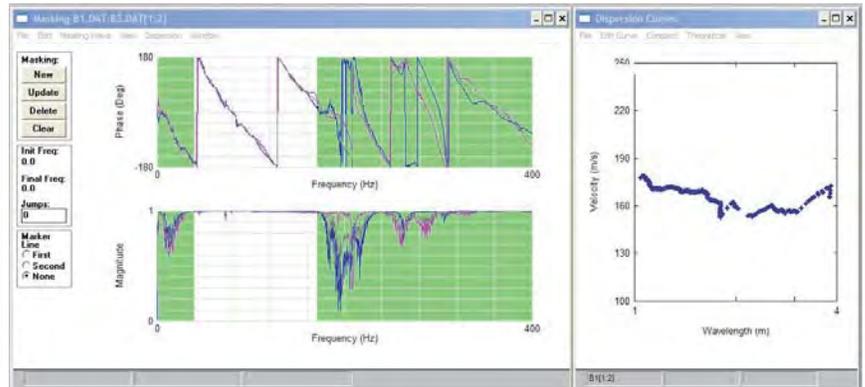
The SASW method is optimized for conducting  $V_S$  depth soundings. A dynamic source is used to generate surface waves of different wavelengths (or frequencies) which are monitored by two or more receivers at known offsets. An expanding receiver spread and optimized source-receiver geometry are used to minimize near field effects, body wave signal and attenuation. A dynamic signal analyzer is typically used to calculate the phase and coherence of the cross spectrum of the time history data collected at a pair of receivers. During data analysis, an interactive masking process is used to discard low quality data and to unwrap the phase spectrum, as shown in the figure below. The dispersion curve (Rayleigh wave phase velocity versus frequency or alternatively wavelength) is calculated from the unwrapped phase spectrum.



**SASW Setup**

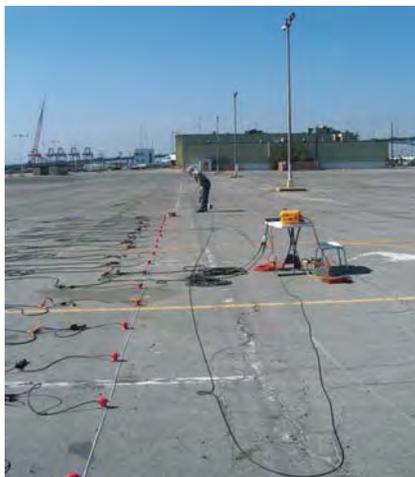


**HP Dynamic Signal Analyzer**

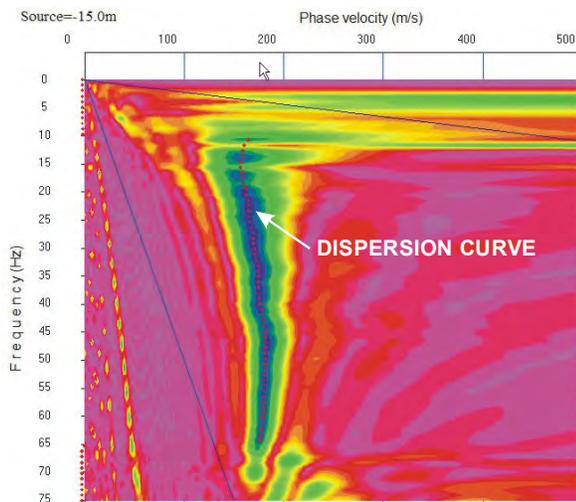


**Masking of Wrapped Phase Spectrum and Resulting Dispersion Curve**

The MASW field layout is similar to that of the seismic refraction technique. Twenty four, or more, geophones are laid out in a linear array with 1 to 2m spacing and connected to a multi-channel seismograph as shown below. This technique is ideally suited to 2D  $V_S$  imaging, with data collected in a roll-along manner similar to that of the seismic reflection technique. The source is offset at a predetermined distance from the near geophone usually determined by field testing. The Rayleigh wave dispersion curve is obtained by a wavefield transformation of the seismic record such as the f-k or  $\tau$ -p transforms. These transforms are very effective at isolating surface wave energy from that of body waves. The dispersion curve is picked as the peak of the surface wave energy in slowness (or velocity) – frequency space as shown. One advantage of the MASW technique is that the wavefield transformation may not only identify the fundamental mode but also higher modes of surface waves. At some sites, particularly those with large velocity inversions, higher surface wave modes may contain more energy than the fundamental mode.



**MASW Field Setup**

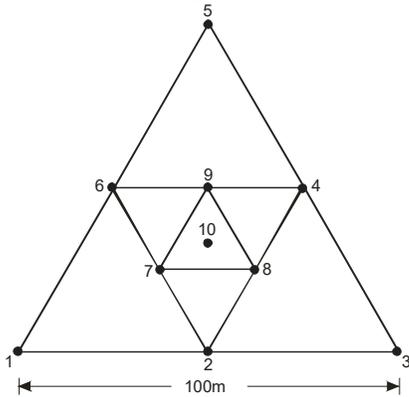


**Wavefield Transform of MASW data**

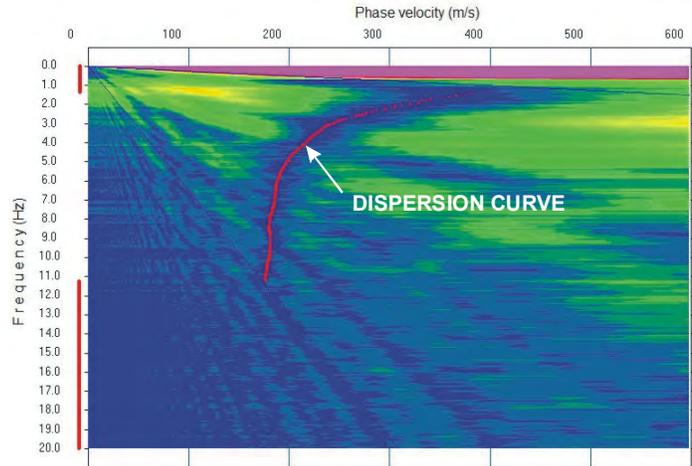
**Passive Surface Wave Techniques**

Passive surface wave techniques measure noise; surface waves from ocean wave activity, traffic, factories, etc. These techniques include the array microtremor and refraction microtremor (REMI) techniques.

The array microtremor technique typically uses 7 or more 4.5- or 1-Hz geophones arranged in a two-dimensional array. The most common arrays are the triangle, circle, semi-circle and "L" arrays. The triangle array, which consists of several embedded equilateral triangles, is often used as it provides good results with a relatively small number of geophones. With this array the outer side of the triangle should be at least as long as the desired depth of investigation. Typically, fifteen to twenty 30-second noise records are acquired for analysis. The spatial autocorrelation (SPAC) technique is one of several methods that can be used to estimate the Rayleigh wave dispersion curve. A first order Bessel function is fit to the SPAC function to determine the phase velocity for particular frequency. The image shown below shows the degree of fitness of the Bessel function to the SPAC function for a wide range of phase velocity and frequency. The dispersion curve, is the peak (best fit), as shown in the figure below.



**Triangle Array Geometry**

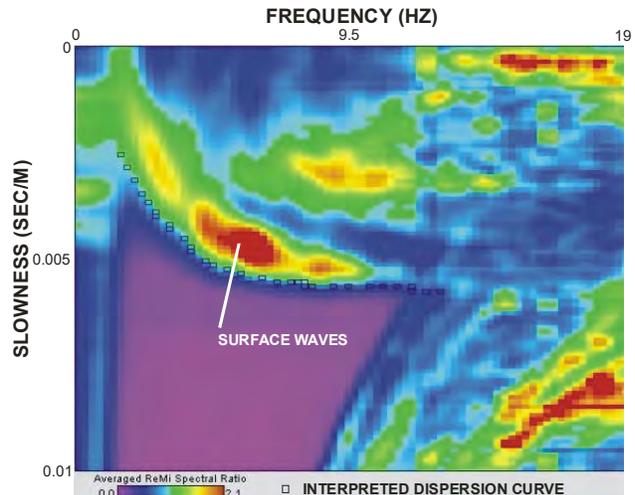


**Dispersion Curve from Array Microtremor Measurements**

The refraction microtremor (REMI) technique uses a field layout similar to the seismic refraction method (hence its name). Twenty-four, 4.5 Hz geophones are laid out in a linear array with a spacing of 6 to 8m and fifteen to twenty 30-second noise records are acquired. A slowness-frequency (p-f) wavefield transform is used to separate Rayleigh wave energy from that of other waves. Because the noise field can originate from any direction, the wavefield transform is conducted for multiple vectors through the geophone array, all of which are summed. The dispersion curve is defined as the lower envelope of the Rayleigh wave energy in p-f space. Because the lower envelope is picked rather than the energy peak (energy traveling along the profile is slower than that approaching from an angle), this technique may be somewhat more subjective than the others, particularly at low frequencies. The SPAC technique can also be used to extract the surface wave dispersion curve from linear array microtremor data providing there are omni-directional noise sources.



**Refraction Microtremor Array Layout**



**Wavefield Transform of REMI Data**

### **Depth of Investigation**

Active surface wave investigations typically use various sized sledge hammers to image the shear wave velocity structure to depths of up to 15m. Weight drops and electromechanical shakers can often be used to image to depths of 30m. Bulldozers and vibroseis trucks can be used to image to depths as great as 100m. Passive surface wave techniques can often image shear wave velocity structure to depths of over 100m, given sufficient noise sources and space for the receiver array. Large passive arrays, utilizing long-period seismometers with GPS clocks have been used to image shear wave velocity structure to depths of several kilometers.

### **Combined Active and Passive Surface Wave Testing**

The combined use of active and passive techniques may offer significant advantages on many investigations. It can be very costly to mobilize large energy sources for 30m/100ft active surface wave soundings. In urban environments, the combined use of active and passive surface wave techniques can image to these depths without the need for large energy sources. We have found that dispersion curves from active and passive surface wave techniques are generally in good agreement, making the combined use of the two techniques viable. It is not recommended that passive surface wave techniques be applied alone for UBC/IBC site classification investigations. Microtremor techniques do not generally characterize near surface velocity, which may have a significant impact of the average shear wave velocity of the upper 30m or 100ft and so should always be used in conjunction with SASW or MASW. An SASW sounding to a depth of 30m requires at least a 60m linear array. If sufficient space is not available for this, it may be possible to use a 45m triangle array on the site or place a 100-200m long REMI array along an adjacent sidewalk or an "L" array at an adjacent street intersection.



**Microtremor Measurements along Sidewalk**

### **Modeling**

There are several options for interpreting surface wave dispersion curves, depending on the accuracy required in the shear wave velocity profile. A simple empirical analysis can be done to estimate the average shear wave velocity profile. For greater accuracy, forward modeling of fundamental-mode Rayleigh wave dispersion as well as full stress wave propagation can be performed using several software packages. A formal inversion scheme may also be used. With many of the analytical approaches, background information on the site can be incorporated into the model and the resolution of the final profile may be quantified.

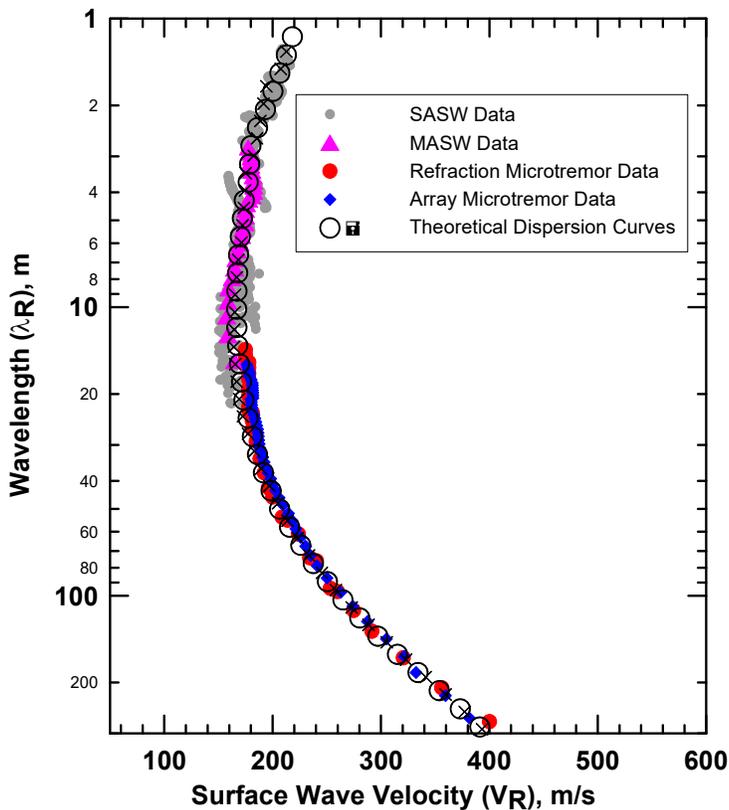
### **Applications**

Active and passive surface wave testing can be used to obtain  $V_s$  profiles for:

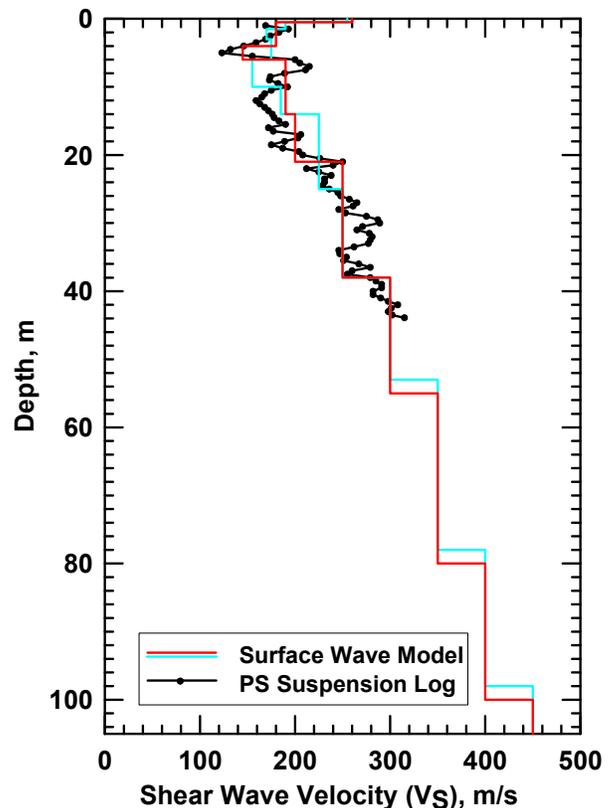
- UBC/IBC site classification for seismic design
- Earthquake site response
- Seismic microzonation
- Liquefaction analysis
- Soil compaction control
- Mapping subsurface stratigraphy
- Locating potentially weak zones in earthen embankments and levees

### Case History

The figures below show the surface wave dispersion curves and alternative shear wave velocity models for a site in Los Angeles, California. All of the previous figures illustrating SASW, MASW, array and refraction microtremor techniques were from this site. The dispersion curves from all four methods are shown on the left along with the theoretical dispersion curves for alternative S-wave velocity versus depth models on the right. Conditions at this site were very poor for active surface wave techniques because of the presence of very low velocity hydraulic fill. In fact, with active surface wave techniques it was only possible to image to a depth of about 12.5m with energy sources typically capable of imaging to 30m. There is excellent agreement in the dispersion curves generated from all of the methods over the overlapping wavelength ranges. The minor differences probably result from variable velocity of the hydraulic fill within the sampling volume of the specific methods. Two  $V_s$  versus depth models were generated to illustrate the difficulty modeling the highly variable, near surface velocity structure evident in the PS log. The two surface wave models yielded similar values for the average shear-wave velocity of the upper 30m ( $V_{s30}$ ), 201 and 202 m/s, illustrating that  $V_{s30}$  is much more tightly constrained than the actual layer thicknesses and velocities in the models.  $V_{s30}$  estimated from the PS log (194 m/s) is within 4% of that estimated from the two surface wave models (201 and 202 m/s). The small differences in  $V_{s30}$  between the two methods may easily result from the different sampling regimes (borehole versus large area) rather than errors in either of the methods.



**Field Data and Theoretical Dispersion Curve**



**$V_s$  Model**

In contrast to borehole measurements which are point estimates, surface wave testing is a global measurement, that is, a much larger volume of the subsurface is sampled. The resulting profile is representative of the subsurface properties averaged over distances of up to several hundred feet. Although surface wave techniques do not have the layer sensitivity or accuracy (velocity and layer thickness) of borehole techniques; the average velocity over a large depth interval (i.e. the average shear wave velocity of the upper 30m or 100ft) is very well constrained. Because surface wave methods are non-invasive and non-destructive, it is relatively easy to obtain the necessary permits for testing. At sites that are favorable for surface wave propagation, active and passive surface wave techniques allow appreciable cost and time savings.

# HVSR METHOD

## HORIZONTAL/VERTICAL SPECTRAL RATIO (HVSR) METHOD



### Overview

The HVSR method is a single station passive seismic method for estimating the fundamental site period (frequency), which is related to the thickness and average shear (S) wave velocity of the sediments overlying bedrock. It should be noted that the HVSR frequency peak is typically very close to, but not always identical to, the fundamental site frequency. Passive seismic techniques involve the recording of ambient noise emanating from ocean wave activity, atmospheric conditions, wind effects, traffic, industrial activity, construction activities, etc., and collectively are referred to as microseisms. Typically, microseisms with frequencies below 1 Hz have natural origins, whereas those with frequencies above 1 Hz are largely due to human activities. The HVSR technique is most often utilized as part of seismic microzonation studies of sedimentary basin, but is recently finding use in hydrogeologic studies to identify potential drill sites with bedrock at the greatest depth.



**Tromino ENGR used for HVSR measurements in shallow basins**

### Procedure

The HVSR method uses a 3-component seismometer to record ambient noise for a period of time between 15 minutes and several hours depending on the estimated thickness of the sediments and ambient noise conditions. The ratio of the Fourier amplitude spectra of the horizontal and vertical components is calculated to determine the frequency of the maximum HVSR response, commonly accepted as an approximation of the fundamental frequency ( $f_0$ ) of the sediment column overlying bedrock.

There are several options for interpreting HVSR data, depending upon the objectives of the investigation, including: joint inversion of the HVSR curve or peak frequency with surface wave dispersion curves, quarter-wavelength correlation, or simple empirical analysis using HVSR data collected at locations with known bedrock depth.

The quarter-wavelength approximation is:

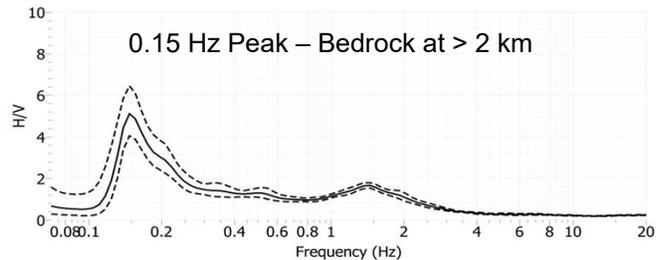
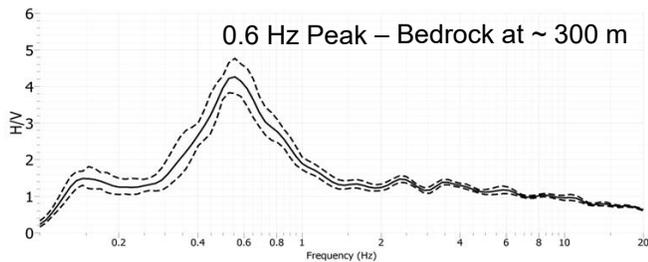
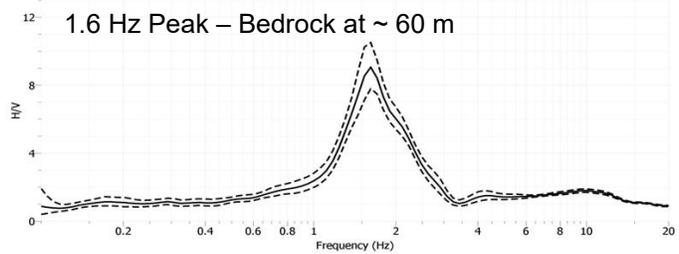
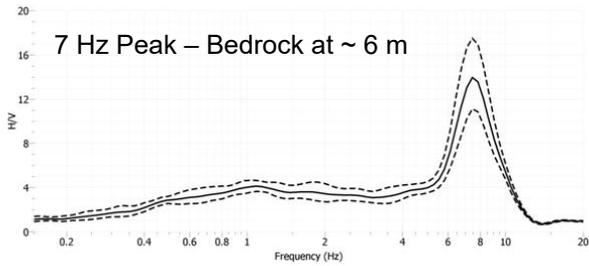
$$f_0 = \frac{\bar{V}_S}{4z}$$

where  $f_0$  is the site fundamental frequency,  $\bar{V}_S$  is the average shear-wave velocity of the soil column overlying bedrock at depth  $z$ . *This relationship* can be used to estimate the average shear wave velocity profile of the sediments when depth to bedrock is known or vice versa. As evident in this relationship, the fundamental site frequency is inversely proportional to bedrock depth; therefore, shallow bedrock will be associated with a high frequency peak and vice versa. If active and passive surface wave soundings are conducted in the deeper portion of sedimentary basins, it may be possible to develop an average S-wave velocity versus depth profile for the basin and use this along with the HVSR frequency peak to estimate bedrock depth. Alternatively, HVSR measurements can be made at locations with known depth to bedrock and a correlation between HVSR peak frequency and bedrock depth developed.

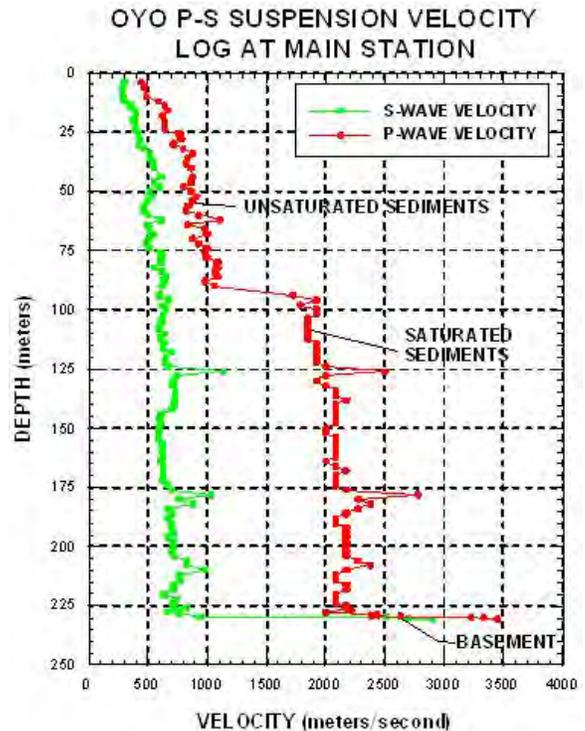
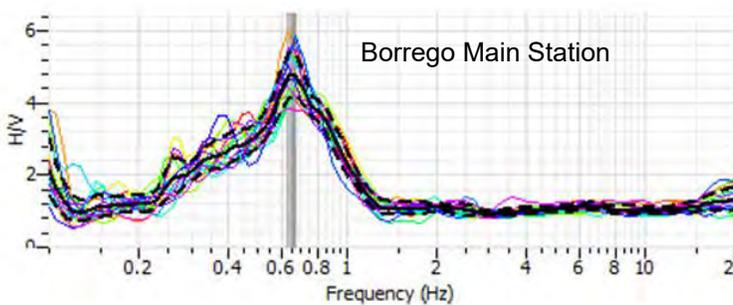


**Trillium Compact 120 second seismometer used for HVSR measurements in deep basins**

The figures below show HVSR data collected at sites with different approximate basement depths. Sites with shallow rock will have HVSR peaks at several Hz, while deep sedimentary basins will have HVSR peaks at a fraction of a hertz.



The figures below demonstrate the effectiveness of the quarter-wavelength approximation. At this site near Borrego Springs, California, a PS Suspension log was acquired in a borehole that encountered bedrock at a depth of 229 m. The PS Suspension log indicates that the average S-wave velocity of the sediments overlying bedrock is about 572 m/s. The HVSR peak at this site is 0.65 Hz which, combined with the average velocity of the sediments, indicates that bedrock is about 220 m deep, within 4% of that encountered in the borehole.



HVSR testing can be used for:

- Seismic microzonation studies.
- Confirming that the velocity structure is 1-D beneath large active/passive surface wave arrays.
- Reduce non-uniqueness in S-wave velocity models developed from surface wave testing through joint inversion.
- Estimate relative depth to bedrock for hydrogeologic studies.

**APPENDIX E**

**MASW GEOPHYSICAL SURVEY INVESTIGATION REPORT  
(NORCAL GEOPHYSICAL CONSULTANTS, INC.)**

**Geophysical Report**  
**Geophysical Investigation:**  
***SFMTA Potrero Facility Rebuild***  
**South San Francisco, California**

April 28, 2023  
NORCAL JOB NO. NS225145

**Prepared for:**

**LANGAN**

**Prepared by:**



NORCAL Geophysical Consultants, Inc. 321A Blodgett Street Cotati, California 94931  
P (707) 796-7170 F (707) 796-7175 [norcalgeophysical.com](http://norcalgeophysical.com)

**Environmental**



**Facilities**



**Geotechnical**



**Materials**

April 28, 2023

Langan Engineering and Environmental Services, Inc.  
3320 Data Drive, Suite 350  
Rancho Cordova, California 95680-7352

Subject: Geophysical Investigation:  
*SFMTA Potrero Facility Rebuild*  
San Francisco, California  
NORCAL Project No. NS225145

Attention: Ms. Jenna Fontaine

Dear Ms. Fontaine,

This report presents the findings of a geophysical investigation performed by NORCAL Geophysical Consultants, Inc., a Terracon company (NORCAL), for Langan Engineering and Environmental Services, Inc. (Langan). The investigation was performed for the SFMTA Potrero Facility Rebuild project located along Hampshire Street between 17<sup>th</sup> and Mariposa Streets in San Francisco, California. The investigation consisted of the seismic refraction (SR) & multichannel analysis of surface waves (MASW) geophysical methods.

This geophysical investigation is supplemental to a geotechnical investigation currently underway by Langan. The work was authorized under a Langan Subcontractor Authorization for Langan Project No. 770691710 dated March 31, 2023. NORCAL Professional Geophysicist David T. Hagin (CA PGp No. 1033) and Staff Geophysicist Matthew N. LaRiviere conducted the survey on March 30, 2023.

The scope of NORCAL's services for this project consisted of using geophysical methods to characterize the subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the standard of care ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, express or implied, is made by NORCAL.

We appreciate having the opportunity to provide our services for this project. If you have any questions or require additional geophysical services, please do not hesitate to call on us.

Sincerely,

**NORCAL Geophysical Consultants, Inc.**



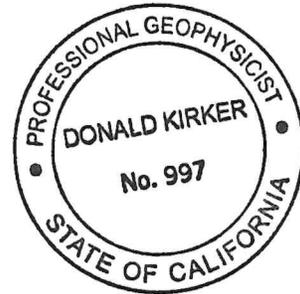
David T. Hagin  
California Professional Geophysicist  
PGp 1033



Donald J. Kirker, Reviewer  
California Professional Geophysicist  
PGp No. 997



4-28-2023



4-28-2023

## 1.0 INTRODUCTION

A rebuild is planned for the Potrero SFMTA facility in South San Francisco. “*The Potrero Yard Modernization Project will replace an obsolete, century-old bus yard with a modern, three-story, efficient bus maintenance and storage facility, equipped to serve the SFMTA’s growing fleet as it transitions to battery electric buses*” (sfmta.com). A geotechnical investigation is currently underway by Langan for this project. They will use the information from this geophysical survey to aid in the planning and design for foundations and other structural elements of the planned improvements.

The geophysical investigation comprised two methods: seismic refraction (SR) and multichannel analysis of surface waves (MASW) surveys. The SR method provides p-wave velocity values that may aid in determining the consolidation, cementation, or hardness of the underlying lithologic materials. The MASW method produces s-wave velocity values that can provide information regarding the relative strength of the underlying geology, which can be used to assess the seismic site class (Vs30).

## 2.0 SITE CONDITIONS

The following description of site conditions is derived from our observations during the survey and a review of publicly available aerial photographs, geologic and topographic maps.

Item	Description
<b>Site Information</b>	The survey site is located along Hampshire Street between 17 <sup>th</sup> and Mariposa Streets in San Francisco, California. The approximate geographic coordinates of the center of the site are: (37°45'49.9"N 122°24'27.0"W).
<b>Survey Site</b>	The seismic surveys were performed on an asphalt-covered, street-side parking area to the east of the current structure.
<b>Existing Topography</b>	Based on our Trimble Geo7X GPS, Google Earth and site observations, the site consists of relatively flat terrain that slopes very slightly southward. Surface elevations range from about 50- to 72-ft (NAVD88).
<b>Site Geology</b>	Available geologic maps (USGS OFR 2006-1037; CGS 2002, 2003) indicate that the site geology is near the mapped border of Quaternary age sand deposits to the southwest and Mesozoic ultramafic rocks to the northeast.

## 3.0 SCOPE OF WORK

Our scope of work included acquiring seismic data consisting of both SR to measure primary compressional-wave (p-wave), and MASW to quantify secondary shear-wave (s-wave) values. Data acquisition consisted of one SR line, designated as Line SR-1, and two MASW soundings, denoted MASW-1 and MASW-2.

Aerial photographic images showing the site vicinity and the locations of the seismic surveys are provided on **Plate 1 – Site Location Map**, as detailed in the legend. To provide documentation of our investigation, this geophysical report includes the site location map, details of our data acquisition and processing, as well as the resulting SR profile and MASW shear-wave models, presented in both tabular and graphic form.

## 4.0 SEISMIC REFRACTION SURVEY

### 4.1 SR SURVEY METHOD

The SR method is designed to measure subsurface variations in the compressional (P-) wave velocities, which will be denoted herein as “Vp.” Variations in Vp can be indicative of variations in the density and elastic properties of subsurface materials. The Vp values can typically be interpreted to differentiate between bedrock and overburden, as well as to evaluate the underlying bedrock. The SR method provides both vertical and lateral variations in the Vp of subsurface materials. These measurements can then be used to produce a two-dimensional (2D) cross-section (profile) illustrating variations in Vp versus depth and distance beneath the seismic line.

Typically, Vp is dependent on physical properties such as density, hardness, compaction, and induration. However, other factors such as bedding, fracturing and saturation also affect Vp. In general, the Vp of weathered rock and consolidated or cemented sedimentary deposits are higher than those of unconsolidated sediments or fill material. Within rock, higher Vp values typically correspond with harder, less weathered and/or fractured rock. Therefore, the configuration of Vp values may aid in determining the thickness of sedimentary and soil layers (overburden), and the character of the underlying bedrock.

Detailed descriptions of the SR methodology, the instrumentation we used, our data acquisition, analysis and interpretation procedures as well as the general limitations of the method are provided in **Appendix A – Seismic Refraction Survey**.

### 4.2 SR PROFILE

The results of the SR survey are illustrated by the color contoured seismic velocity cross-section (profile) shown on **Plate 2 – Seismic Refraction Profile**. The vertical axis represents elevation (NAVD88), and the horizontal axis represents the survey stationing established for the SR line, with the zero-value at the northwestern end of the line. The unit of measure for both axes is the US Survey Foot. The solid black line along the top of the contoured portion of the profile represents the ground surface. The maximum depth of investigation is determined by the greatest shot-to-receiver distance and is estimated to be 50-ft below ground surface.

### 4.3 SEISMIC P-WAVE VELOCITY VALUES

Seismic p-wave velocity ( $V_p$ ) is represented by the labeled contours and the color shading between contours and is presented in feet per second (ft/sec). The relationship between color and  $V_p$  is specified by the color scale shown below each profile. The color scales are identical (normalized) for ease of comparison.

The  $V_p$  measured by the seismic refraction survey range from slightly less than 1,000 ft/sec near the surface to greater than 10,000 ft/sec at depth. This velocity range can be differentiated into three sub-ranges which we define herein as low, moderate and high.

- *Low  $V_p$*  range from approximately 1,000 to 4,500 ft/sec and are represented by tan to yellow shading.  $V_p$  in this range typically represent unsaturated surficial soils, poorly consolidated sedimentary deposits or fill.
- *Moderate  $V_p$*  range from 4,500 to 6,500 ft/sec and are represented by shades of green to blue.  $V_p$  in this range typically represent more consolidated, cemented or saturated sediments and/or weathered rock.
- *High  $V_p$*  range from 6,500 to over 10,000 ft/sec and are represented by varying shades of maroon, typically representing rock with varying degrees of weathering. As  $V_p$  increases, weathering and/or fracturing typically decrease.

### 4.4 OBSERVATIONS

The distribution of  $V_p$  values allows for a general interpretation of thickness of soils and sediments and depth-to-rock, drawn from the  $V_p$  interpretations presented in Section 4.3.

- The profile for Line SR-1 shows high  $V_p$  (maroon) across the bottom of the profile, dropping in elevation toward the southwest, likely indicating the presence of hard rock. The high  $V_p$  are near 20-ft deep at the northwest end of the profile and drop to about 45-ft at the southwest end.
- Moderate  $V_p$  values (blue, green) are moderately thin on the northern end of the profile and thicken considerably toward the south, varying from about 15- to 30-ft thick. These values may represent the dune sands overlying the ultramafic rock. The sands are mapped toward the southwest, as indicated on the geologic map (CGS 2002, 2003).
- The upper portion of the profile shows 5- to 10-ft of surficial low  $V_p$  (tan, yellow), likely representing a layer of soils and/or poorly consolidated sedimentary deposits.

## 5.0 MASW SURVEY

### 5.1 MASW SURVEY METHOD

The Seismic Multichannel Analysis of Surface Waves (MASW) sounding survey measures the shear-wave ( $V_s$ ) velocities of the subsurface as a function of depth. The method used for this survey is referred to as a sounding, producing one-dimensional (1D) data that are presented in both tabular and graphic form as a layered shear wave model. The location of each sounding is the center of the geophone array. Descriptions of the MASW methodology, our data acquisition and analysis procedures, and the instrumentation we employed are provided in **Appendix B – MASW Sounding Survey**.

The standard method of reporting MASW data is to consider the location of the 1D velocity vs. depth model as the center point of the MASW array. However, this does not mean that the measured velocity values represent materials solely beneath that location. In fact, the subsurface conditions underlying the entire length of the array, and for several tens of feet to either side, contribute to the measured velocity values.

### 5.2 MASW TABLES AND STEP-CHART GRAPHS

The results of the MASW survey are listed in the tables presented in Section 5.3. The left columns of each table contain the depth ranges for each layer (feet below ground surface) and the right columns comprise the associated  $V_s$  values in feet per second (ft/sec). The results are also presented graphically in ft/sec by the step charts shown on **Plates 3 and 4 – MASW Soundings**.

The maximum depth of investigation is determined by the longest wavelength (lowest frequency) measured by the survey, which is a function of the site geology, the geophone spacing and the array length. The maximum depth of exploration for each sounding is approximated as 100-ft below ground surface. Note that although  $V_s$  generally increase with depth, both data sets indicate velocity inversions (lower  $V_s$  beneath higher  $V_s$ ).

### 5.3 SEISMIC S-WAVE VELOCITY VALUES

The s-wave layered models for MASW-1 and MASW-2 are presented by the following tables:

*MASW-1: Seismic S-Wave Velocity vs Depth*

<b>DEPTH RANGE (FT)</b>	<b>S-WAVE VELOCITY (FT/SEC)</b>
0 - 3	2,380
3 - 7	2,680
7 - 12	2,940
12 - 18	2,210
18 - 26	1,240
26 - 36	2,080
36 - 48	3,910
48 - 64	4,200
64 - 83	2,060
83 - 100	3,690

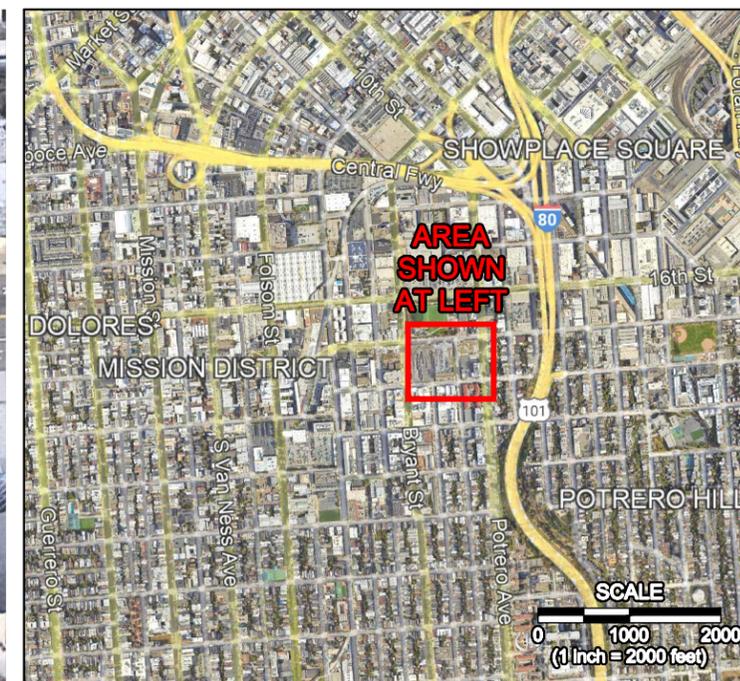
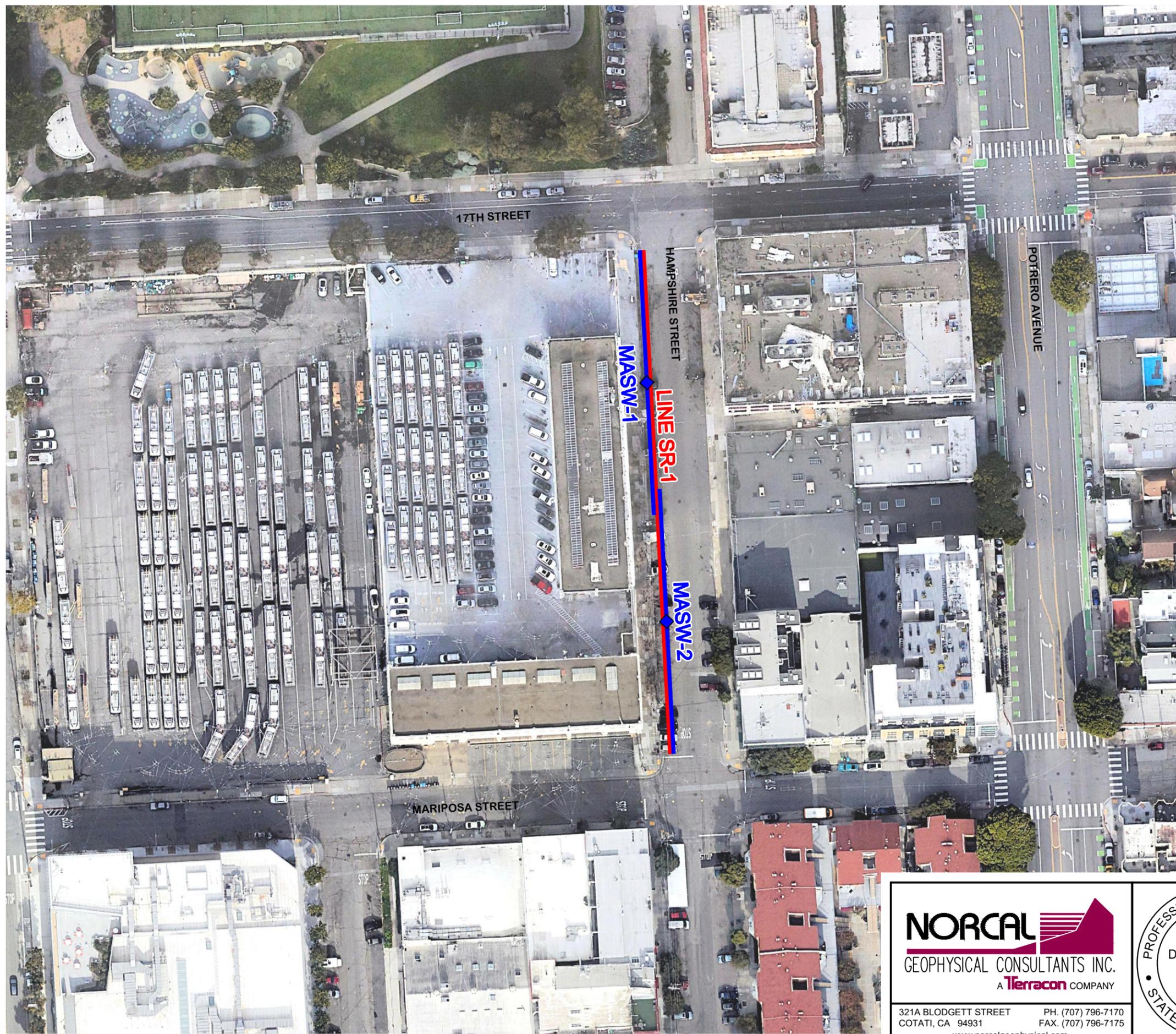
*MASW-2: Seismic S-Wave Velocity vs Depth*

<b>DEPTH RANGE (FT)</b>	<b>S-WAVE VELOCITY (FT/SEC)</b>
0 - 2	1,910
2 - 6	2,050
6 - 9	2,140
9 - 14	2,100
14 - 20	1,790
20 - 28	1,320
28 - 37	1,600
37 - 49	2,900
49 - 63	3,720
63 - 100	5,360

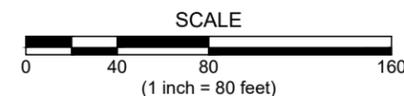
The measured Vs values for both soundings range from a low of 1,240 ft/sec to a maximum of 5,360 ft/sec. It is possible that some of the measured shallow layer velocities may be increased due to the proximity of building foundations or other man-made structures.

## 6.0 DISCUSSION

The SR profile appears to generally agree with the general geology (USGS), as the interpreted rock appears to decrease in depth towards the north where ultramafic rock is mapped. The SR and MASW data sets show good correlation to one another within the range defined on the SR profile.



VICINITY MAP

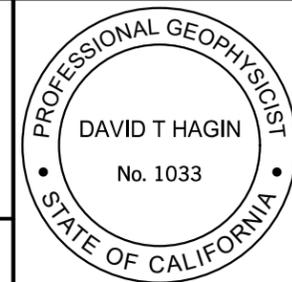


LEGEND

	SEISMIC REFRACTION LINE
	MASW SOUNDING LOCATION
	MASW SOUNDING ARRAY

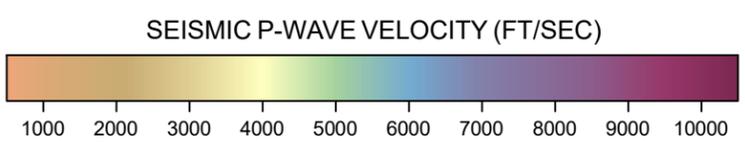
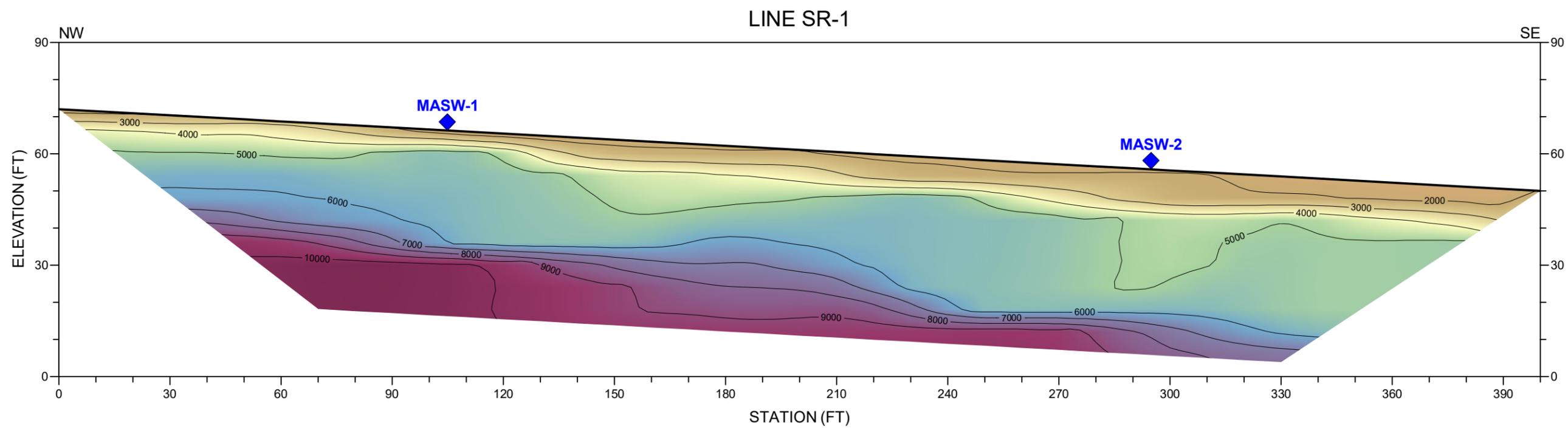
**NORCAL**  
 GEOPHYSICAL CONSULTANTS INC.  
 A Terracon COMPANY

321A BLODGETT STREET PH. (707) 796-7170  
 COTATI, CA 94931 FAX. (707) 796-7175  
 www.norcalgeophysical.com

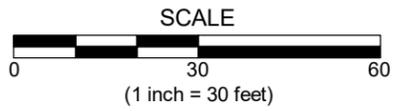


SITE LOCATION MAP  
 SEISMIC INVESTIGATION  
 SFMTA POTRERO FACILITY REBUILD

LOCATION: HAMPSHIRE STREET, SAN FRANCISCO, CALIFORNIA		
CLIENT: LANGAN		
JOB #: NS225145	DATE: APRIL 2023	PLATE
DRAWN BY: H.PHILSON	APPROVED BY: DTH	1
<i>David Hagin</i>		4/27/2023



LEGEND	
	MASW SOUNDING LOCATION

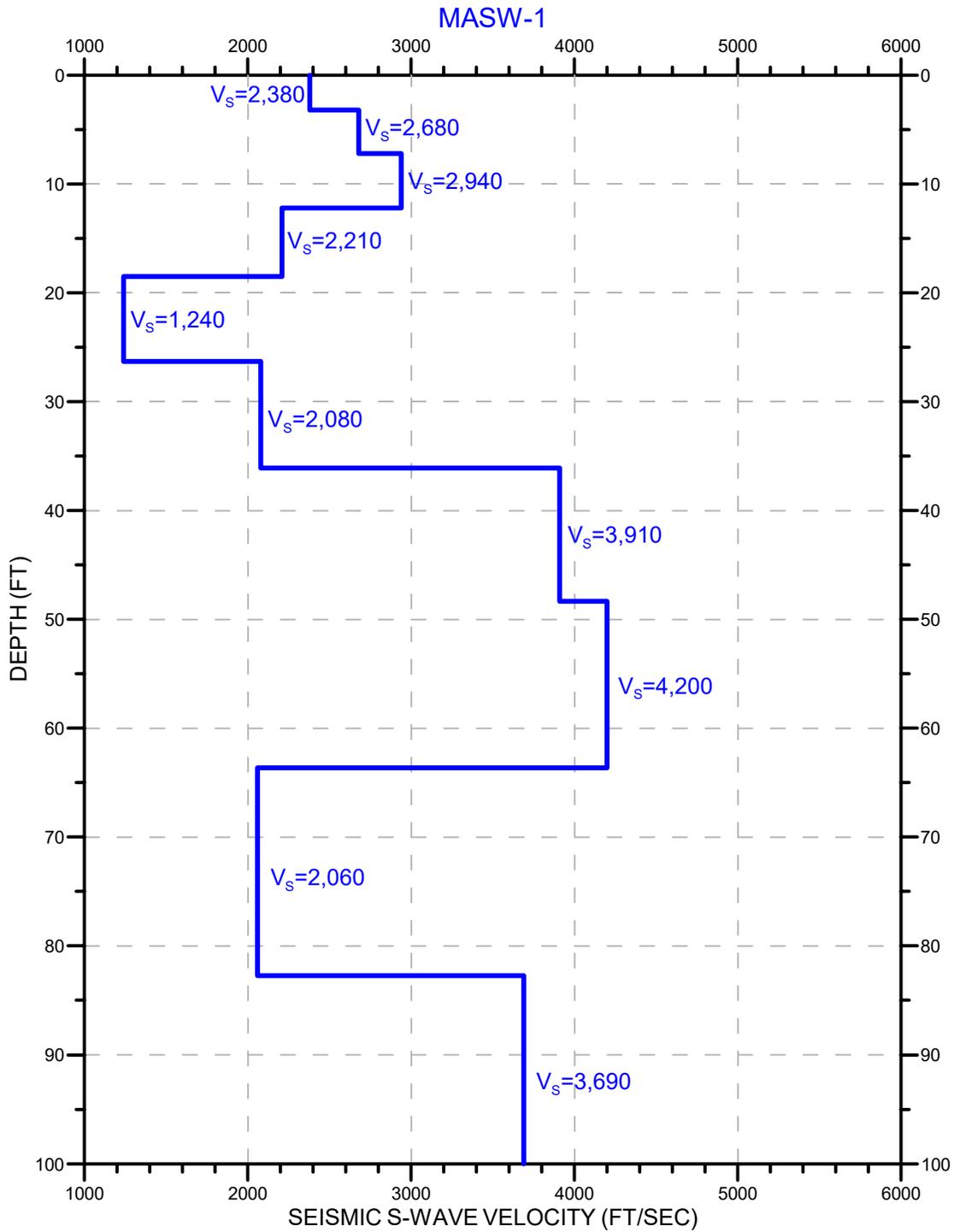


**NORCAL**  
 GEOPHYSICAL CONSULTANTS INC.  
 A Terracon COMPANY

321A BLODGETT STREET PH. (707) 796-7170  
 COTATI, CA 94931 FAX. (707) 796-7175  
 www.norcalgeophysical.com

PROFESSIONAL GEOPHYSICIST  
 DAVID T HAGIN  
 No. 1033  
 STATE OF CALIFORNIA

SEISMIC REFRACTION PROFILE LINE SR-1 SFMTA POTRERO FACILITY REBUILD		
LOCATION: HAMPSHIRE STREET, SAN FRANCISCO, CALIFORNIA		
CLIENT: LANGAN		
JOB #: NS225145	DATE: APRIL 2023	PLATE <b>2</b>
DRAWN BY: H.PHILSON	APPROVED BY: DTH	
<i>David Hagin</i>		4/27/2023



LEGEND	
	SEISMIC S-WAVE VELOCITY



321A BLODGETT STREET PH. (707) 796-7170  
 COTATI, CA 94931 FAX. (707) 796-7175  
 www.norcalgeophysical.com



**MASW SOUNDING  
 MASW-1  
 SFMTA POTRERO FACILITY REBUILD**

LOCATION: HAMPSHIRE STREET, SAN FRANCISCO, CALIFORNIA

CLIENT: LANGAN

JOB #: NS225145

DATE: APRIL 2023

DRAWN BY: H.PHILSON

APPROVED BY: DTH

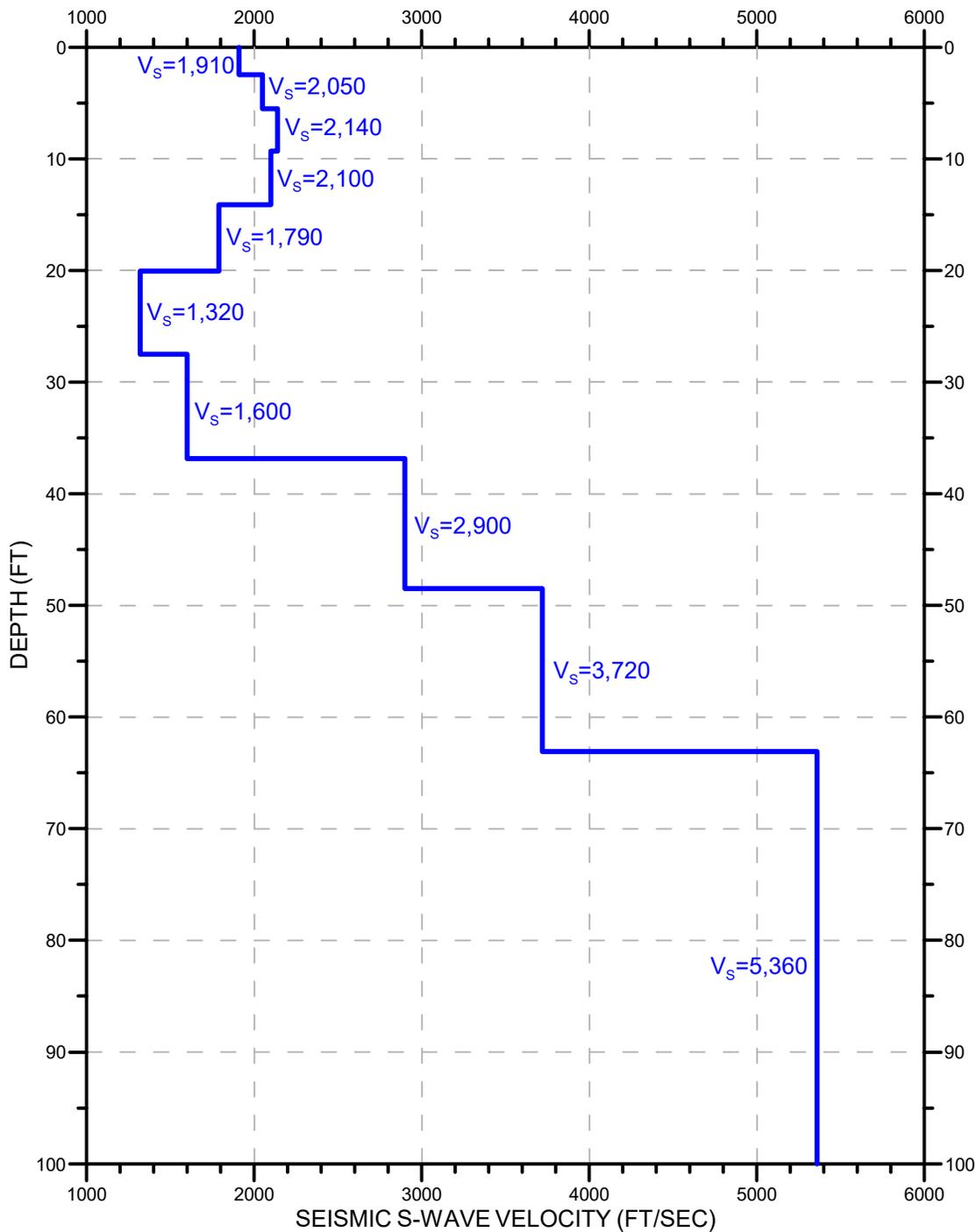
*David Hagin*

4/27/2023

PLATE

**3**

# MASW-2



## LEGEND



SEISMIC S-WAVE VELOCITY

**NORCAL**  
 GEOPHYSICAL CONSULTANTS INC.  
 A Terracon COMPANY

321A BLODGETT STREET PH. (707) 796-7170  
 COTATI, CA 94931 FAX. (707) 796-7175  
 www.norcalgeophysical.com



## MASW SOUNDING MASW-2 SFMTA POTRERO FACILITY REBUILD

LOCATION: HAMPSHIRE STREET, SAN FRANCISCO, CALIFORNIA

CLIENT: LANGAN

JOB #: NS225145

DATE: APRIL 2023

PLATE

DRAWN BY: H.PHILSON

APPROVED BY: DTH

*David Hagin*

4/27/2023

**4**

**APPENDIX A:**  
**Seismic Refraction Survey**

## **APPENDIX A:**

### **Seismic Refraction Survey**

#### **1.0 METHODOLOGY**

The seismic refraction method provides information regarding the seismic velocity structure of the subsurface. An impulsive (mechanical or explosive) energy source is used to produce compressional (p-) wave seismic energy at the surface. The p-waves propagate into the earth and are refracted along interfaces caused by an increase in velocity. A portion of the p-wave energy is typically refracted back to the surface where it is detected by sensors (geophones) that are coupled to the ground surface in a collinear array (spread). The detected signals are recorded on a multi-channel seismograph and are analyzed to determine the shot point-to-geophone travel times. These data can be used along with the corresponding shot point-to-geophone distances and elevation data to determine the depth, thickness, and velocity of subsurface seismic layers.

#### **2.0 INSTRUMENTATION**

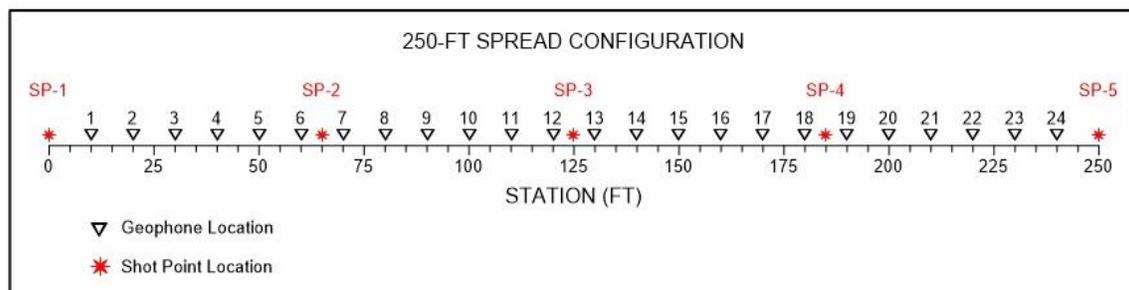
The seismic waveforms produced at each shot point were recorded using a Geometrics **Geode** 24-channel engineering distributed array seismograph, as pictured in Figure 1, and **RT Clark** geophones with a natural frequency of 4.5 Hz. The geophones were coupled to the ground surface by a metal spike affixed to the bottom of each geophone case. Seismic energy was produced at each shot point by multiple impacts with a 16-pound sledgehammer against a metal strike plate placed on the ground surface. The seismic waveforms were digitized, processed, and amplified by the Geode, transmitted via a ruggedized Ethernet cable to a field computer and algebraically summed (stacked) until sufficient signal to noise ratio was achieved. The data were displayed on the computer's LCD screen in the form of seismograms, analyzed for quality assurance and archived for subsequent processing. These images were subsequently used to determine the time required for P-waves to travel from each shot point to each geophone in the array (spread).



**Figure 1:** Geometrics Geode 24-channel engineering distributed array seismograph.

### 3.0 DATA ACQUISITION

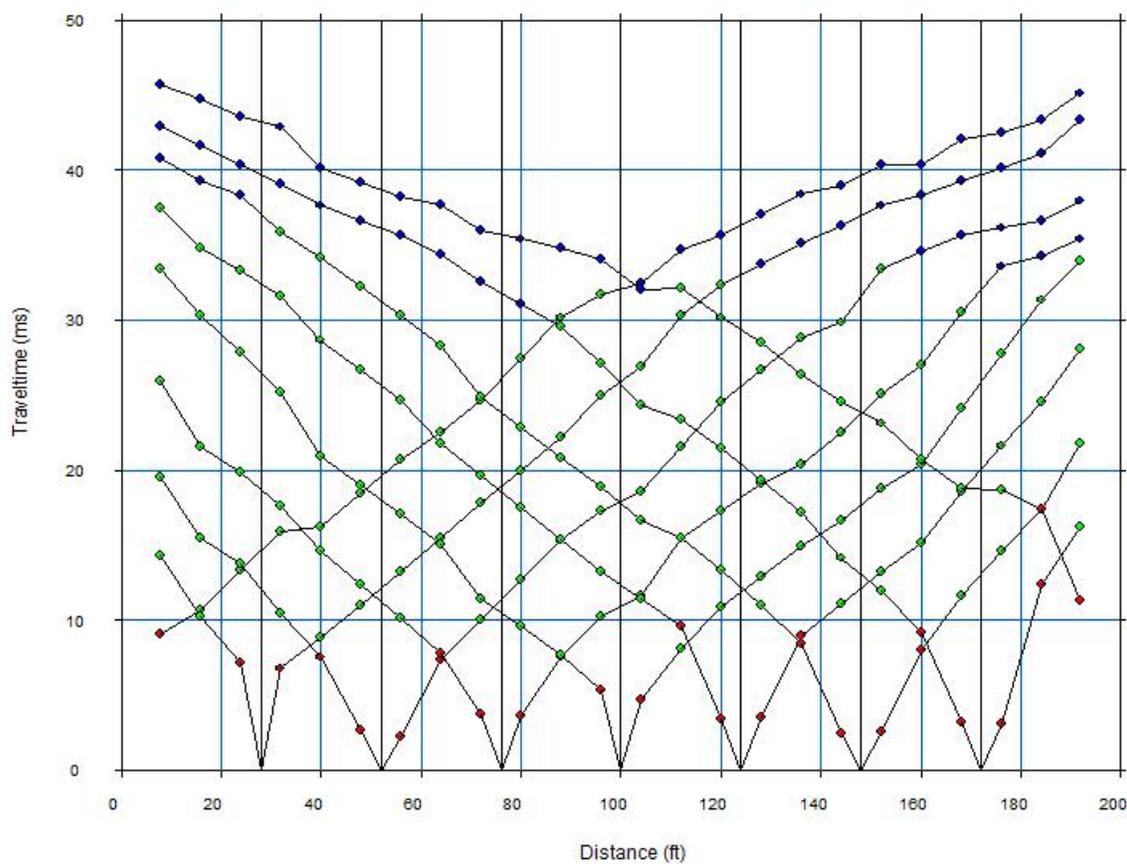
We collected SR data along a single line, designated as Line SR-1, as described in the main body of the report. The line location is shown by the red line on the site location map (Plate 1). Langan personnel determined the location and orientation of the SR line. Data were acquired using arrays of 24 geophones with 10-ft spacing and 5 shot-points at approximately 60-ft intervals, as shown in Figure 2. Shot-points were placed off each end of the geophone arrays as well as distributed equally within each array, yielding a 250-ft length for each array. Two overlapping arrays were acquired to reach the 400-ft line length required. The maximum depth of investigation is determined by the greatest shot-to-receiver distance and is estimated to be 50-ft.



**Figure 2:** SR Array configuration.

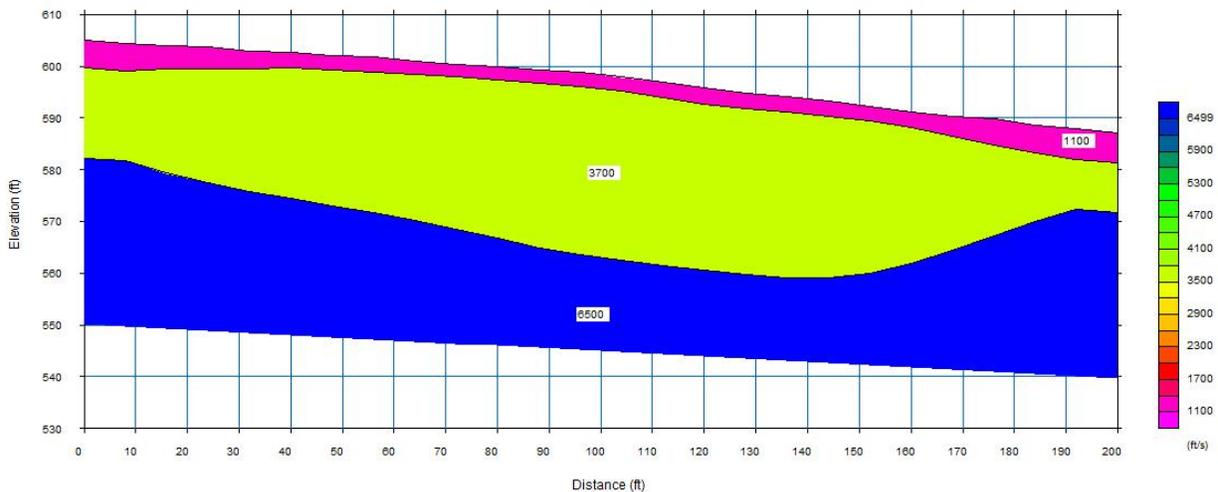
## 4.0 DATA ANALYSIS

The seismic refraction data were processed using the software package **SeisImager**, written by Oyo Corporation (Japan) and distributed by Geometrics Inc. This package consists of two programs titled **Pickwin**, Version 5.1.1.2 (2013) and **Plotrefa**, Version 3.0.0.6 (2014). For each seismic line we used **Pickwin** to view the seismic records and identify first arriving P-wave energy at each geophone and to determine the shot point to geophone travel time associated with each arrival. We then used **Plotrefa** to assign elevations to each geophone and to plot the shot point to geophone travel times versus their distance (Station) along the line. A sample Time versus Depth (T-D) graph is shown in Figure 3.



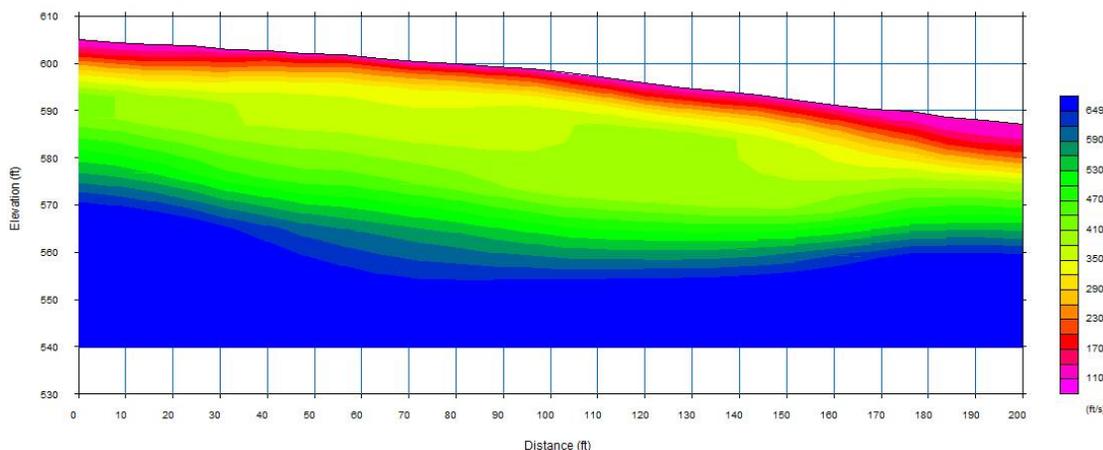
**Figure 3:** Sample SR Time-Distance Graph. Red circles represent layer 1 (V1), green circles represent V2 and blue circles represent V3.

After examining the T-D graph we assigned velocity layers (1-3) to each travel time and then computed a 2D model using **Plotrefa's** time-term routine. This resulted in a 2D layered cross-section (profile) illustrating seismic velocity versus depth. A sample 2D time-term model is shown in Figure 4.



**Figure 4:** Sample Time-Term Seismic Velocity Model. Velocities are labeled and indicated by the color bar on the right.

Finally, we used the time term model as input to **Plotrefa's** tomographic routine. This routine divided the input model into cells according to the geophone spacing and depth range and assigned a velocity to each cell. It then used a ray-tracing routine to compute synthetic travel times through the model from each shot point to every geophone. The synthetic travel times were compared with the observed travel times to determine the goodness of fit. If the fit was not within certain assigned parameters, the program then adjusted the velocity in each cell and reran the ray tracing. This procedure was repeated through as many as 20 iterations in order to achieve the optimum fit between observed and synthetic travel times. A sample tomographic model is shown in Figure 5.



**Figure 5:** Sample tomographic Inverted Seismic Velocity Model. Velocities indicated by color bar on right.

Once the tomographic processing was complete, we used the computer program **Surfer 21.2** by Golden Software to construct a color contoured 2D cross-section (profile) illustrating the results for each seismic line.

## 5.0 INTERPRETATION

The SR profiles described above are models of the subsurface based on P-wave velocities. How these velocities and their subsurface distribution relate to geology is a matter of interpretation. This interpretation can be based on experience and a general knowledge of the local geology. However, the best results are achieved when the models can be correlated with subsurface information provided by other means such as onsite observations, borehole geological and/or geophysical logs, trench logs or projections based on mapped surface geology. This type of information is referred to as “ground truth”.

In any case, the resulting seismic velocity profile represents a model of the subsurface that must be interpreted by the best means available. Thus, the interpreted profile is conceptual in nature, and is not expected to represent an exact depiction of the subsurface.

## 6.0 LIMITATIONS

Based on the physical properties of refraction (Snell’s Law), in order for a seismic wave to be refracted back toward the surface, the seismic velocity of the upper layer must be less than the velocity of the lower layer. When higher velocities overlie lower velocities, often referred to as a velocity inversion, the seismic energy will be refracted downward and the lower layer will not be detected at the surface. As a result, the calculated depths of any deeper higher velocity layers may be over-estimated. Furthermore, some layers may be truncated or too thin to detect. These are referred to as “hidden layers”.

If the seismic source used for the survey does not produce sufficient energy to propagate through the entire spread at detectable levels, the first arriving P-waves at each geophone may not be visible on the seismic records. Additionally, extraneous seismic energy sources such as wind, traffic or nearby machinery may create “noise” on the recorded waveforms that may mask the first arrivals.

Another common external noise source is overhead power lines. If the cable is laid out parallel to the lines electrical noise may be induced in the cable. Possible internal noise sources may be faulty geophone connections due to dirt or moisture or use of an unsuppressed power supply.

In noisy conditions many “stacks” (multiple shots) may be necessary to achieve an acceptable signal-to-noise ratio. Stacking consists of superposition of waveforms such that the stacked shot energy builds with successive shots, whereas the noise tends to cancel itself out due to its random nature. In extremely noisy conditions it may not be possible to achieve an acceptable signal-to-noise ratio for the greatest shot-to-receiver distance, possibly reducing the maximum depth of investigation.

Finally, seismic refraction processing algorithms are based on the assumption that the seismic velocity layers are isotropic. That is, that the velocity is uniform within the length and breadth of each layer. Another assumption is that the velocity distribution does not change in a direction transverse to the seismic line. In other words, that there is true 2D symmetry. If these conditions are not met, the actual subsurface conditions will vary from those represented by the seismic model.

**APPENDIX B:**  
**MASW Sounding Survey**

## **APPENDIX B:**

### **MASW Sounding Survey**

#### **1.0 METHODOLOGY**

When seismic energy is generated at or near the ground surface, both body and surface waves are produced. Body waves expand omni-directionally throughout the subsurface. They consist of both compressional (P) and shear (S) waves. Surface waves (e.g., Rayleigh, Love, etc.) radiate along the ground surface at velocities that are proportional to shear wave velocity ( $V_s$ ). Rayleigh waves are characterized by retrograde elliptical particle motion, and travel at approximately 0.9 times the velocity of S-waves.

If a vertical impact source is used, approximately two-thirds of the seismic energy that is produced is in the form of ground roll. As a result, surface waves are typically the most prominent signal on multi-channel seismic records. In addition, surface waves have dispersion properties that body waves lack. That is, different wavelengths have different penetration depths and, therefore, propagate at different velocities. By analyzing the dispersion of surface waves, it is possible to obtain an S-wave versus depth velocity profile. Since s-wave velocity is directly proportional to shear modulus, this provides a direct indication in the variation of stiffness (or rigidity) of subsurface materials.

Surface waves can be recorded and analyzed using a method referred to as Multichannel Analysis of Surface Waves (MASW). This method is used to collect surface wave data using a fixed array of geophones and shot points. This is referred to as a sounding, and results in a one-dimensional (1D) model depicting variation in S-wave velocity versus depth beneath the center of the array. However, the subsurface conditions underlying the entire length of the array, and for several tens of feet to either side, contribute to the measured velocity values. The method requires an energy source that is capable of producing ground roll and geophones that are capable of detecting low frequencies (<10 Hz) signals.

#### **2.0 INSTRUMENTATION**

The seismic waveforms produced at each shot point were recorded using a Geometrics **Geode** 24-channel engineering distributed array seismograph, as pictured in Figure 1, and **RT Clark** geophones with a natural frequency of 4.5 Hz. The geophones were coupled to the ground surface by a metal spike affixed to the bottom of each geophone case. Seismic energy was produced at each shot point by multiple impacts with a 16-pound sledgehammer against a metal strike plate placed on the ground surface. The seismic waveforms were digitized, processed and amplified by the Geode, transmitted via a ruggedized Ethernet cable to a field computer and algebraically summed (stacked) until sufficient signal to noise ratio was achieved. The data were displayed on the computer's LCD screen in the form of seismograms, analyzed for quality assurance and

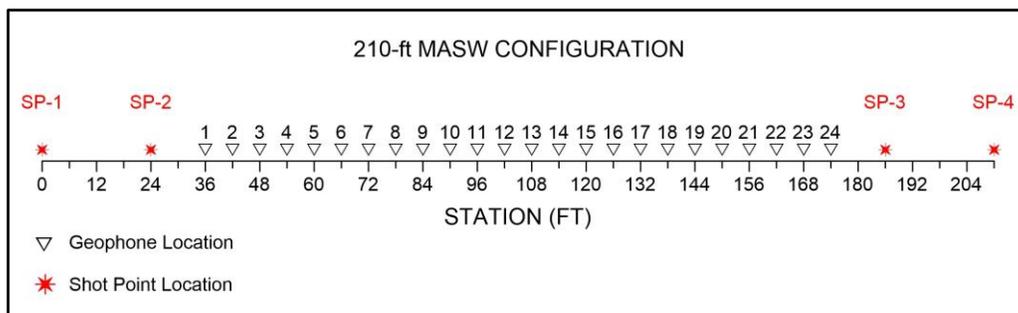
archived for subsequent processing. These images were subsequently used to determine the time required for P-waves to travel from each shot point to each geophone in the array (spread).



**Figure 1:** Geometrics Geode 24-channel engineering distributed array seismograph.

### 3.0 DATA ACQUISITION

We acquired two MASW soundings, designated as MASW-1 and MASW-2, as described in the main body of the report. The sounding locations were determined by Langan personnel. The positions of the MASW arrays are shown by the blue lines on the site location map (Plate 1). The center points of the arrays, which are considered the sounding locations, are represented by the blue diamonds. For each sounding, the seismic equipment was set out in a collinear array consisting of 24-geophones and four shot-points. The geophone stationing interval was 6-ft and shot-points were placed 2- and 6-stations off each end of the arrays, for a total line length of 210-ft. The maximum depth of exploration is determined by the frequency content of the seismograms and is estimated at 100-ft for each sounding. The configuration of each seismic array is depicted by the diagram in Figure 2, below.



**Figure 2:** MASW Array Configuration.

## 4.0 DATA ANALYSIS

The seismic wave-traces (shot gathers) recorded at each shot point were analyzed using the computer program **SURFSEIS** developed by the Kansas Geological Survey (Version 5.0, 2016). This interactive program converts the data acquired from all four shot points in a given sounding into a dispersion curve representing phase velocity versus frequency. This curve is then inverted to produce a 1D model indicating S-wave velocity versus depth. The steps involved in this procedure are as follows:

- 1) The shot gathers are converted to KGS format.
- 2) Stations are assigned to the geophone and shot point locations.
- 3) The resulting records are viewed to determine their overall quality. If necessary, portions of the records are muted to remove interference from refractions, reflections and higher mode events.
- 4) For each formatted (and/or muted) record, the program produces what is referred to as an “overtone plot”. This is a colored cross-section indicating phase velocity versus frequency and amplitude. The vertical axis represents phase velocity (increasing upward); the horizontal axis represents frequency (increasing to the right); and signal amplitude is indicated by various colors, with the hottest colors (orange to red to dark brown) representing the greatest signal to noise ratio. Typically, the strongest signals align in a curved pattern with a symmetry with the shape of a “hockey stick” where the blade is pointing upward at the lower end of the frequency spectrum (higher velocity at greater depth) and the handle projects to the right in the direction of increasing frequencies indicating lower velocities.
- 5) The overtone plots compiled from the four shot points are reviewed to determine their overall quality and the best among them (possibly all) are merged to form a single overtone. This enhances the overall signal to noise ratio of the survey and incorporates data from both ends of the spread (if feasible).
- 6) The resulting overtone plot is used as a guide in deriving a dispersion curve representing phase velocity versus frequency. This is done by fitting the curve along the center of the hockey stick where the signal to noise ratio is highest.
- 7) The resulting dispersion curve is inverted through an iterative process to compute a 1D model representing S-wave velocity versus depth.

The shear-wave velocities in each depth range for the soundings are tabulated in Section 5.3 of the main body of the report. The results are also presented graphically by the step-chart graphs on Plates 3 and 4.

## 5.0 LIMITATIONS

Extraneous seismic energy sources such as wind, traffic or nearby machinery may create “noise” on the recorded waveforms. Also, live electric lines may induce unwanted electrical current into the seismic cable, also creating noise. If the seismic source used for the survey does not produce sufficient energy to propagate through the entire spread at detectable levels, the wave forms created by the surface waves may be overly contaminated by noise and reduce the signal-to-noise ratio and thus the data quality.

In noisy conditions many “stacks” may be necessary to achieve an acceptable signal-to-noise ratio. Stacking consists of superposition of waveforms such that the stacked shot energy builds with successive shots whereas the noise tends to cancel itself out due to its random nature. In some cases, however, noise is not sufficiently random to be reduced to acceptable levels.

DRAFT

**APPENDIX F**  
**LABORATORY TEST RESULTS BY ARUP/RYCG**

**MOISTURE & DENSITY TEST**

Client : ARUP/RYCG JV

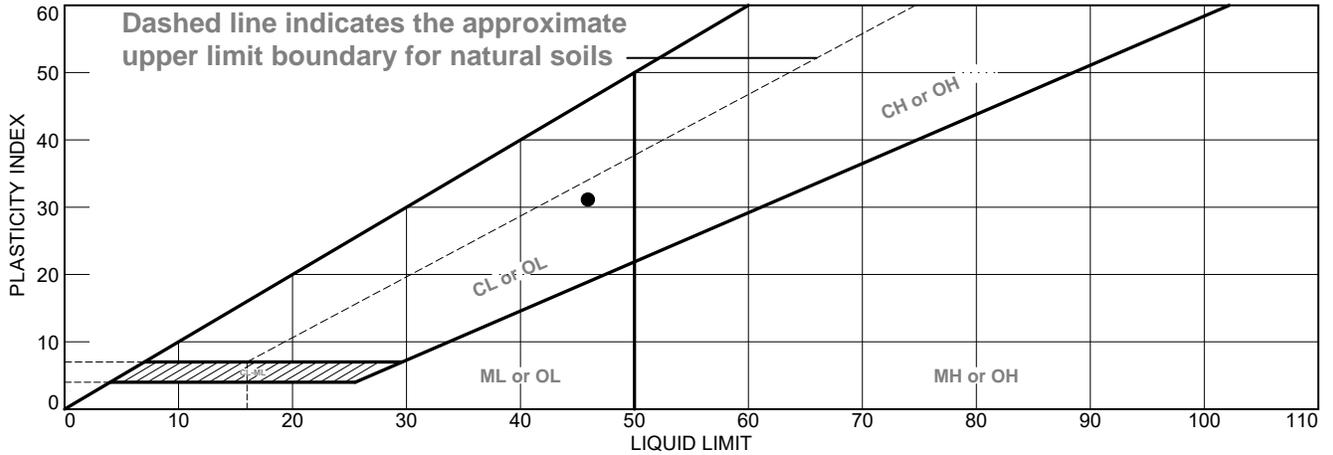
Project : SFMTA Potrero

ISI Lab No.: G-62084

Job no : 260018-00 2018-001

Boring #	BH-06	BH-02	BH-02					
Sample #	6-2A	2-2B	2-14B					
Depth ( ft. )	5.5-6	6.5-7	75.5-76					
Soil type: ( visual )	Brown sandy clay	Reddish brown silty, clayey sand	Gray bedrock					
1. Date tested:	04/15/18	04/15/18	04/09/18					
2. Tested by:	JH	JH	JH					
3. Specimen height ( in. )	4.71	6.00						
4. Wt. of specimen + tare ( gm )	704.01	959.19						
5. Tare wt. ( gm )	0.00	0.00						
6. Diameter ( in. )	2.40	2.39						
7. Wet wt. of soil + dish wt. ( gm )	439.77	211.93	489.90					
8. Dry wt. of soil + dish wt. ( gm )	400.56	190.90	479.76					
9. Wt. of dish ( gm )	187.58	51.47	188.32					
10. Dish ID								
<b>Wet Density ( pcf )</b>	125.8	135.6						
<b>Dry Density ( pcf )</b>	106.2	117.9						
<b>Moisture Content ( % )</b>	18.4	15.1	3.5					
Gs ( Assumed )	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.586	0.429						
Saturation ( % )	84.8	94.8						
Additional data:								
Wt. of dry soil + dish before washing ( gm )								
Wt. of dry soil + dish after washing ( gm )								
<b>% Passing # 200 sieve</b>								
<b>USCS symbol</b>								

# LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown clay with sand	46	15	31	97	72	CL

**Project No.** 2657-003.0    **Client:** ARUP/RYCG JV  
**Project:** SFMTA Potrero  
 260018-00 2018-001  
**● Source of Sample:** BH-01    **Depth:** 3.5-4.5    **Sample Number:** 1-1B & 1-1C

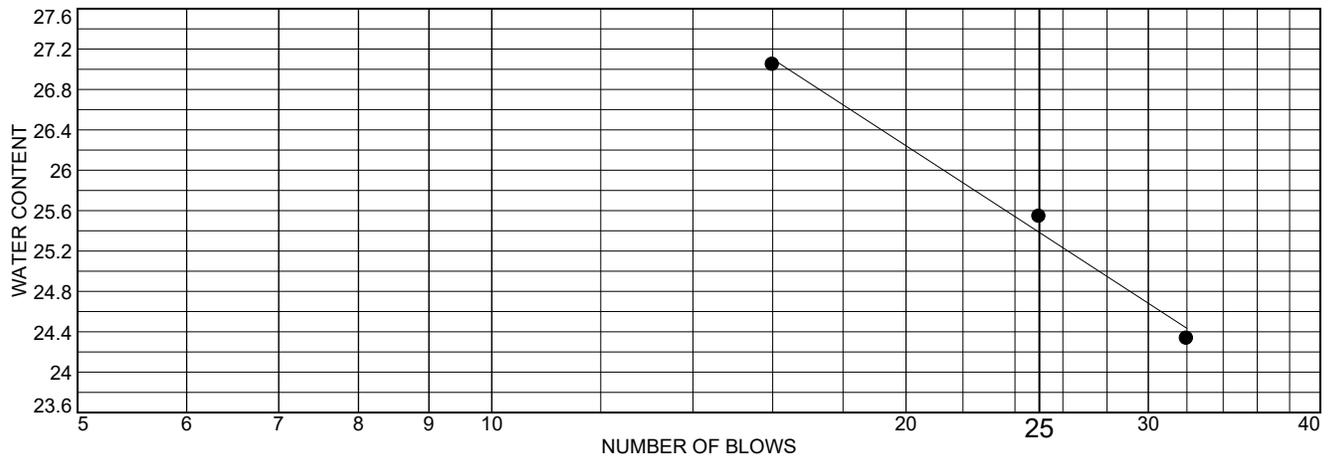
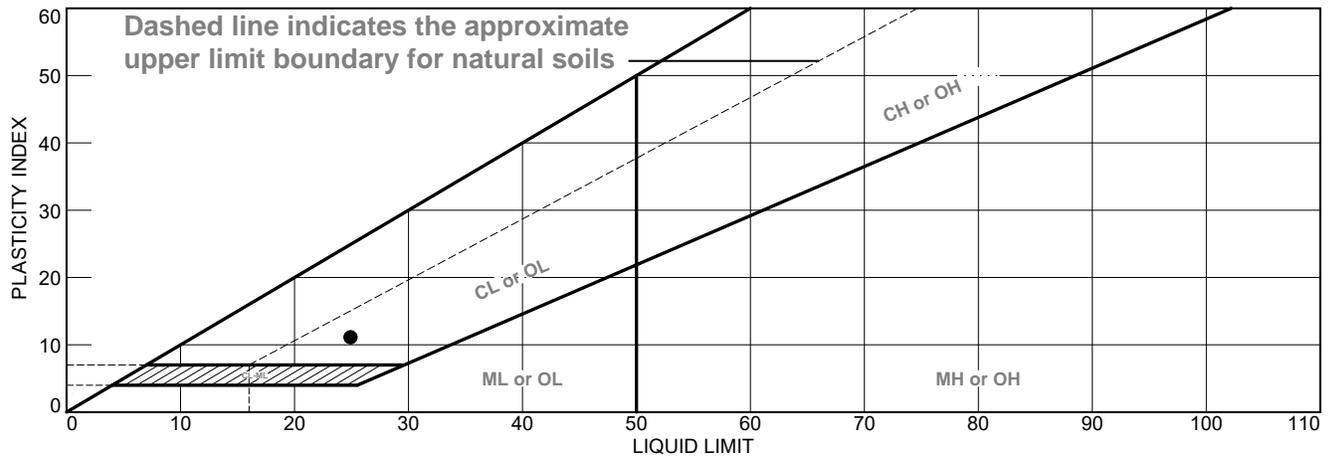
**Remarks:**  
 ● Combined both samples



Figure

**Tested By:** JH \_\_\_\_\_    **Checked By:** JH \_\_\_\_\_

# LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown clayey sand	25	14	11	99	43	SC

**Project No.** 2657-003.0    **Client:** ARUP/RYCG JV  
**Project:** SFMTA Potrero  
 260018-00 2018-001  
**● Source of Sample:** BH-01    **Depth:** 11-11.5    **Sample Number:** 1-3B



**Remarks:**

**Figure**

**Tested By:**   JH                        **Checked By:**   JH



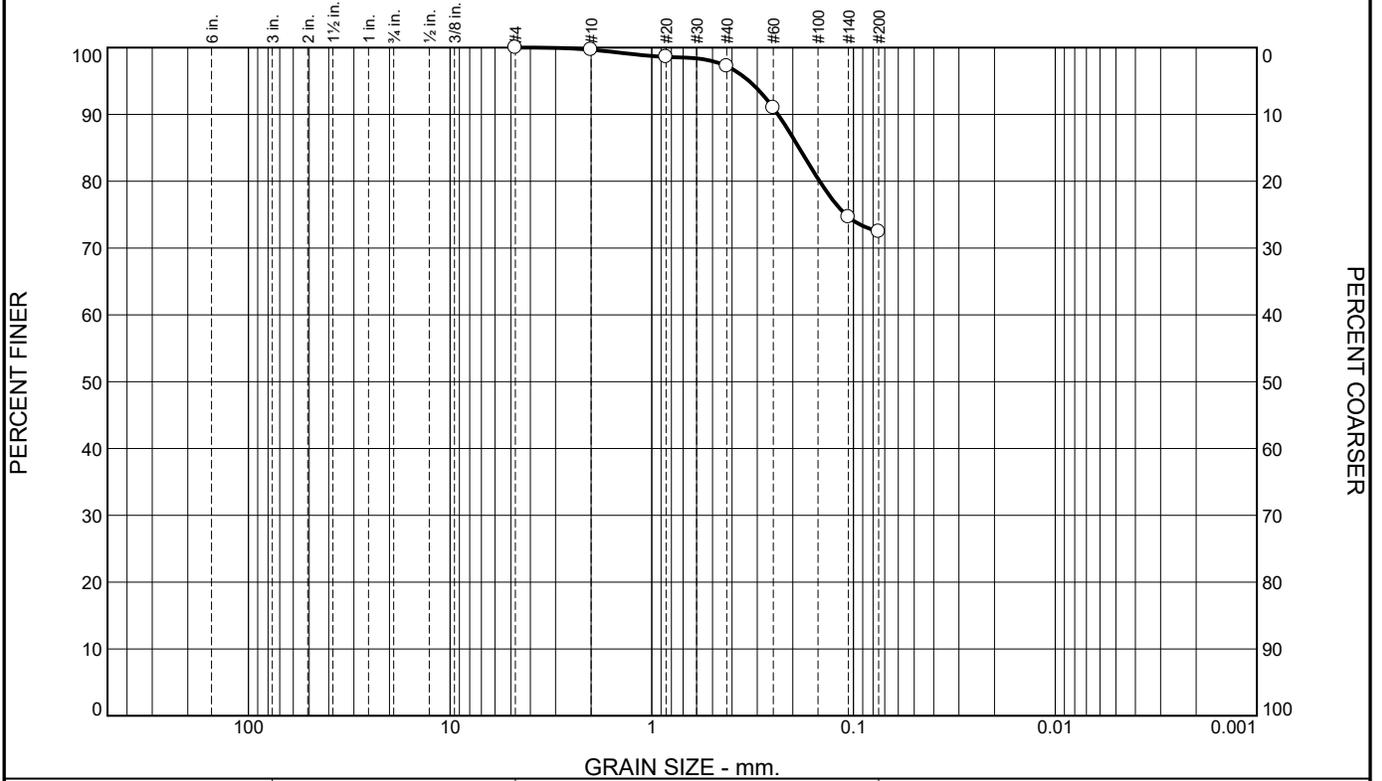








# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	3	25	72	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	99		
#40	97		
#60	91		
#140	75		
#200	72		

**Soil Description**

Brown clay with sand

**Atterberg Limits**

PL= 15      LL= 46      PI= 31

**Coefficients**

D<sub>90</sub>= 0.2368      D<sub>85</sub>= 0.1861      D<sub>60</sub>=  
D<sub>50</sub>=                      D<sub>30</sub>=                      D<sub>15</sub>=  
D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**

USCS= CL                      AASHTO= A-7-6(20)

**Remarks**

Combined both samples

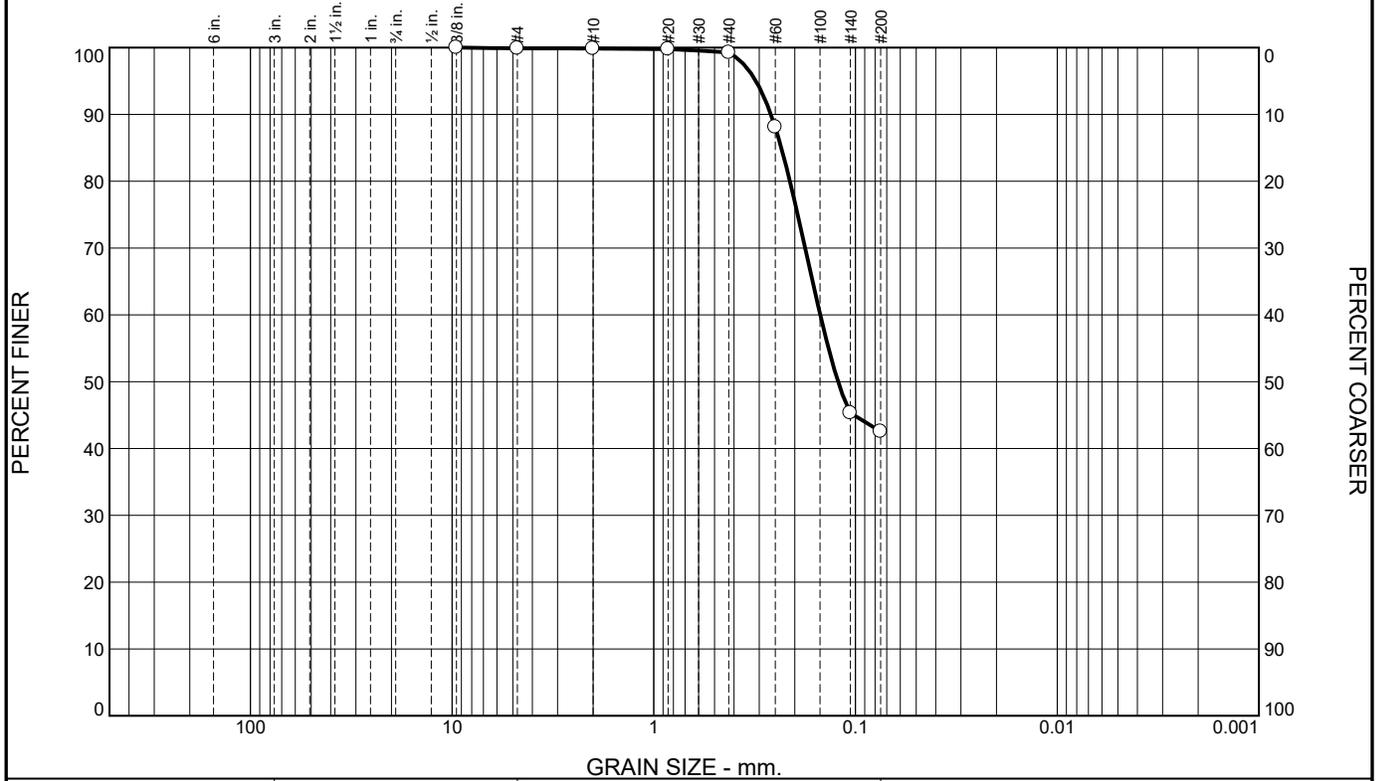
\* (no specification provided)

Source of Sample: BH-01      Depth: 3.5-4.5      Date: 4-20-18  
Sample Number: 1-1B & 1-1C

	<b>Client:</b> ARUP/RYCG JV <b>Project:</b> SFMTA Potrero 260018-00 2018-001 <b>Project No:</b> 2657-003.0	<b>Figure</b>
---	---	---------------

Tested By: JH                      Checked By: JH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	56	43	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100		
#4	100		
#10	100		
#20	100		
#40	99		
#60	88		
#140	45		
#200	43		

**Soil Description**  
Brown clayey sand

**Atterberg Limits**  
 PL= 14      LL= 25      PI= 11

**Coefficients**  
 D<sub>85</sub>= 0.2333      D<sub>60</sub>= 0.1495  
 D<sub>50</sub>= 0.1221      D<sub>15</sub>=  
 D<sub>10</sub>=              C<sub>u</sub>=              C<sub>c</sub>=

**Classification**  
 USCS= SC      AASHTO= A-6(1)

**Remarks**

\* (no specification provided)

Source of Sample: BH-01      Depth: 11-11.5      Date: 4-20-18  
 Sample Number: 1-3B

	Client: ARUP/RYCG JV Project: SFMTA Potrero 260018-00 2018-001 Project No: 2657-003.0	Figure
---	--	--------

Tested By: JH      Checked By: JH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	3	74	13	10

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	97		
#60	76		
#140	27		
#200	23		
0.0335 mm.	18		
0.0214 mm.	16		
0.0125 mm.	13		
0.0089 mm.	12		
0.0063 mm.	11		
0.0031 mm.	9.8		
0.0013 mm.	8.3		

**Soil Description**

Reddish brown silty, clayey sand

**Atterberg Limits**

PL= 18      LL= 23      PI= 5

**Coefficients**

D<sub>90</sub>= 0.3360      D<sub>85</sub>= 0.2984      D<sub>60</sub>= 0.1948  
D<sub>50</sub>= 0.1674      D<sub>30</sub>= 0.1153      D<sub>15</sub>= 0.0184  
D<sub>10</sub>= 0.0037      C<sub>u</sub>= 52.62      C<sub>c</sub>= 18.42

**Classification**

USCS= SC-SM      AASHTO= A-2-4(0)

**Remarks**

\* (no specification provided)

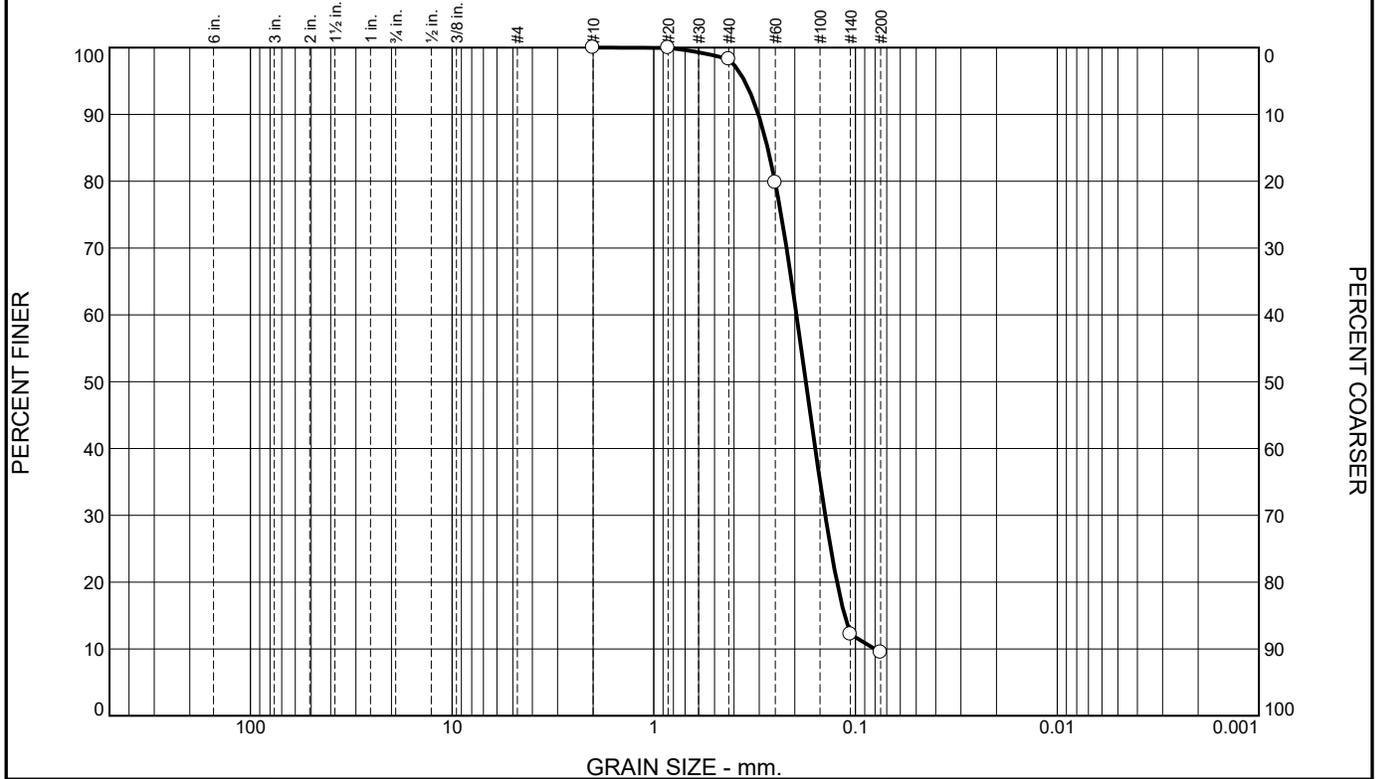
Source of Sample: BH-02      Depth: 6.5-7      Date: 4-20-18  
Sample Number: 2-2B

	<p><b>Client:</b> ARUP/RYCG JV</p> <p><b>Project:</b> SFMTA Potrero 260018-00 2018-001</p> <p><b>Project No:</b> 2657-003.0</p>
<b>Figure</b>	

Tested By: JH      Checked By: JH



# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	2	89	9	0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	98		
#60	80		
#140	12		
#200	9.5		

**Soil Description**  
Brown sand

**Atterberg Limits**  
 PL= \_\_\_\_\_ LL= \_\_\_\_\_ PI= \_\_\_\_\_

**Coefficients**  
 D<sub>90</sub>= 0.3032    D<sub>85</sub>= 0.2726    D<sub>60</sub>= 0.1962  
 D<sub>50</sub>= 0.1763    D<sub>30</sub>= 0.1413    D<sub>15</sub>= 0.1133  
 D<sub>10</sub>= 0.0801    C<sub>u</sub>= 2.45    C<sub>c</sub>= 1.27

**Classification**  
 USCS= \_\_\_\_\_ AASHTO= \_\_\_\_\_

**Remarks**

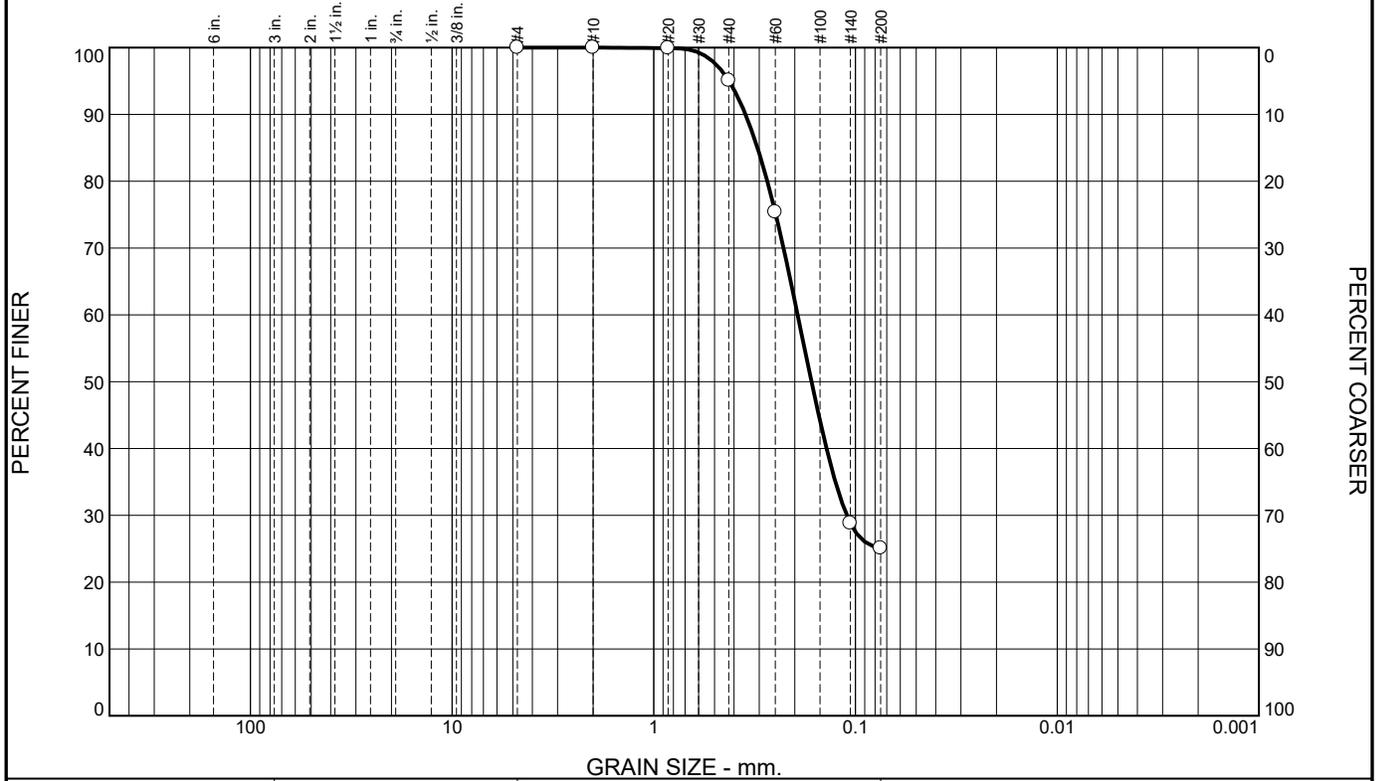
\* (no specification provided)

Source of Sample: BH-02      Depth: 41-41.5      Date: 5-10-18  
 Sample Number: 2-9B

	<b>Client:</b> ARUP/RYCG JV <b>Project:</b> SFMTA Potrero 260018-00 2018-001 <b>Project No:</b> 2657-003.0	<b>Figure</b>
---	---	---------------

Tested By: JH      Checked By: JH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	5	70	25	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	95		
#60	75		
#140	29		
#200	25		

**Soil Description**

Brown sand with clay

**Atterberg Limits**

PL= 19      LL= 27      PI= 8

**Coefficients**

D<sub>90</sub>= 0.3510      D<sub>85</sub>= 0.3062      D<sub>60</sub>= 0.1936  
D<sub>50</sub>= 0.1653      D<sub>30</sub>= 0.1105      D<sub>15</sub>=  
D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**

USCS= SC      AASHTO= A-2-4(0)

**Remarks**

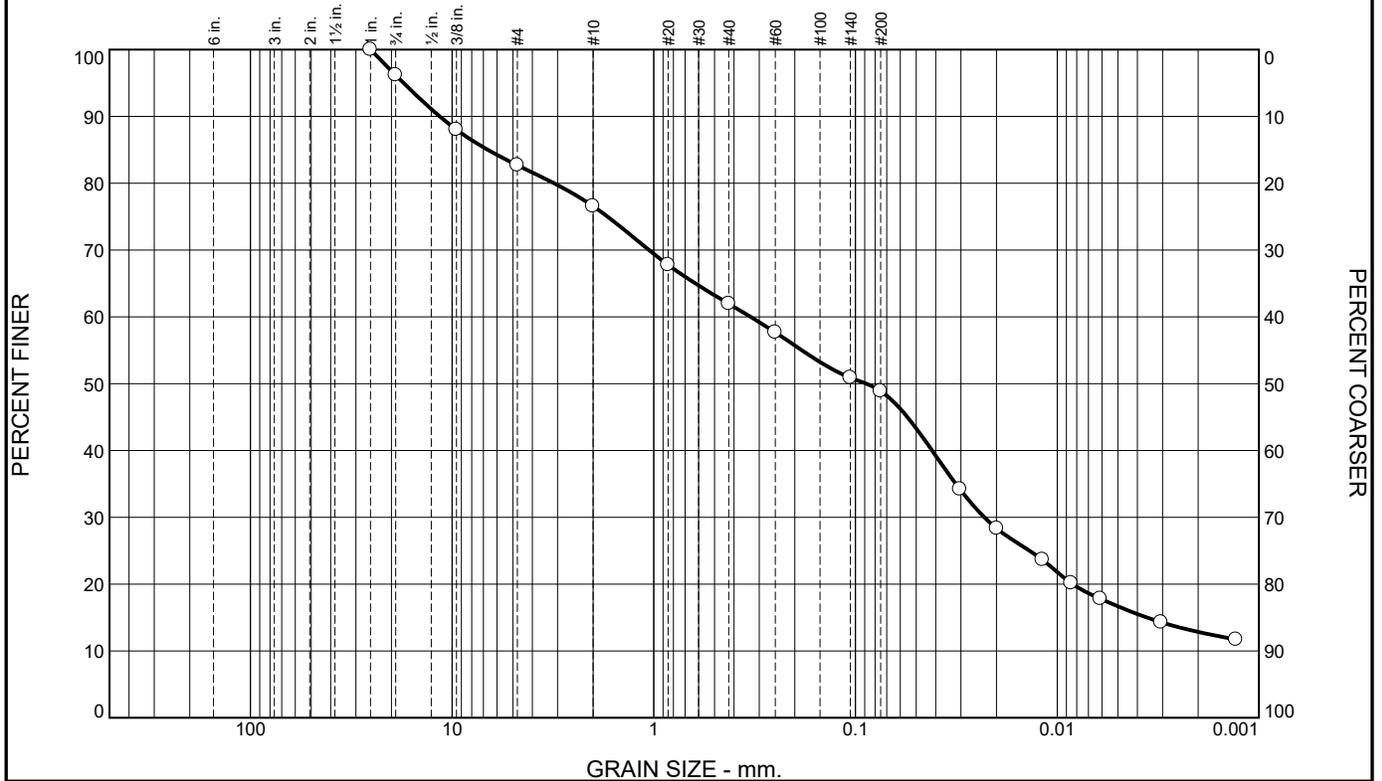
\* (no specification provided)

Source of Sample: BH-03      Depth: 6-6.5      Date: 4-20-18  
Sample Number: 3-2B

	<b>Client:</b> ARUP/RYCG JV <b>Project:</b> SFMTA Potrero 260018-00 2018-001 <b>Project No:</b> 2657-003.0	<b>Figure</b>
--	---	---------------

Tested By: JH      Checked By: JH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	4	13	6	15	13	32	17

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	96		
3/8"	88		
#4	83		
#10	77		
#20	68		
#40	62		
#60	58		
#140	51		
#200	49		
0.0304 mm.	34		
0.0199 mm.	28		
0.0118 mm.	24		
0.0085 mm.	20		
0.0061 mm.	18		
0.0030 mm.	14		
0.0013 mm.	12		

**Soil Description**

Brown sandy silt with gravel

**Atterberg Limits**

PL= 38      LL= 67      PI= 29

**Coefficients**

D<sub>90</sub>= 11.5208      D<sub>85</sub>= 6.6627      D<sub>60</sub>= 0.3312  
D<sub>50</sub>= 0.0884      D<sub>30</sub>= 0.0230      D<sub>15</sub>= 0.0036  
D<sub>10</sub>=              C<sub>u</sub>=              C<sub>c</sub>=

**Classification**

USCS= SM      AASHTO= A-7-5(11)

**Remarks**

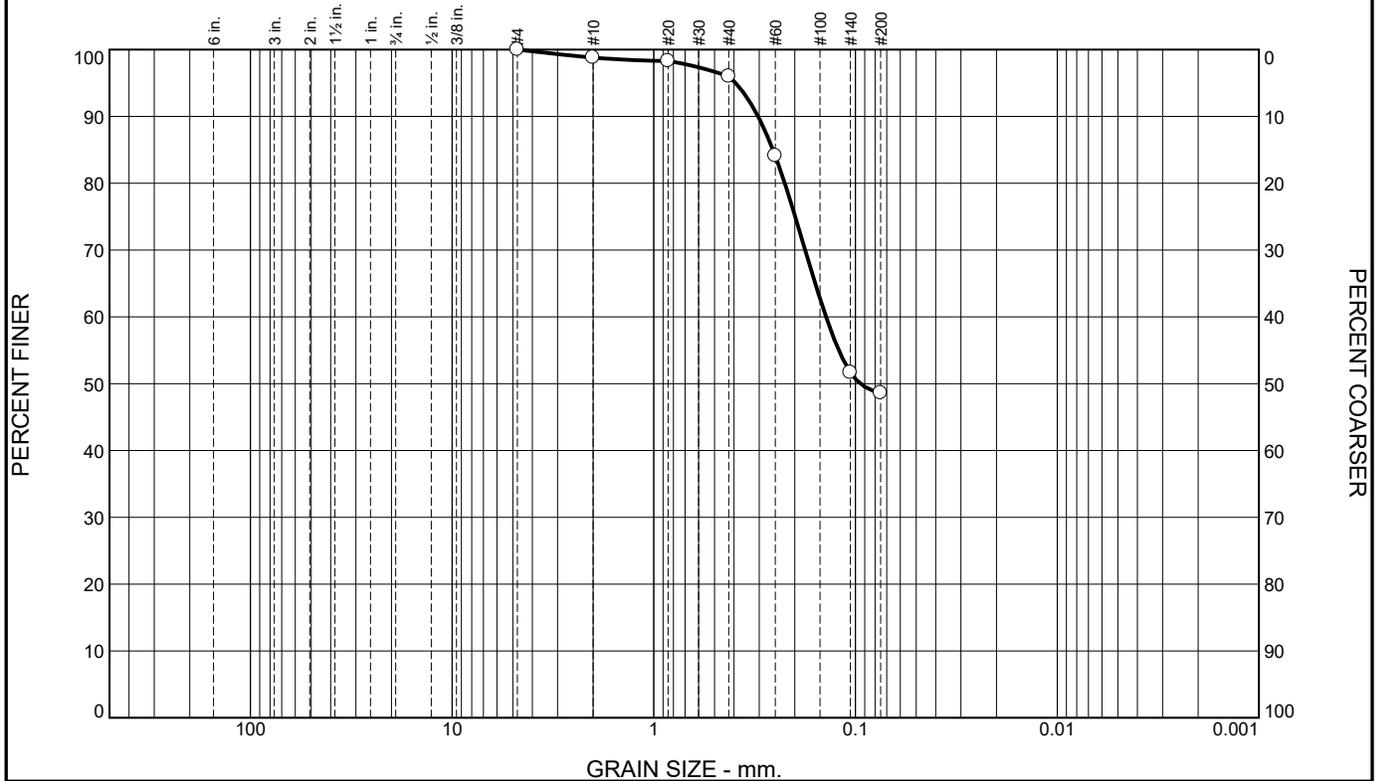
\* (no specification provided)

Source of Sample: BH-04      Depth: 5-5.5      Date: 4-20-18  
Sample Number: 4-2B

	<p><b>Client:</b> ARUP/RYCG JV</p> <p><b>Project:</b> SFMTA Potrero 260018-00 2018-001</p> <p><b>Project No:</b> 2657-003.0</p>
--	---

Tested By: JH      Checked By: JH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	3	47	49	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	99		
#20	98		
#40	96		
#60	84		
#140	52		
#200	49		

**Soil Description**  
Reddish brown clayey sand

**Atterberg Limits**  
 PL= 14      LL= 36      PI= 22

**Coefficients**  
 D<sub>90</sub>= 0.3041      D<sub>85</sub>= 0.2566      D<sub>60</sub>= 0.1400  
 D<sub>50</sub>= 0.0947      D<sub>30</sub>=                      D<sub>15</sub>=  
 D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**  
 USCS= SC      AASHTO= A-6(7)

**Remarks**

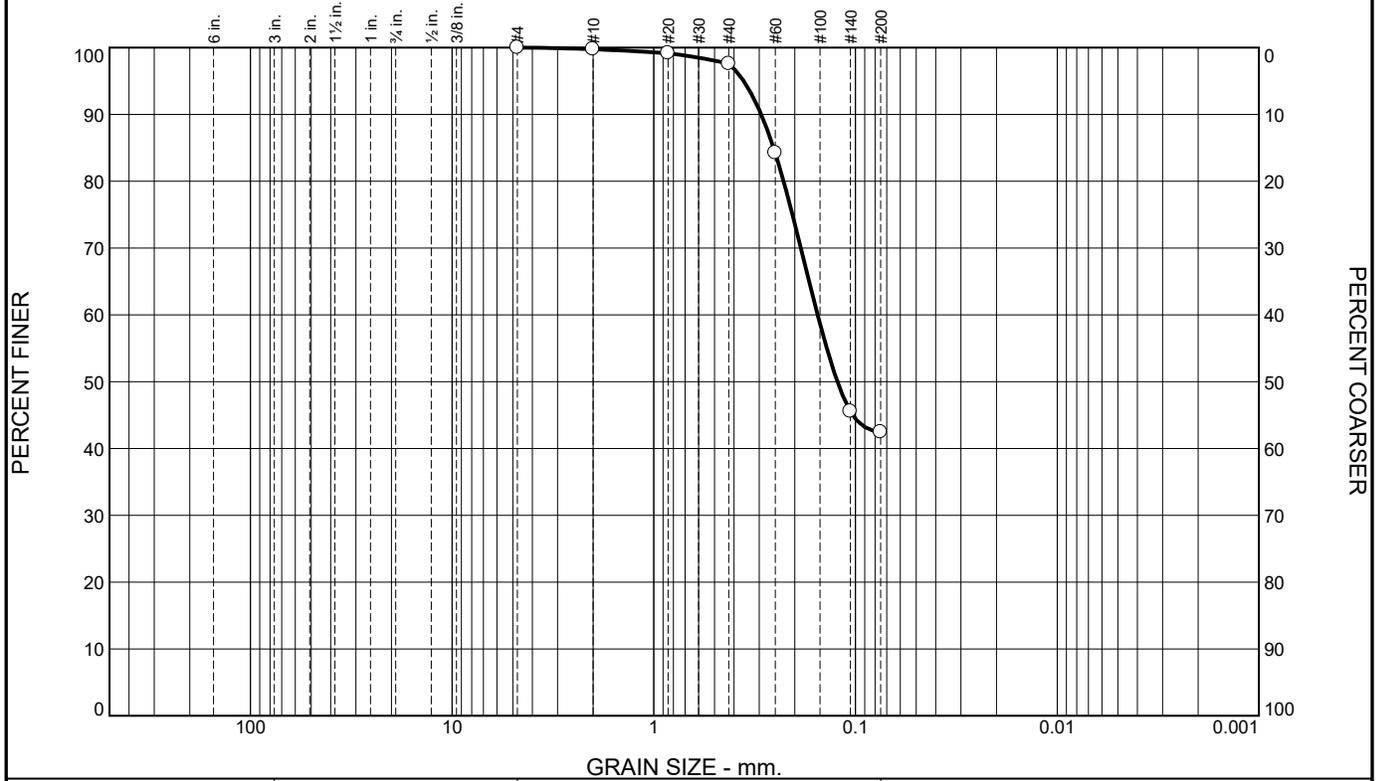
\* (no specification provided)

Source of Sample: BH-04      Depth: 15-15.5      Date: 5-7-18  
 Sample Number: 4-4B

	Client: ARUP/RYCG JV Project: SFMTA Potrero 260018-00 2018-001 Project No: 2657-003.0	Figure
---	--	--------

Tested By: JH      Checked By: JH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	2	56	42	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	99		
#40	98		
#60	84		
#140	46		
#200	42		

**Soil Description**  
Reddish brown clayey sand

**Atterberg Limits**  
 PL=                      LL=                      PI=

**Coefficients**  
 D<sub>90</sub>= 0.2935      D<sub>85</sub>= 0.2548      D<sub>60</sub>= 0.1541  
 D<sub>50</sub>= 0.1230      D<sub>30</sub>=                      D<sub>15</sub>=  
 D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**  
 USCS= SC                      AASHTO=

**Remarks**

\* (no specification provided)

Source of Sample: BH-04      Depth: 20-20.5      Date: 5-11-18  
 Sample Number: 4-5B

	Client: ARUP/RYCG JV Project: SFMTA Potrero 260018-00 2018-001 Project No: 2657-003.0	Figure
---	--	--------

Tested By: JH                      Checked By: JH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	4	27	69	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	99		
#40	96		
#60	86		
#140	71		
#200	69		

**Soil Description**  
Brown sandy clay

**Atterberg Limits**  
PL= 15      LL= 35      PI= 20

**Coefficients**  
D<sub>85</sub>= 0.2353      D<sub>60</sub>=  
D<sub>50</sub>=                      D<sub>30</sub>=                      D<sub>15</sub>=  
D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**  
USCS= CL      AASHTO= A-6(11)

**Remarks**

\* (no specification provided)

Source of Sample: BH-06      Depth: 5.5-6      Date: 4-20-18  
Sample Number: 6-2A

	<p><b>Client:</b> ARUP/RYCG JV <b>Project:</b> SFMTA Potrero 260018-00 2018-001 <b>Project No:</b> 2657-003.0</p>	<p><b>Figure</b></p>
---	---	----------------------

Tested By: JH      Checked By: JH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	2	2	74	11	11

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	98		
#20	98		
#40	96		
#60	84		
#140	26		
#200	22		
0.0334 mm.	15		
0.0212 mm.	14		
0.0123 mm.	13		
0.0088 mm.	12		
0.0062 mm.	11		
0.0031 mm.	11		
0.0013 mm.	9.2		

**Soil Description**  
Brown clayey sand

**Atterberg Limits**  
 PL=                      LL=                      PI=

**Coefficients**  
 D<sub>90</sub>= 0.2887      D<sub>85</sub>= 0.2550      D<sub>60</sub>= 0.1774  
 D<sub>50</sub>= 0.1565      D<sub>30</sub>= 0.1159      D<sub>15</sub>= 0.0306  
 D<sub>10</sub>= 0.0019      C<sub>u</sub>= 92.35      C<sub>c</sub>= 39.45

**Classification**  
 USCS= SC                      AASHTO=

**Remarks**

\* (no specification provided)

Source of Sample: BH-06  
Sample Number: 6-4B

Depth: 15-15.5

Date: 5-10-18



Client: ARUP/RYCG JV  
 Project: SFMTA Potrero  
 260018-00 2018-001  
 Project No: 2657-003.0

Figure

Tested By: JH

Checked By: JH

## UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : ARUP/RYCG JV  
 Project : SFMTA Potrero  
 Job # : 260018-00 2018-001  
 Boring # BH-01  
 Sample # : 1-13B  
 Depth (ft) : 60.25-60.75  
 Date tested : 04/15/18  
 Soil : Greenish gray bedrock

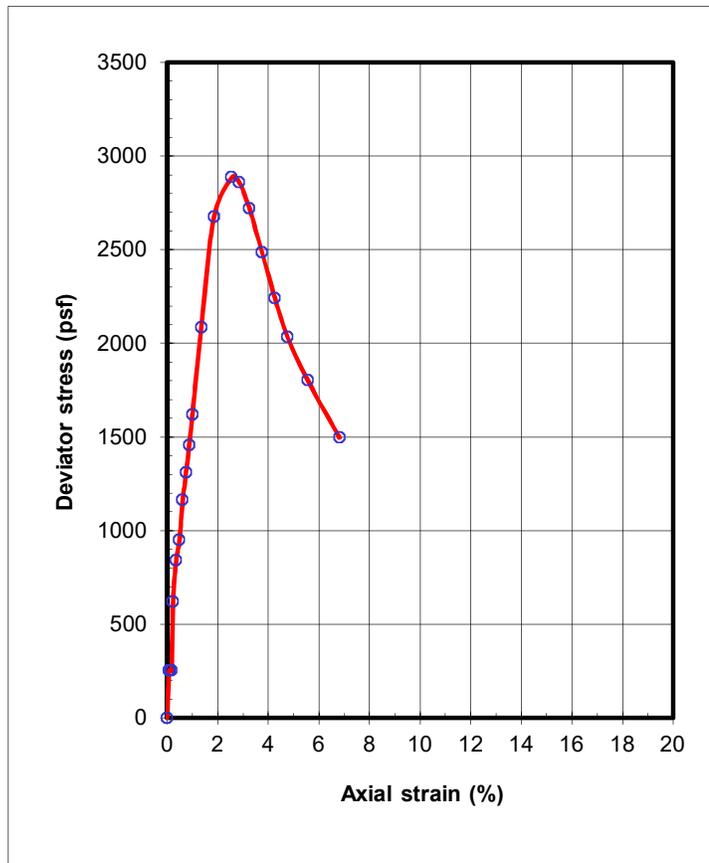
### Data Reduction:

Dial factor = 1.0 in/unit  
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 863.4 gms  
 Ht. = 5.720 in  
 Ave dia. = 2.397 in  
 Area = 4.513 sq.in  
 Volume = 423.0 c.c.  
 Shearing rate = 0.03 inch/min  
 Shearing rate = 0.5 %/min  
 Gs (assumed) = 2.70

Test Report: Void ratio = 0.595  
 Ht/Dia ratio = 2.39  
 Moisture = 20.6 %  
 Total density = 127.4 pcf  
 Dry density = 105.6 pcf  
 Saturation = 93.4 %  
 Chamber pressure = 5040 psf  
 Max. deviator stress = 2886 psf  
 Strain @ failure = 2.55 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	8.0	0.08	254.6
0.006	8.0	0.13	254.5
0.009	8.0	0.18	254.3
0.011	19.5	0.23	620.5
0.019	26.5	0.36	842.6
0.026	29.9	0.49	950.8
0.033	36.7	0.61	1163.4
0.041	41.4	0.75	1311.1
0.048	46.1	0.87	1457.5
0.055	51.2	1.00	1618.8
0.075	66.2	1.35	2083.8
0.104	85.5	1.85	2676.0
0.144	92.8	2.55	2886.5
0.161	92.3	2.85	2860.5
0.184	88.1	3.25	2719.8
0.213	80.9	3.75	2484.7
0.242	73.3	4.26	2239.7
0.270	66.9	4.75	2034.5
0.316	59.8	5.56	1802.9
0.388	50.3	6.81	1496.1



## UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : ARUP/RYCG JV  
 Project : SFMTA Potrero  
 Job # : 260018-00 2018-001  
 Boring # BH-02  
 Sample # : 2-4B  
 Depth (ft) : 16-16.5  
 Date tested : 04/15/18  
 Soil : Grayish brown clay with sand

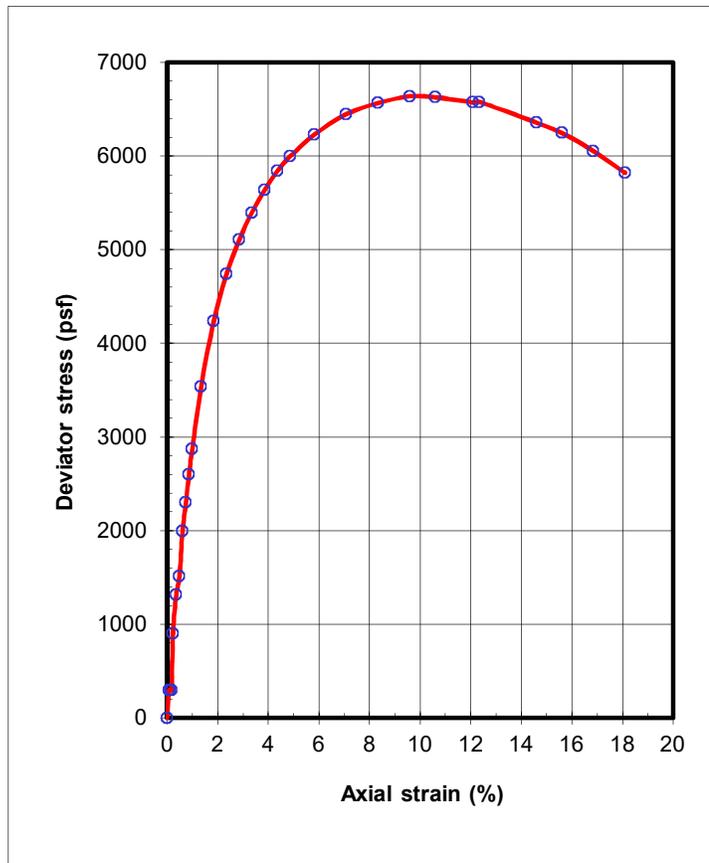
### Data Reduction:

Dial factor = 1.0 in/unit  
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 909.7 gms  
 Ht. = 5.720 in  
 Ave dia. = 2.403 in  
 Area = 4.538 sq.in  
 Volume = 425.4 c.c.  
 Shearing rate = 0.04 inch/min  
 Shearing rate = 0.75 %/min  
 Gs (assumed) = 2.70

Test Report: Void ratio = 0.500  
 Ht/Dia ratio = 2.38  
 Moisture = 18.8 %  
 Total density = 133.4 pcf  
 Dry density = 112.3 pcf  
 Saturation = 101.6 %  
 Chamber pressure = 2016 psf  
 Max. deviator stress = 6638 psf  
 Strain @ failure = 9.58 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	9.4	0.08	298.4
0.006	9.4	0.12	298.2
0.009	9.4	0.18	298.0
0.011	28.4	0.23	900.6
0.019	41.6	0.36	1314.7
0.026	48.0	0.49	1515.6
0.033	63.3	0.61	1994.8
0.041	73.0	0.74	2300.2
0.048	82.6	0.86	2598.6
0.055	91.4	0.99	2871.8
0.075	113.0	1.34	3535.9
0.104	136.1	1.85	4238.1
0.133	153.0	2.35	4741.3
0.162	165.7	2.85	5108.8
0.190	176.0	3.35	5396.3
0.219	184.7	3.86	5634.5
0.248	192.5	4.36	5842.6
0.277	198.7	4.87	5998.4
0.331	208.5	5.82	6229.5
0.403	218.7	7.07	6447.2
0.475	225.7	8.33	6565.2
0.547	231.4	9.58	6637.7
0.604	233.6	10.59	6628.1
0.690	235.7	12.09	6573.3
0.704	236.5	12.34	6578.4
0.833	234.6	14.60	6356.5
0.891	233.2	15.60	6246.3
0.962	229.5	16.85	6053.8
1.034	224.0	18.10	5820.9



## UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : ARUP/RYCG JV  
 Project : SFMTA Potrero  
 Job # : 260018-00 2018-001  
 Boring # BH-03  
 Sample # : 3-3B  
 Depth (ft) : 10-10.5  
 Date tested : 04/15/18  
 Soil : Yellowish brown bedrock

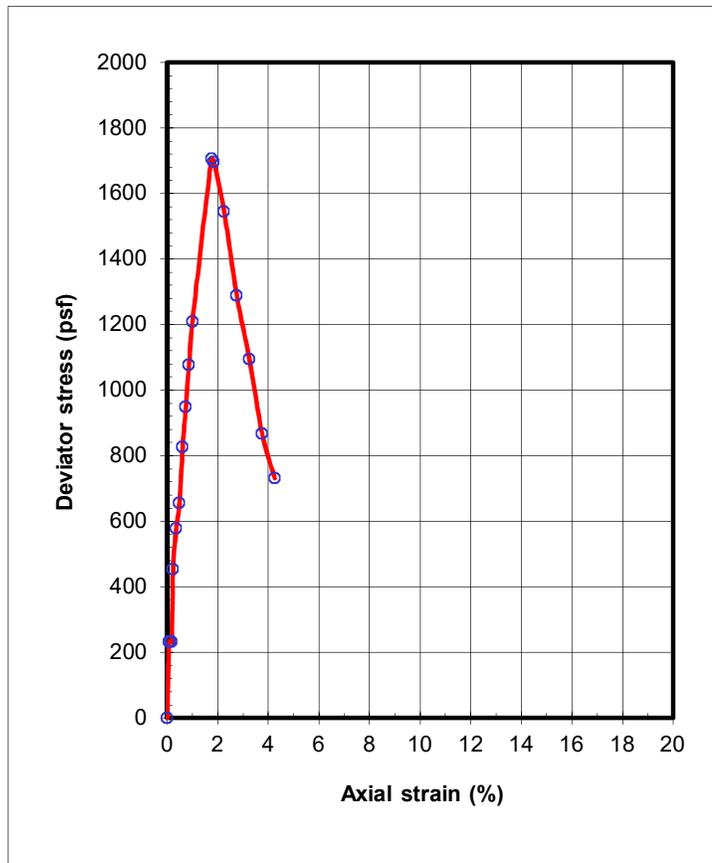
### Data Reduction:

Dial factor = 1.0 in/unit  
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 705.5 gms  
 Ht. = 5.800 in  
 Ave dia. = 2.393 in  
 Area = 4.501 sq.in  
 Volume = 427.8 c.c.  
 Shearing rate = 0.03 inch/min  
 Shearing rate = 0.5 %/min  
 Gs (assumed) = 2.70

Test Report: Void ratio = 1.223  
 Ht/Dia ratio = 2.42  
 Moisture = 35.8 %  
 Total density = 102.9 pcf  
 Dry density = 75.8 pcf  
 Saturation = 79.0 %  
 Chamber pressure = 1008 psf  
 Max. deviator stress = 1706 psf  
 Strain @ failure = 1.75 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	7.3	0.08	233.0
0.006	7.3	0.13	232.9
0.009	7.3	0.18	232.7
0.012	14.2	0.23	453.4
0.019	18.1	0.36	578.5
0.027	20.6	0.49	656.2
0.034	26.0	0.61	825.6
0.041	29.9	0.74	949.2
0.049	33.9	0.87	1076.5
0.056	38.2	1.00	1209.2
0.100	54.3	1.75	1705.9
0.106	54.0	1.85	1696.2
0.129	49.4	2.25	1545.6
0.158	41.4	2.75	1289.1
0.187	35.4	3.25	1094.4
0.216	28.2	3.75	867.8
0.245	23.9	4.25	731.3



## UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : ARUP/RYCG JV  
 Project : SFMTA Potrero  
 Job # : 260018-00 2018-001  
 Boring # BH-06  
 Sample # : 6-5B  
 Depth (ft) : 20-20.5  
 Date tested : 04/15/18  
 Soil : Greenish gray sandy clay

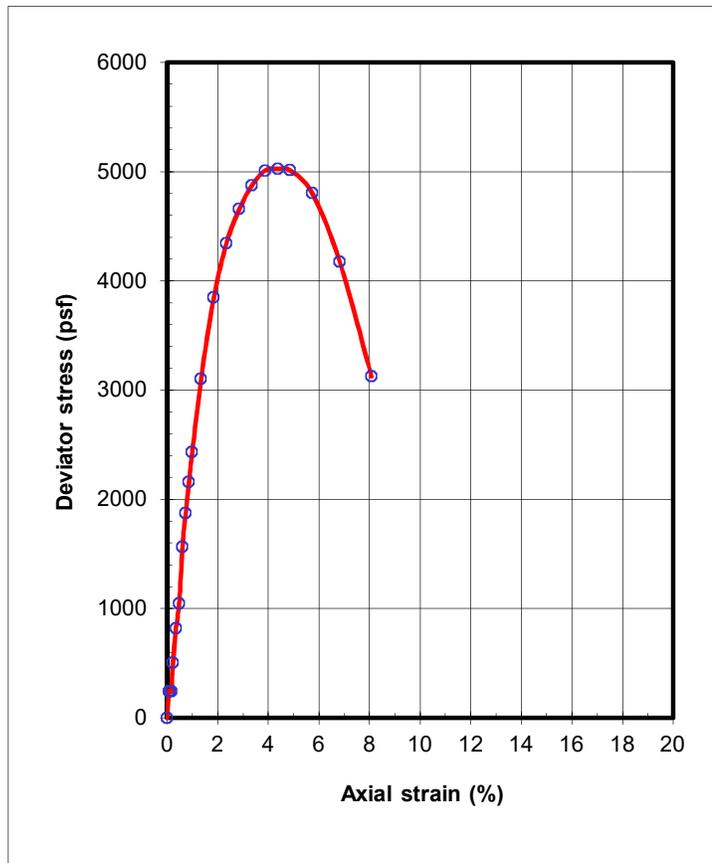
### Data Reduction:

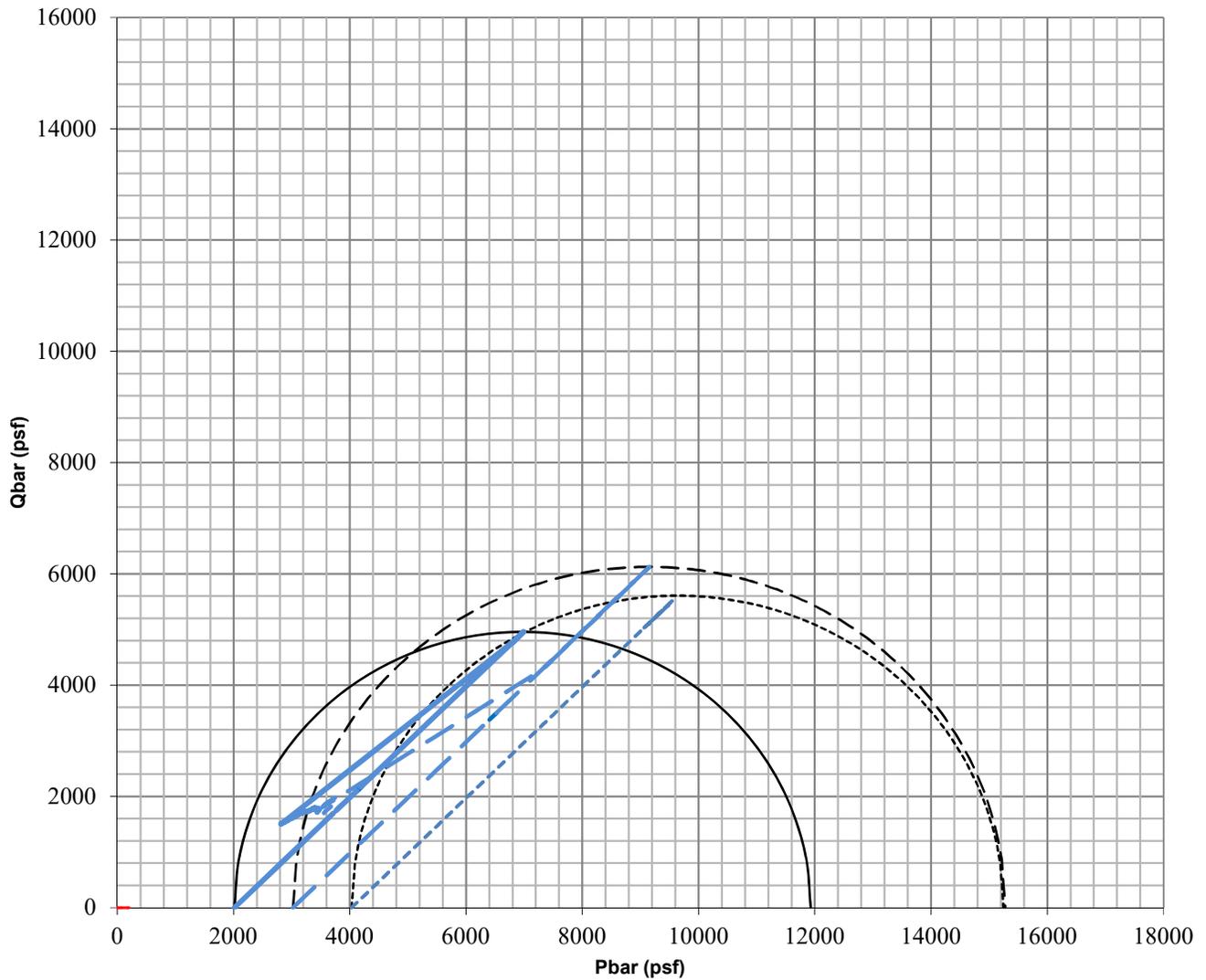
Dial factor = 1.0 in/unit  
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 888.1 gms  
 Ht. = 5.780 in  
 Ave dia. = 2.400 in  
 Area = 4.526 sq.in  
 Volume = 428.7 c.c.  
 Shearing rate = 0.04 inch/min  
 Shearing rate = 0.75 %/min  
 Gs (assumed) = 2.70

Test Report: Void ratio = 0.581  
 Ht/Dia ratio = 2.41  
 Moisture = 21.3 %  
 Total density = 129.3 pcf  
 Dry density = 106.6 pcf  
 Saturation = 99.1 %  
 Chamber pressure = 2016 psf  
 Max. deviator stress = 5026 psf  
 Strain @ failure = 4.37 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.001		0.00	0.0
0.003	7.7	0.08	245.4
0.006	7.7	0.12	245.2
0.008	7.7	0.17	245.1
0.012	15.9	0.23	505.9
0.019	25.9	0.35	822.2
0.026	33.1	0.47	1047.8
0.034	49.5	0.61	1566.4
0.041	59.3	0.73	1874.4
0.048	68.4	0.86	2157.5
0.056	77.2	0.99	2432.8
0.076	98.9	1.34	3103.0
0.105	123.2	1.84	3846.7
0.134	139.9	2.34	4345.8
0.163	150.7	2.85	4657.8
0.192	158.5	3.36	4872.6
0.222	163.8	3.86	5009.5
0.251	165.2	4.37	5025.7
0.280	165.5	4.86	5010.9
0.330	160.2	5.73	4805.2
0.393	140.7	6.82	4172.0
0.465	106.9	8.08	3126.9





PQ MOHR GRAPH

**Failure Criteria Maximum Effective  $\sigma_1 / \sigma_3$  ratio**

Line Type	Minor Principal Stress at failure (psf) $\sigma_3$	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2016	9913	2.60	5.62	2.40	25.65	122.7	97.7	0.726	95.4	2.70	0.02			2.3
dash	3024	12252	1.80	5.62	2.43	25.65	119.5	95.1	0.772	89.7	2.70	0.02			2.3
dot	4032	11215	19.75	5.62	2.46	25.65	117.0	93.1	0.810	85.5	2.70	0.02			2.3

Client: **ARUP/RYCG JV**

Boring #: **BH-01**

Sample #: **1-7B**

Project: **SFMTA Potrero**

Depth (ft): **31-31.5**

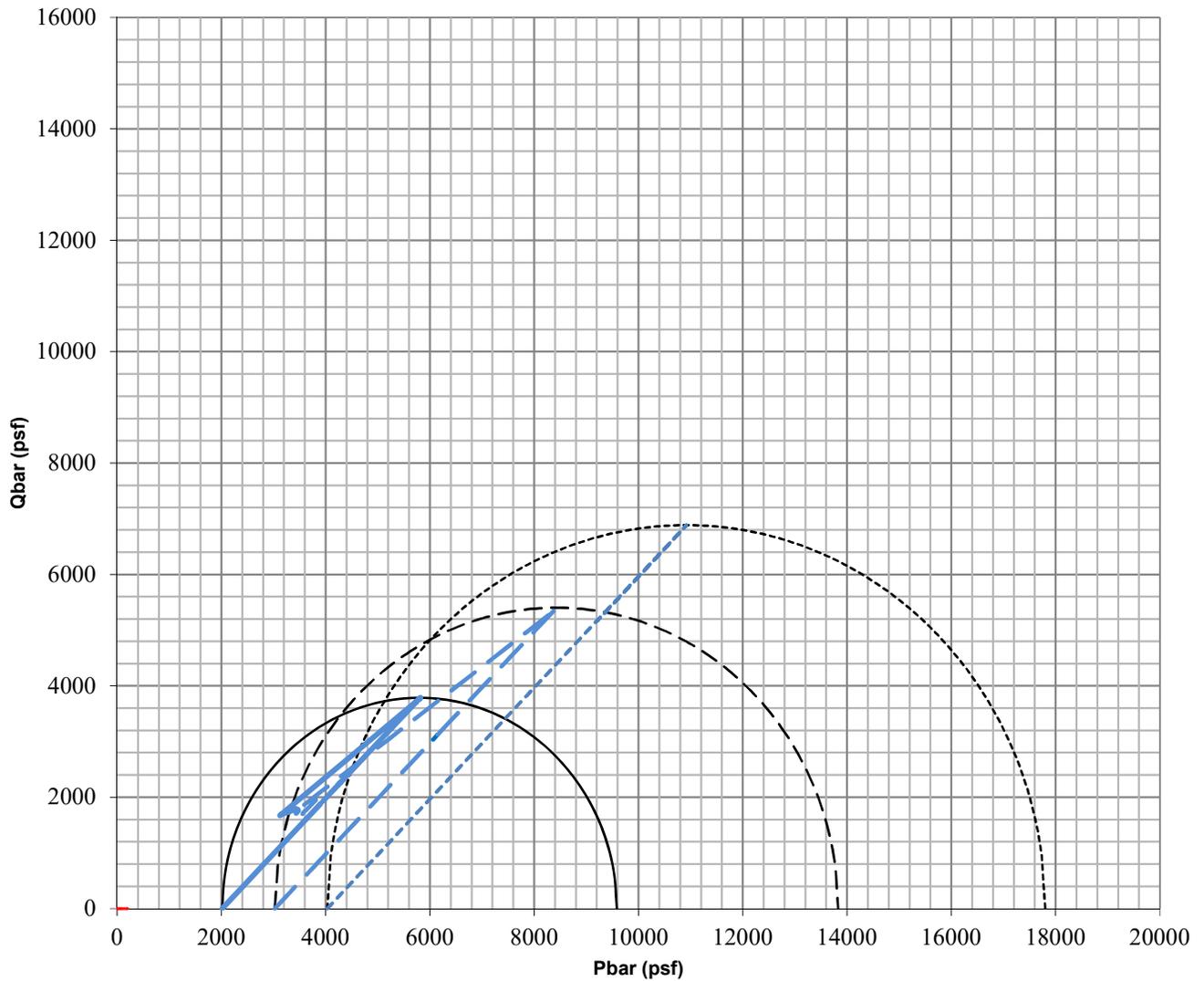
Project #: **260018-00 2018-001**

Soil: **Brown sand**

**ASTM  
D-4767**

**STAGED TRIAXIAL COMPRESSION  
CONSOLIDATED-DRAINED**

**TXCD**



PQ MOHR GRAPH

**Failure Criteria Maximum Effective  $\sigma_1 / \sigma_3$  ratio**

Line Type	Minor Principal Stress at failure (psf) $\sigma_3$	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2016	7568	4.10	5.62	2.40	22.59	129.7	105.8	0.593	102.8	2.70	0.02			2.3
dash	3024	10805	2.60	5.62	2.45	22.59	124.3	101.4	0.662	92.1	2.70	0.02			2.3
dot	4032	13768	2.40	5.62	2.48	22.59	121.3	98.9	0.703	86.7	2.70	0.02			2.3

Client: **ARUP/RYCG JV**

Boring #: **BH-02**

Sample #: **2-8B**

Project: **SFMTA Potrero**

Depth (ft): **36-36.5**

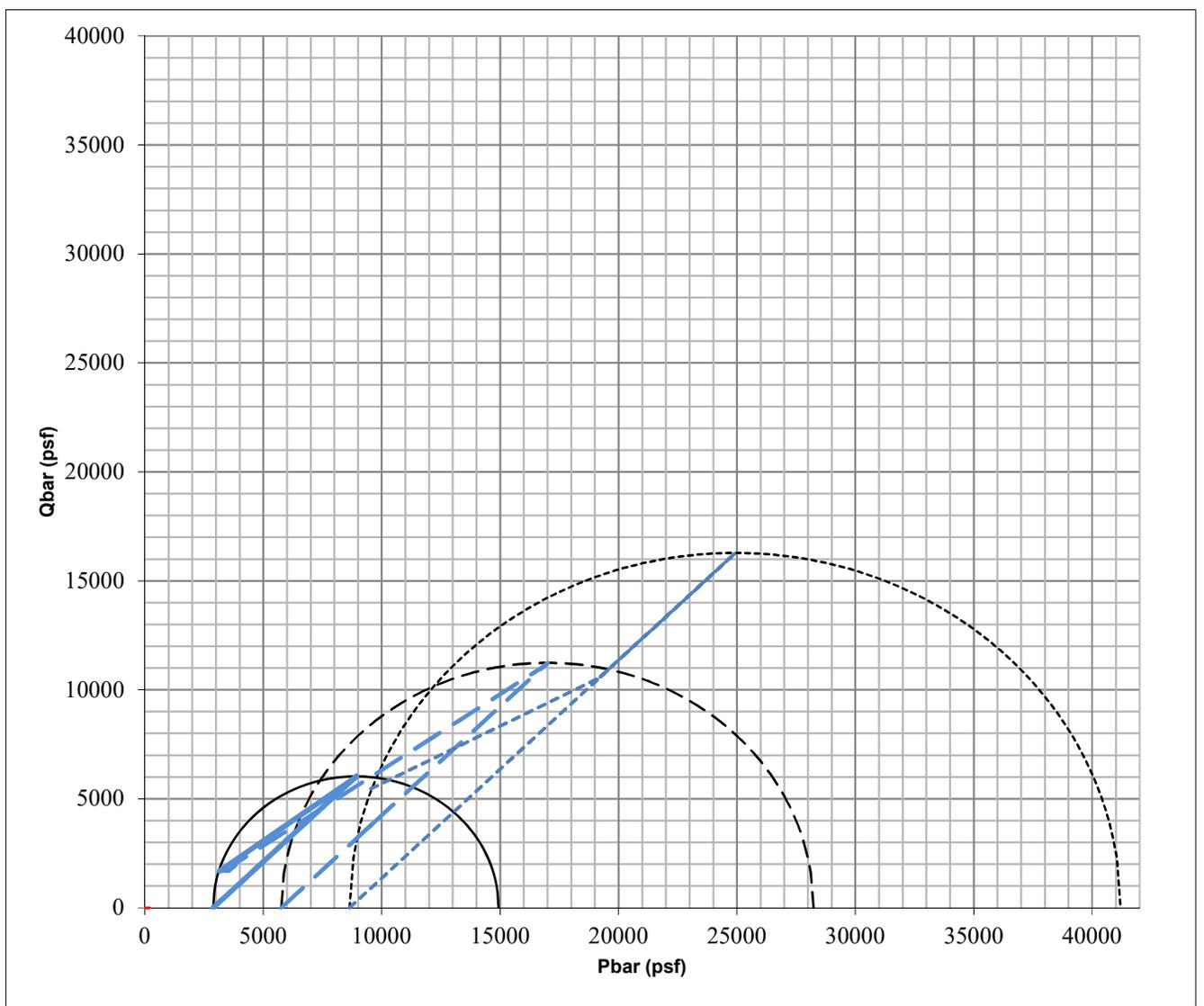
Project #: **260018-00 2018-001**

Soil: **Brown sand**

**ASTM  
D-4767**

**STAGED TRIAXIAL COMPRESSION  
CONSOLIDATED-DRAINED**

**TXCD**



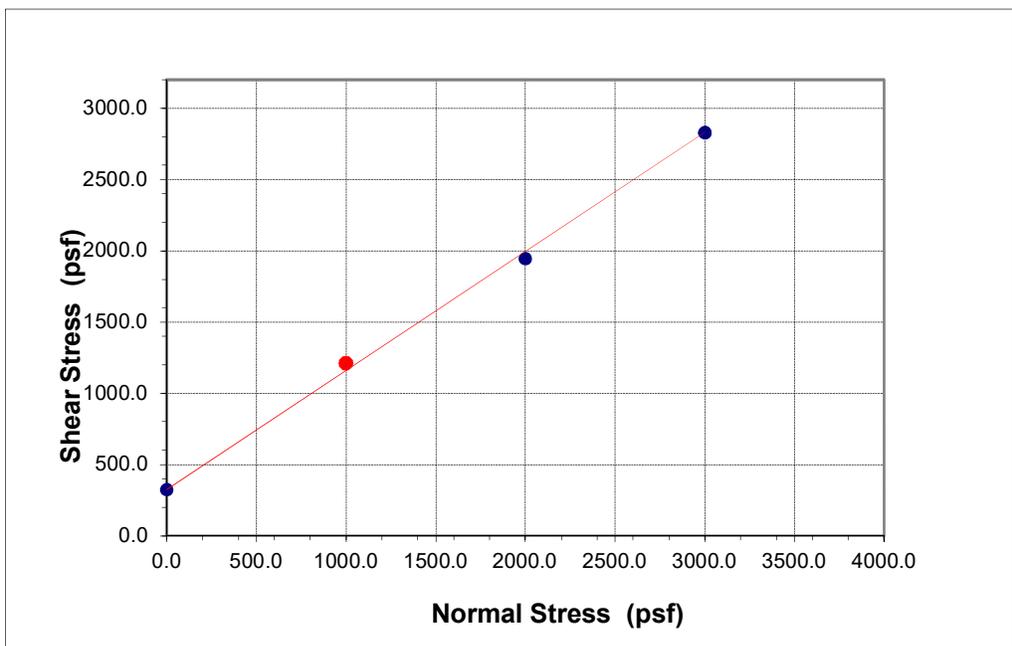
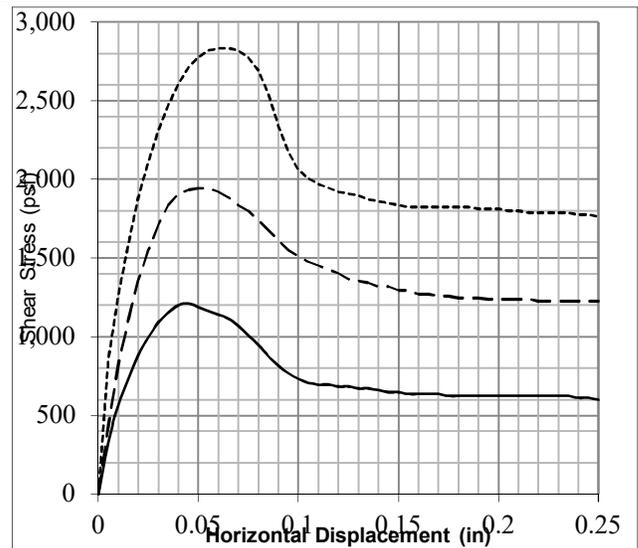
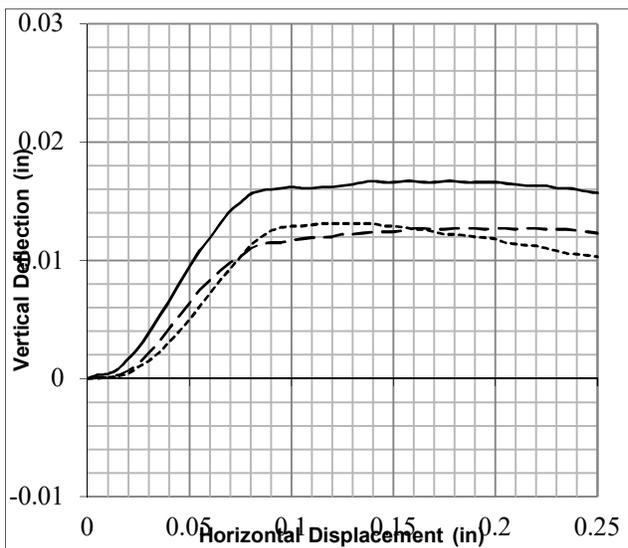
PQ MOHR GRAPH

**Failure Criteria Maximum Effective  $\sigma_1 / \sigma_3$  ratio**

Line Type	Minor Principal Stress at failure (psf) $\sigma_3$	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	12055	4.60	5.75	2.40	17.86	134.8	114.4	0.473	101.8	2.70	0.02			2.4
dash	5760	22472	4.10	5.75	2.43	17.86	131.8	111.8	0.507	95.0	2.70	0.02			2.4
dot	8640	32559	3.80	5.75	2.46	17.86	129.0	109.5	0.540	89.3	2.70	0.02			2.3

Client: <b>ARUP/RYCG JV</b>	Boring #: <b>BH-02</b>	Sample #: <b>2-11</b>
Project: <b>SFMTA Potrero</b>	Depth (ft): <b>57-57.5</b>	
Project #: <b>260018-00 2018-001</b>	Soil: <b>Brown silty sand</b>	

<b>ASTM D-4767</b>	<b>STAGED TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED</b>	<b>TXCD</b>
--------------------	---	-------------



**Legend**

- Test 1
- - - Test 2
- ..... Test 3

**Results**

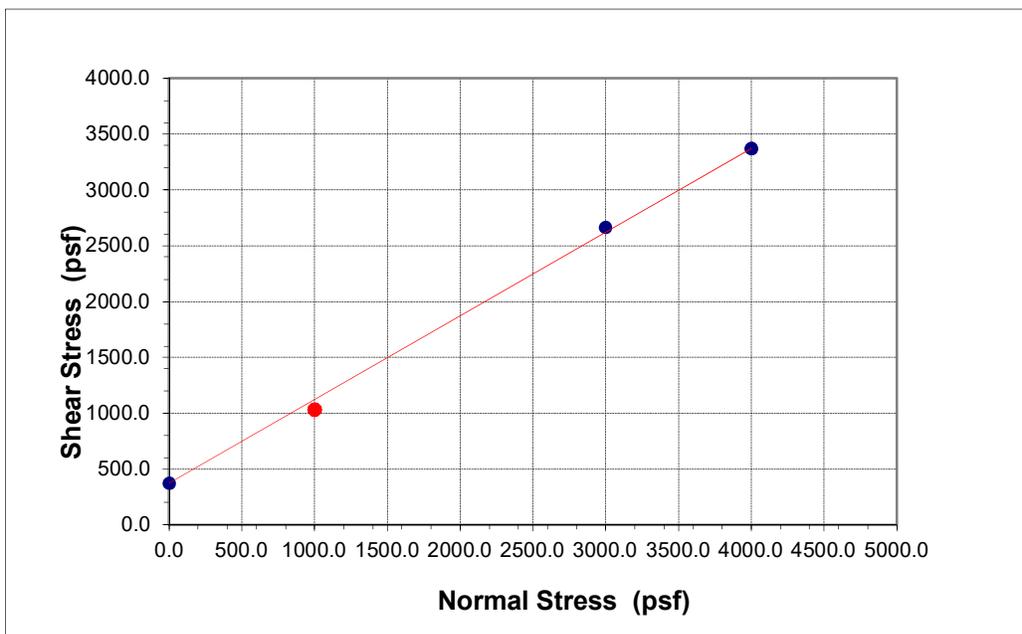
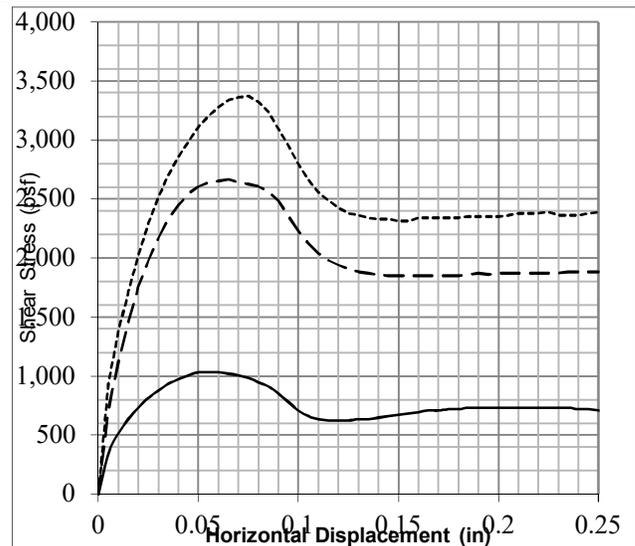
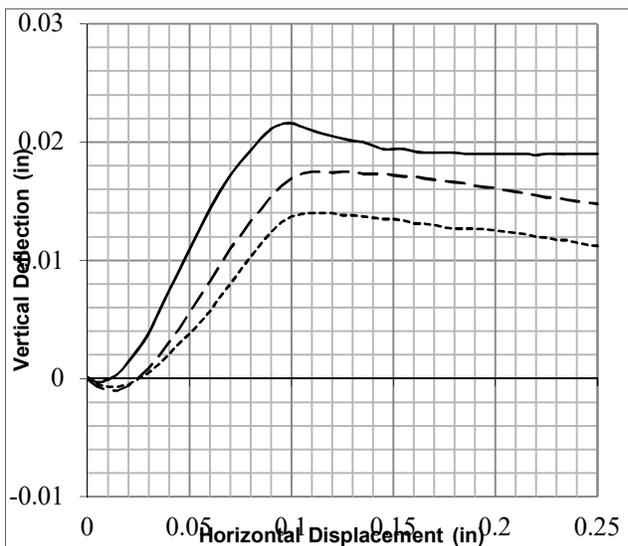
C = 325 psf  
 phi = 40 deg.

Gs = 2.70  
 Type = undisturbed

Test no.	SigN psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	1000	1212	0.045	0.09	14.0	116.8	86	0.443	1.00	2.416	15.7	117.1	97	0.439	0.998
2	2000	1944	0.050	0.09	14.7	116.6	89	0.446	1.00	2.416	16.2	112.2	87	0.502	1.039
3	3000	2832	0.060	0.09	15.6	116.1	93	0.451	1.00	2.416	16.3	111.4	86	0.513	1.043

<b>Client:</b> ARUP/RYCG JV	<b>Boring #:</b> BH-01	<b>Sample #:</b> 1-3B
<b>Project:</b> SFMTA Potrero	<b>Depth(ft)</b> 11-11.5	
<b>Project #:</b> 260018-00 2018-001	<b>Soil:</b> Undisturbed brown clayey sand	

**TEST REPORT: Direct shear - inundated, consolidated, & drained test**



**Legend**

- Test 1
- - - Test 2
- ..... Test 3

**Results**

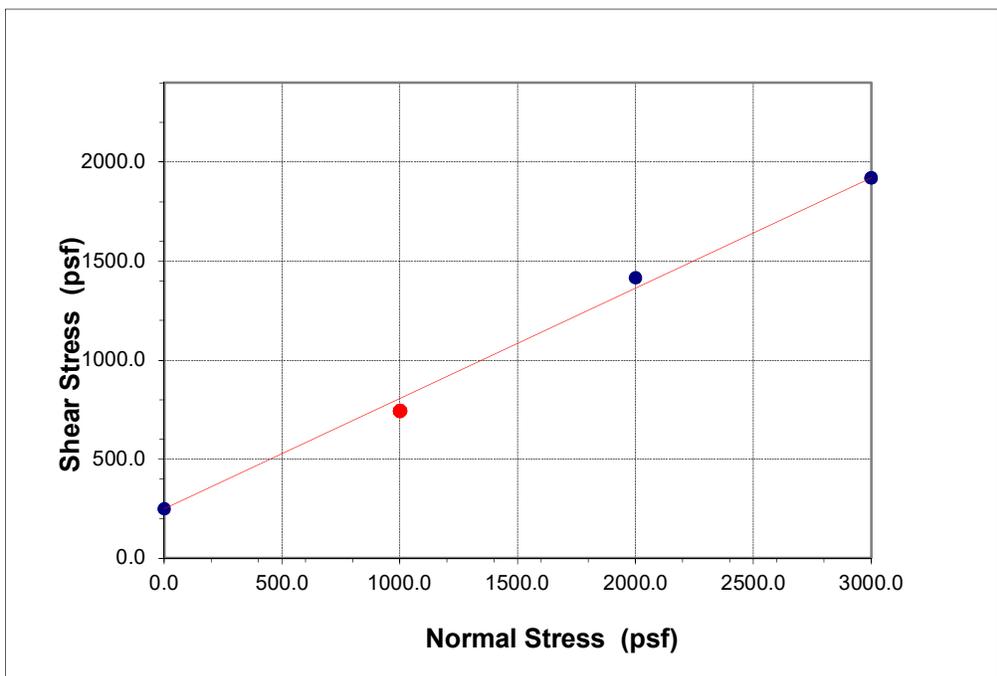
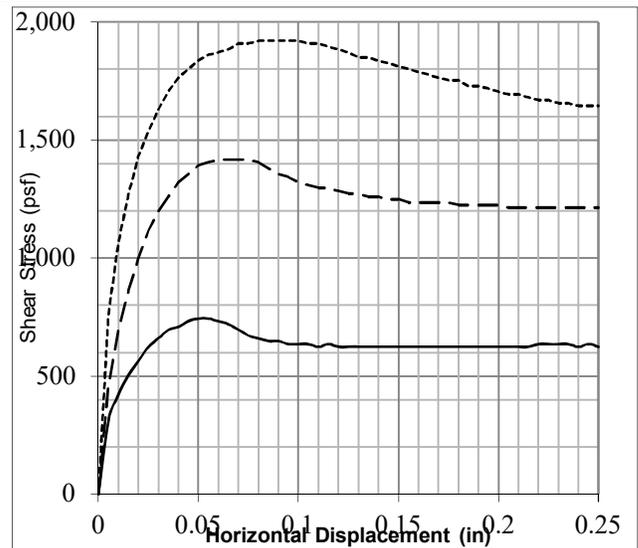
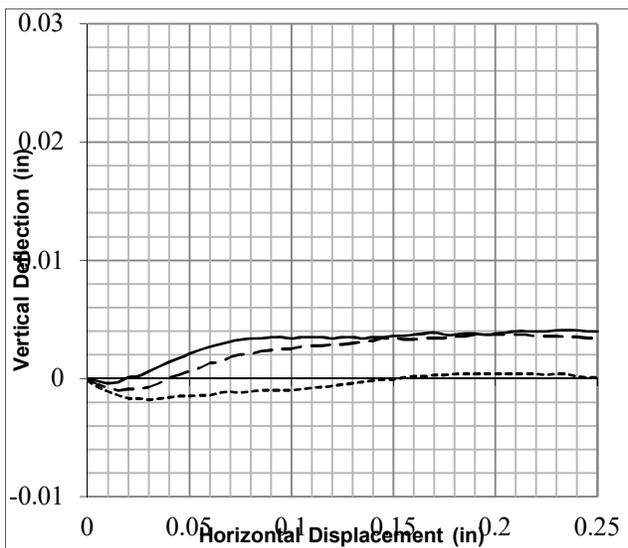
C = 375 psf  
 phi = 37 deg.

Gs = 2.70  
 Type = undisturbed

Test no.	SigN psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	1000	1032	0.050	0.09	17.7	105.9	81	0.592	1.00	2.416	18.1	102.5	76	0.645	1.033
2	3000	2664	0.065	0.09	18.3	104.8	81	0.609	1.00	2.416	19.3	101.8	80	0.655	1.029
3	4000	3372	0.075	0.09	18.2	104.0	79	0.621	1.00	2.416	18.7	105.3	84	0.601	0.988

<b>Client:</b> ARUP/RYCG JV	<b>Boring #:</b> BH-02	<b>Sample #:</b> 2-9B
<b>Project:</b> SFMTA Potrero	<b>DEPTH(ft):</b> 41-41.5	
<b>Project #:</b> 260018-00 2018-001	<b>Soil:</b> Undisturbed brown sand	

**TEST REPORT: Direct shear - inundated, consolidated, & drained test**



**Legend**

- Test 1
- - - Test 2
- ..... Test 3

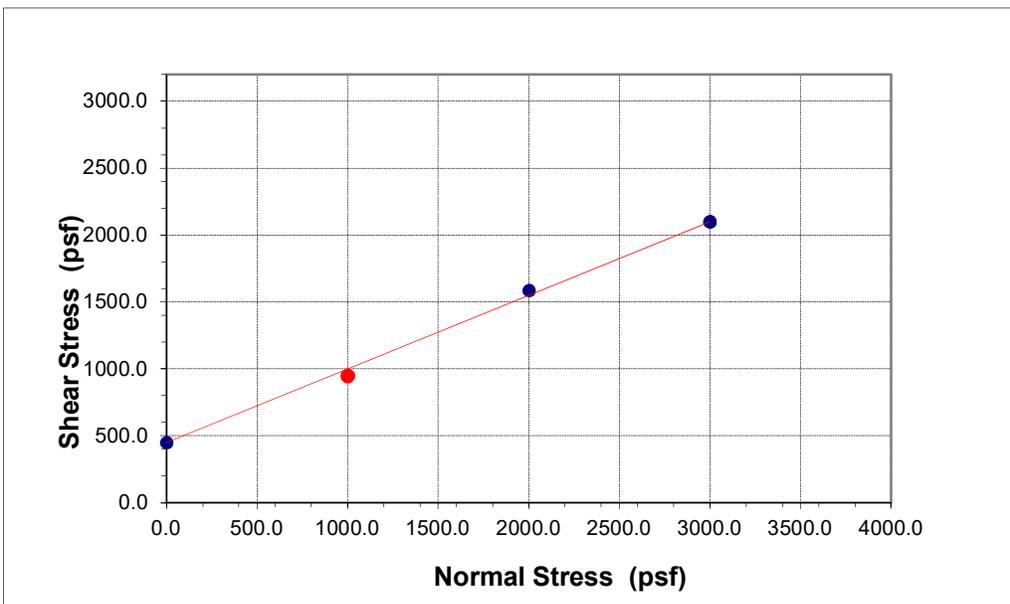
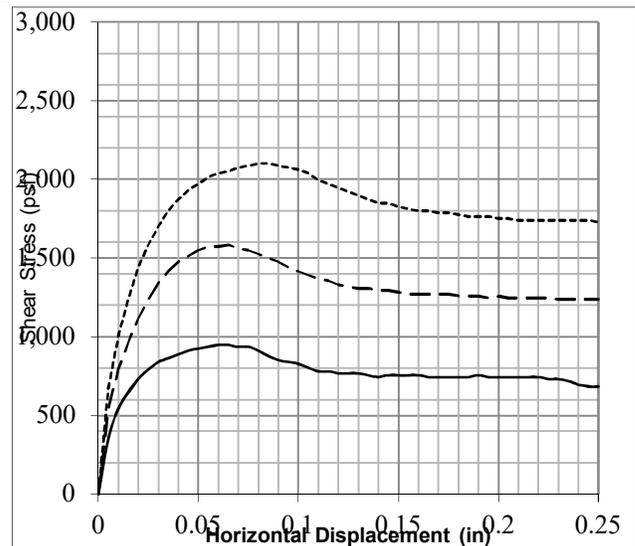
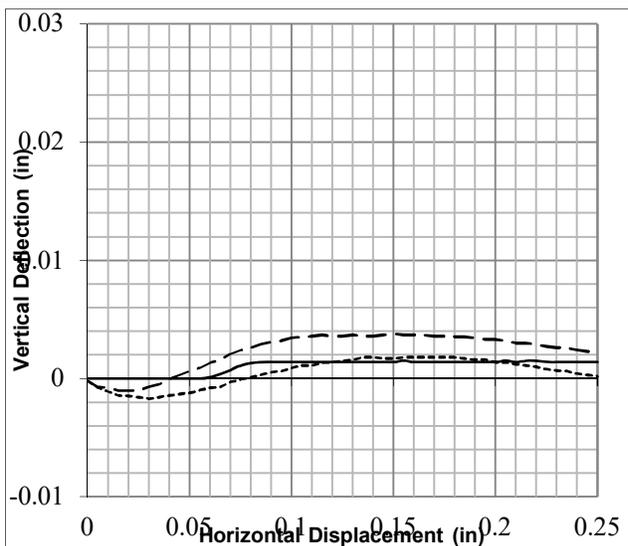
**Results**

C = 250 psf  
 phi = 29 deg.  
 Gs = 2.70  
 Type = undisturbed

Test no.	SigN psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	1000	744	0.050	0.09	15.4	111.7	82	0.509	1.00	2.416	15.8	109.8	80	0.535	1.017
2	2000	1416	0.060	0.09	17.4	110.3	89	0.529	1.00	2.416	17.3	107.5	82	0.568	1.026
3	3000	1920	0.080	0.09	19.9	106.3	92	0.585	1.00	2.416	19.9	108.6	97	0.552	0.979

<b>Client:</b> ARUP/RYCG JV	<b>Boring #:</b> BH-04	<b>Sample #:</b> 4-4B
<b>Project:</b> SFMTA Potrero	<b>Depth(ft)</b> 15-15.5	
<b>Project #:</b> 260018-00 2018-001	<b>Soil:</b> Undisturbed reddish brown clayey sand	

**TEST REPORT: Direct shear - inundated, consolidated, & drained test**



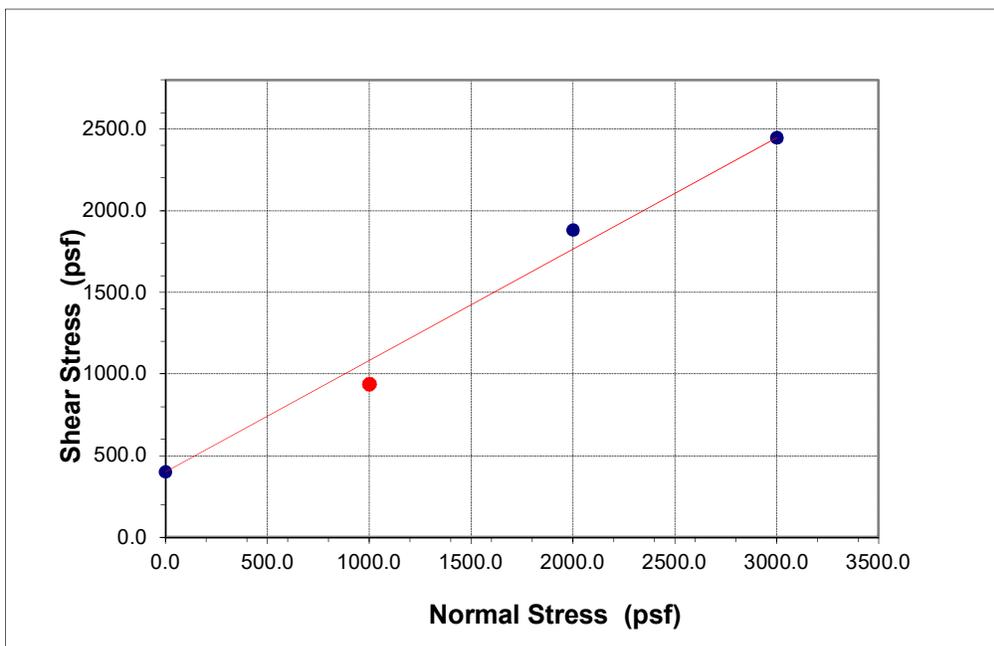
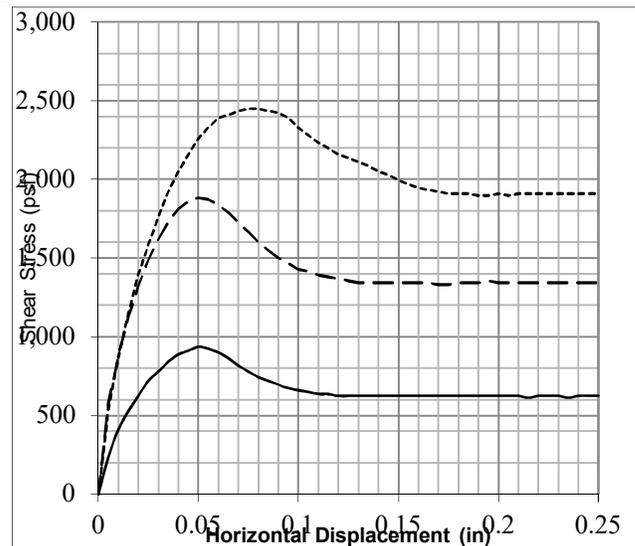
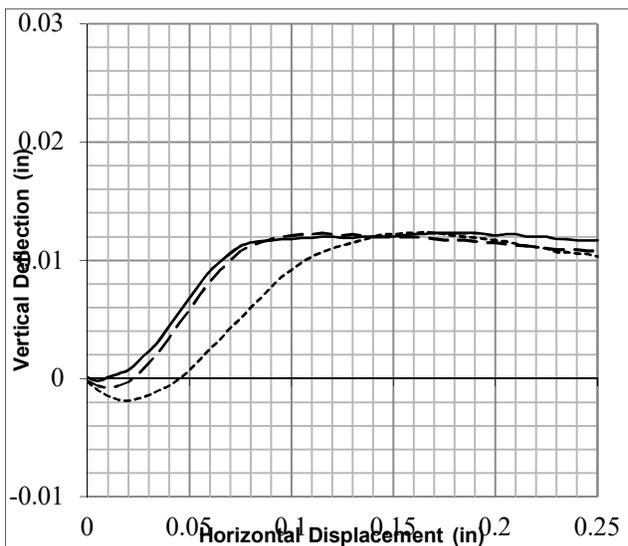
Legend  
 — Test 1  
 - - - Test 2  
 ..... Test 3

Results  
 C = 450 psf  
 phi = 29 deg.  
 Gs = 2.70  
 Type = undisturbed

Test no.	SigN psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	1000	948	0.060	0.09	19.8	106.9	93	0.577	1.00	2.416	20.1	108.1	97	0.559	0.989
2	2000	1584	0.065	0.09	20.0	107.1	94	0.574	1.00	2.416	20.3	105.0	91	0.605	1.020
3	3000	2100	0.080	0.09	20.5	105.6	93	0.597	1.00	2.416	19.9	103.1	85	0.634	1.024

<b>Client:</b> ARUP/RYCGJV	<b>Boring #:</b> BH-04	<b>Sample #:</b> 4-5B
<b>Project:</b> SFMTA Potrero	<b>Depth(ft):</b> 20-20.5	
<b>Project #:</b> 260018-00 2018-001	<b>Soil:</b> Undisturbed reddish brown clayey sand	

**TEST REPORT: Direct shear - inundated, consolidated, & drained test**



**Legend**

- Test 1
- - - Test 2
- ..... Test 3

**Results**

C = 400 psf  
 phi = 34 deg.  
 Gs = 2.70  
 Type = undisturbed

Test no.	SigN psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	1000	936	0.050	0.09	19.5	105.1	87	0.603	1.00	2.416	19.7	105.7	89	0.595	0.995
2	2000	1884	0.050	0.09	19.6	105.5	89	0.597	1.00	2.416	20.2	102.0	83	0.653	1.035
3	3000	2448	0.075	0.09	19.7	104.1	86	0.619	1.00	2.416	20.0	100.8	80	0.672	1.033

<b>Client:</b> ARUP/RYCG JV	<b>Boring #:</b> BH-06	<b>Sample #:</b> 6-4B
<b>Project:</b> SFMTA Potrero	<b>Depth(ft):</b> 15-15.5	
<b>Project #:</b> 260018-00 2018-001	<b>Soil:</b> Undisturbed brown clayey sand	

**TEST REPORT: Direct shear - inundated, consolidated, & drained test**

## **DISTRIBUTION**

Electronic copy: Plenary Americas  
555 W. Fifth Street, Suite 3150  
Los Angeles, California 9001

DRAFT

---

## Division 4: Supplemental Design Criteria

**POTRERO YARD MODERNIZATION PROJECT**

**Exhibit 18:  
Technical Requirements**

**Division 04:  
Supplemental Design Criteria  
PDA Appendix E: Technical Requirements**

**November 06, 2024**

**FINAL DRAFT**

## TABLE OF CONTENTS

<b>Introduction</b>	<b>1</b>
<b>1 Supplemental Noise and Vibration Requirements</b>	<b>1</b>
1.1 Intent of these Supplemental Noise and Vibration Requirements	1
1.2 Acoustic Consultant Qualifications	2
1.3 Applicable Codes and Standards	2
1.4 Acoustics, Noise, and Vibration Criteria	3
1.4.1 Environmental Noise	3
1.4.2 Background Noise Criteria from MEP Systems	3
1.4.3 MEP Systems Vibrations Isolation	4
1.4.4 Building Envelope Sound Isolation	4
1.4.5 Acoustic Separation of Spaces and Interior Room Acoustics	4
1.4.6 Project Vibration Criteria	5
1.5 Proprietary Design Deliverables	6
1.5.1 50% Design Development	6
1.5.2 100% Design Development	6
1.5.3 50% Construction Documents	7
1.5.4 90% Construction Documents	7
1.5.5 Construction Administration	8
1.6 Special Commentary on Vibration Control Approaches	8
1.7 Special Commentary on Required Engineering Analysis	8
<b>2 Seismic Resilience Performance Requirements</b>	<b>9</b>
2.1 Resilience Requirements	10
2.2 Compliance Standard	11
2.3 Seismic Hazard Definition	11
2.4 Structural Analysis Method	12
2.5 Structural and Non-Structural Performance Requirements	12
2.6 Loss and Downtime Assessment	13
2.7 Seismic Resilience Peer Review	14
2.8 Consideration of Joint Development Alternative Scenarios	14
2.9 Deliverables and Timeline for Seismic Resilience Peer Review	16

# Introduction

This Division 4 sets forth supplemental design criteria for the Project. These supplemental design criteria shall apply together with other design criteria and requirements set forth in the Technical Requirements.

As described in Division 1 and elsewhere in the Technical Requirements, the Project must fully enable the design, construction, operations and maintenance of either Joint Development Alternative. While complying with these requirements, the Principal Project Company shall demonstrate how possible noise, vibration, or seismic impacts to each Joint Development Alternative are taken into account and mitigated.

## 1 Supplemental Noise and Vibration Requirements

The Principal Project Company shall comply with these supplemental noise and vibration requirements in the design of the Project..

### 1.1 Intent of these Supplemental Noise and Vibration Requirements

Principal Project Company shall demonstrate through engineering analysis that the Project’s design will comply with the applicable noise and vibration requirements included in this Division 4 and Division 3.

Engineering analysis refers to industry-standard or project-specific approaches (with technical back-up) that present the basis and results of airborne source-path-receiver calculations (and the same for structure-borne noise and vibration transmission where noted to be required), along with uncertainty estimation.

These supplemental noise and vibration requirements establish:

1. Project criteria for noise and vibration; and
2. Deliverable requirements for the noise and vibration scope.

The criteria for noise and vibration are established in the following categories:

<i>Environmental Noise</i>	Includes all systems and operations, which shall be designed to comply with outdoor noise restrictions governed by applicable Laws.
<i>MEP Systems Noise and Vibration</i>	Includes: mechanical, HVAC, electrical, plumbing, vertical transportation, power generation and back-up systems, window cleaning and building maintenance systems, and other specialty systems that may generate noise or vibration.

<i>Building Envelope Sound Isolation / CalGreen</i>	Includes sound isolation performance of the building façade and the remainder of the Infrastructure Facility building envelope, which shall comply with these supplemental noise and vibration requirements.
<i>Acoustic Separation of Spaces</i>	Includes airborne sound transmission performance of demising constructions separating adjacent spaces. Composite calculations are required for constructions with multi-component floor/ceiling and partition/ door/ window systems. This includes estimation of flanking paths from ductwork, cable-passes and shaft-ways, and project-specific architectural detailing.
<i>Interior Room Acoustics</i>	Includes project requirements for interior room acoustics such as reverberation time and/or occupational noise levels to support the intended programmatic usage of spaces.
<i>Structure-borne Vibration</i>	This category specifically pertains to the transmission of structure-borne noise and vibration from the Project systems and operations (primarily, but not exclusively, from bus operations and maintenance equipment that are part of the Bus Yard Component) to other areas.

## 1.2 Acoustic Consultant Qualifications

Principal Project Company shall, through Substantial Completion, engage the services of a qualified, independent acoustics and vibration consulting firm (“acoustic consultant”) with a minimum of 10 years of relevant acoustics and vibration consulting experience with projects of type and complexity similar to the Project. The acoustics consultant shall have proven and demonstrated capabilities (as demonstrated by a minimum of three projects) both in predictive analysis of structure-borne vibration transmission and re-radiated noise in buildings. The acoustic consultant shall also have related experience in site testing and commissioning.

## 1.3 Applicable Codes and Standards

The latest published editions of the following codes and standards are referenced herein and made part of these supplemental noise and vibration requirements.

1. San Francisco Police Code Article 29
2. California Green Building Standards Code, Ch 5, CALGreen
3. California Uniform Building Code Title 24, with particular attention to Ch 12, Section 1206 Sound Transmission
4. International Building Code (IBC) Section 1206
5. International Code Council (ICC) G2-2010 Guidelines for Acoustics
6. If applicable: U.S. Department of Housing and Urban Development (HUD) regulation 24 CFR Part 51, Sub-part B
7. ASHRAE, American Society of Heating, Refrigerating and Air Conditioning Engineers, Fundamentals Handbook
8. NFPA 72

9. ISO 2631

10. 2018 FTA “Transit Noise and Vibration Impact Assessment Manual”

## **1.4 Acoustics, Noise, and Vibration Criteria**

Acoustics, noise, and vibration criteria for the Project are listed below. Principal Project Company confirms that design concepts and strategies it develops for the Project will meet these criteria.

For any space type not listed or specified, criteria shall be proposed by the acoustics consultant for the City’s review and approval.

### **1.4.1 Environmental Noise**

Design noise emissions from the Project to comply with the noise ordinance and requirements of San Francisco Police Code Article 29.

Limit noise emissions from the Project equipment or operations at the Project Site to no more than 55 dBA Leq, 5min for outdoor areas frequented by people. Such areas include the grounds surrounding the Project Site, including any outdoor courtyards, break areas, and other areas where people congregate or hold meetings.

Consider all non-transportation sound sources from the Project and their impact on existing and future, nearby residential properties. Non-transportation sound sources include locations of loading docks, and outdoor services docks, if any.

### **1.4.2 Background Noise Criteria from MEP Systems**

Designs for mechanical, electrical, and plumbing (MEP) building-system shall comply with the background noise criteria, as defined per occupancy type in the latest published edition of the ASHRAE Fundamentals Handbook.

Designs for occupied spaces shall comply with ASHRAE criteria for background noise level and shall exceed a noise level of NC 50. This is the highest recommended level that still allows for occupants to speak relatively comfortably without raising their voices.

Ductwork velocities shall comply with ASHRAE Fundamentals Handbook Chapter 49, 2019 edition, per room noise criteria.

For spaces that do not require speech communication and are unoccupied but require occasional occupancy (e.g., monitoring, maintenance, etc.), design the MEP systems must for a background noise level below 85 dBA in each space, to comply with the lower action limit for OSHA requirements to protect worker noise exposure.

Conduct engineering analysis for background noise level calculations in octave bands or one-third octave bands from 63 Hz to 4000 Hz spectra for each occupied space, inclusive of all system parameters including fan noise, flow-generated noise, self-generated noise of silencers, noise due to terminals, dampers, diffusers, duct breakout, radiated through partitions, structure-borne, and duct-borne noise.

Conduct a 31.5 Hz octave band analysis if there is a reasonable basis to expect high noise levels from very low frequency sources,

Occupied spaces in the Project shall be free of pure tones. A pure tone is defined as an amplitude at any 1/3-octave band center frequency that is 5dB or more above the amplitude of adjacent bands. Manufacturer's data sheets for MEP equipment shall be assessed by the acoustic consultant to confirm that equipment exhibiting pure tones is not selected.

Emergency generators and similar stand-by equipment such as smoke exhaust or stair pressurization fans shall be designed with noise and vibration control to meet the requirements of applicable local noise ordinance(s) and to limit disturbance to Project occupants during maintenance or testing, including the noise associated with any temporary load banks or load application systems.

Noise levels generated by emergency and stand-by systems shall also be considered in the analysis of emergency evacuation or paging systems that require intelligibility. NFPA-72 shall be referred to for guidance on intelligibility requirements for such systems design.

### **1.4.3 MEP Systems Vibrations Isolation**

Vibration isolation of equipment and any associated piping, as well as structural stiffness and deflection requirements of structures supporting MEP equipment shall comply with requirements in ASHRAE Fundamentals Handbook Chapter 49, 2019 edition.

### **1.4.4 Building Envelope Sound Isolation**

The Project's façade and building envelope shall comply with the requirements of California Green Building Standards Code, Ch 5, CALGreen and California Uniform Building Code Title 24, with particular attention to Ch 12, Section 1206 *Sound Transmission*.

### **1.4.5 Acoustic Separation of Spaces and Interior Room Acoustics**

Supplemental noise and vibration requirements include the 2019 California Uniform Building Code (section 1206) and 2020 California Residential Building Code (Title 24, Part 2.5, section AK102-103) for indoor sound separation, noting that these are currently in line with IBC.

Requirements for acoustic separation between demising spaces shall meet minimum standards for Class A office space in San Francisco. This includes, at minimum:

1. Open plan workspace "normal" speech privacy
  - a. background Noise: NC 40 maximum
  - b. electronic sound masking: 40 to 45 dBA if background noise levels are calculated to be less than NC-35 on average.
  - c. Sound absorbing ceiling of NRC 0.70 Minimum (ASTM C423, Type E-400 mounting)
2. Offices and meeting rooms "normal" speech privacy
  - a. background noise: NC 35 maximum

- b. minimum noise reduction of partitions: NIC 35 Minimum with sound masking and NIC 40 minimum without sound masking (noise isolation class defined per ASTM E336)
  - c. sound absorbing ceiling of NRC 0.80 minimum (ASTM C423, Type E-400 mounting)
  - d. sound absorbing wall panels on 25% of walls of NRC 0.70 minimum (ASTM C423, type-A mounting)
3. Private offices and meeting rooms “confidential” speech privacy
- a. background noise: NC 30 maximum
  - b. noise reduction of partitions: NIC 45 minimum
  - c. provide absorption of NRC 0.80 minimum on 25% of walls

For purposes of evaluating impacts to Joint Development Alternative 1, Principal Project Company shall assume the following are residential acoustic design requirements: the International Building Code and “Average” rating or greater under the U.S. Department of Housing and Urban Development Guide.

### 1.4.6 Project Vibration Criteria

Noise and vibration impacts from the operations and maintenance activities in the Infrastructure Facility shall not adversely impact any Joint Development Alternative. Vibration control systems shall be provided for all Infrastructure Facility operations and maintenance activities (including vehicle idling, vehicle movements over surface discontinuities, vehicle lifts and conveyance, tools, testing and other processes that occur within the yard), as well as all Project building systems (architectural and /or structural), such that maximum mid-span floor vibration levels shall not exceed recommended criteria for residential dwellings contained in the following two references:

1. ISO 2631 (part 1 and part 2) provides “base curves” for maximum allowable vibration in all 3 axes. For nighttime residential applications, Annex A requires no more than 1.4x the base curve. ISO requirements for steady state, transient vibration and “shock” shall be used based on the type of activity analyzed.
2. The US industry standard is the 2018 FTA “Transit Noise and Vibration Impact Assessment Manual”. See Table 6-3 below. Applicable criteria are outlined in red, as applicable to elevated residential floors of this Project.

**Table 6-3 Indoor Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN)  
 Impact Criteria for General Vibration Assessment**

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch /sec)			GBN Impact Levels (dBA re 20 micro Pascals)		
	Frequent Events	Occasional Events	Infrequent Events	Frequent Events	Occasional Events	Infrequent Events
<b>Category 1:</b> Buildings where vibration would interfere with interior operations.	65 VdB*	65 VdB*	65 VdB*	N/A**	N/A**	N/A**
<b>Category 2:</b> Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
<b>Category 3:</b> Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

## 1.5 Proprietary Design Deliverables

In addition to the requirements in Division 1, Section 1.8.5, the following sections describe the Design Deliverables required at each stage of the design specified in Division 1, Section 1.8.5.2.

### 1.5.1 50% Design Development

Principal Project Company shall prepare and submit the following in the 50% Design Development package:

1. Acoustic criteria per program space. Identify acoustically sensitive spaces.
2. Demonstrate compliance with acoustic criteria, including:
  - a. Background noise calculations for acoustically-sensitive program space types, providing proof of design compliance.
  - b. Verify compliance with prescriptive sound isolation and room acoustics criteria for acoustically-sensitive spaces.
3. Register of risks and critical path items in the Project design related to achievement of acoustic criteria, including recommendations for resolution of the same.
4. Detailed engineering analysis that meets the requirements of Section 1.7 (Special Commentary on Required Engineering Analysis) and demonstrates full compliance with vibration and structure-borne noise criteria.
5. Coordinated design to meet acoustics, noise, and vibration criteria with all related disciplines (architectural, structural, mechanical, etc.).

All noise control specifications that relate to these noise calculations shall be included in the written specifications for mechanical vibration and seismic control provided in a schedule in the Design Documents.

### 1.5.2 100% Design Development

Principal Project Company shall prepare and submit the following in the 100% Design Development package:

1. Updates to acoustic criteria per program space, identifying changes from the prior design deliverable.
2. Demonstrate compliance with acoustic criteria, including:
  - a. Background noise calculations for each program space type, providing proof of design compliance.
  - b. Sound isolation and room acoustics proof of design compliance for each category of acoustic privacy.
3. Register of risks and critical path items in the Project design related to airborne noise, including recommendations for resolution of the same.

4. Updates, if any, to detailed engineering analysis that meets the requirements of Section 1.7 (Special Commentary on Required Engineering Analysis) and demonstrates full compliance with vibration and structure-borne noise criteria.
5. Coordinated design to meet acoustics, noise, and vibration criteria with all related disciplines (architectural, structural, mechanical, etc.).

All noise control specifications that relate to these noise calculations shall be included in the written specifications for mechanical vibration and seismic control provided in a schedule in the Design Documents.

### **1.5.3 50% Construction Documents**

Principal Project Company shall prepare and submit the following in the 50% Construction Documents package:

1. Updates to acoustic criteria per program space, identifying changes from the prior design deliverable.
2. Proof of design compliance and detailed calculations, as necessary, with an executive summary that demonstrate compliance with airborne noise acoustic criteria.
3. Updates, if any, to detailed engineering analysis that meets the requirements of Section 1.7 (Special Commentary on Required Engineering Analysis) and demonstrates full compliance with vibration and structure-borne noise criteria.
4. Coordinated design to meet acoustics, noise, and vibration criteria with all related disciplines (architectural, structural, mechanical, etc.).

All noise control specifications that relate to these noise calculations shall be included in the written specifications for Mechanical Vibration and Seismic Control provided in a schedule in the Design Documents.

### **1.5.4 90% Construction Documents**

Prepare and submit the following in the 90% Construction Documents package:

1. Final acoustic criteria per program space.
2. Final summary documentation and detailed calculations, as necessary, demonstrating full compliance with criteria related to airborne noise.
3. Final detailed engineering analysis that meets the requirements of Section 1.7 (Special Commentary on Required Engineering Analysis) and proves full compliance with vibration and structure-borne noise criteria.
4. Final coordinated design to meet acoustics, noise, and vibration criteria with all related disciplines (architectural, structural, mechanical, etc.).

Include final noise control specifications that relate to these noise calculations in the written specifications for mechanical vibration and seismic control and/or provided in a schedule on the Project drawings.

## 1.5.5 Construction Administration

Confirm any changes to the Construction Documents made during construction remain compliant with the acoustics, noise, and vibration criteria.

Submit to the City a testing report with validating measurements demonstrating the acoustics, noise, and vibration criteria are met in all program spaces including:

- Background noise
- Speech privacy
- Structure-borne vibration
- Structure-borne noise

Perform testing based on available industry standards. Submit a request for information to the City for any clarification request related to testing requirements.

## 1.6 Special Commentary on Vibration Control Approaches

Excess vibration from the Infrastructure Facility may have an adverse effect on occupants of the Joint Development Alternatives. Given the high forces that can be imparted from some bus operations and maintenance equipment onto the building structure, the resulting vibration could travel through the building structure. If strong enough, this vibration can be re-radiated as audible noise and be felt in spaces, which can sometimes be quite far away from the source of vibration.

Based on the foregoing, the City's preferred hierarchy of methods for mitigating structure-borne vibration is in the order of precedence indicated as follows:

1. The preferred method is for the proposed building design to have decoupled structures between the Infrastructure Facility and the Joint Development Alternatives, with sufficient mass in demising constructions to also mitigate airborne noise to project criteria levels.
2. If a building design is proposed that does not entirely decouple the structures (per item 1 above), then acoustically-isolated architectural and/or structural systems shall be introduced where appropriate to meet the Project's vibration criteria.
3. Where neither decoupled structures nor acoustically-isolated systems are possible (per items 1 and 2 above, respectively), the mass of the demising constructions shall be capable of meeting the Project's vibration criteria.

## 1.7 Special Commentary on Required Engineering Analysis

In all design deliverables, engineering analysis shall demonstrate the Project's vibration criteria is met in the proposed building design. Minimum requirements for the analysis include the following:

1. Measurement and/or other documentation of noise and vibration levels for all equipment planned for the Bus Yard Component.
2. Conversion of the above into forcing functions representing each source.

3. Analysis showing that the source forcing functions do not cause exceedance of vibration and structure-borne noise criteria in the Joint Development Alternatives.
4. Error analysis and factor of safety shall be included.

Principal Project Company shall implement appropriate coordination with the Project's structural engineer to ensure that suitable assumptions regarding the stiffness and damping of floors are considered as part of the design parameters.

## 2 Seismic Resilience Performance Requirements

A high level of seismic resilience is required for the Project, both due to the SFMTA's role in emergency response and due to its interest in owning, operating, and maintaining a durable capital asset. Building codes aim for life safety but do not necessarily address resilience, which is the ability of a building to support its core functions quickly after an earthquake. Seismic resilience encompasses not just the structural performance of a building in an earthquake but also the performance of architectural, mechanical, electrical, plumbing, and other systems required to support those functions.

The seismic resilience requirements presented in this document draw on the recommendations from a 2009 report by the San Francisco-based think tank SPUR.<sup>1</sup> This report outlines desirable recovery scenarios for the San Francisco civic infrastructure following a major earthquake. Regarding the SFMTA transit system, the report recommends that "service [be] restored for 90 percent of MUNI customers" within 30 days of an "expected earthquake," which is defined as an earthquake event having 10% probability of occurrence in 50 years.

The SPUR report does not specifically address bus maintenance facilities such as the Project's Bus Yard Component. It is expected that buses themselves may be able to run immediately after such an earthquake, while the facilities that support transit operations might lose some functionality temporarily. However, functionality of such support facilities must soon be restored to maintain bus service. Hence it is judged that the Bus Yard Component facility should be operational within that 30-day period of the event if 90% of bus service is to be achieved.

Consistent with the SPUR report, these seismic criteria define functionality requirements for a seismic hazard level given by an earthquake event having 10% probability of occurrence in 50 years, otherwise known as a 475-year event. In these criteria this seismic level is termed the "design-level" event.

An additional structural performance target is defined for a much larger event known as the maximum considered earthquake ( $MCE_R$ ). This event may be expected to cause more damage and consequent loss of functionality. The California Building Code targets a maximum 10% probability of collapse in the  $MCE_R$  event for most buildings. A higher level of performance in the  $MCE_R$  is not necessary for the Facility. However, these seismic criteria do specify that the

---

<sup>1</sup> San Francisco Bay Area Planning and Urban Research Association (SPUR), "Lifelines: Upgrading Infrastructure to Enhance San Francisco's Earthquake Resilience," [https://www.spur.org/sites/default/files/publications\\_pdfs/SPUR\\_Lifelines.pdf](https://www.spur.org/sites/default/files/publications_pdfs/SPUR_Lifelines.pdf)

MCE<sub>R</sub> performance be explicitly checked, which is not otherwise required by the code. This provides additional confidence that the intended performance will be attained.

These resilience goals apply specifically to the Infrastructure Facility, but the design of the Joint Development Alternatives must consider the impacts of their performance on transit operations following a large earthquake. Structurally, the Joint Development Alternatives must meet the same performance level as the Infrastructure Facility. However, these performance requirements do not address utilities that only serve the Joint Development Alternatives and whose repair would not impede operation of the transit portion of the Project.

It is possible that the Infrastructure Facility and Joint Development Alternatives could be developed in separate phases. All the requirements and deliverables discussed herein that are related to seismic resilience are applicable in all cases or scenarios for future development, whether in phases or otherwise, and including any interim conditions in between phases.

It is the responsibility of the Principal Project Company to:

- Clearly define phases of development, if any, and the Project scope(s) to be implemented in each phase; and,
- Develop the design and engineering analyses that demonstrate compliance with the seismic resilience criteria set forth herein for each and every phase of the Project's development.

The above objectives are translated into specific requirements in the following sections. The resilience standard for this Project exceeds the code design standard in many areas; however, it should be noted that this resilience standard does not replace full compliance with the governing building code.

## 2.1 Resilience Requirements

The Project's resilience requirements are stated qualitatively as follows in terms of expected performance at two levels of seismic hazard:

1. Immediate re-occupancy of the Infrastructure Facility after the design-level event ("green tag" expected)
2. Recovery of essential functionality of the Infrastructure Facility within 30 days after the design-level event
3. Maximum 10% probability of collapse of the Project in an MCE<sub>R</sub> seismic event

The required approach to attaining these requirements is described in greater detail in the following sections. The seismic hazard levels are defined in Section 2.3 (*Seismic Hazard Definition*).

## 2.2 Compliance Standard

These seismic resilience requirements adopt the system outlined by the Resilience-based Earthquake Design Initiative (REDi). A copy of this standard can be downloaded free of charge.<sup>2</sup> Other systems of equivalent intent and approach may be used upon review and approval by the City.

In keeping with the resilience requirements stated in Section 2.1 (*Resilience Requirements*) above, the Project's resilience requirements are as required for REDi Gold Level, except as modified in this document.

## 2.3 Seismic Hazard Definition

The design-level earthquake is represented by an elastic acceleration response spectrum having 10% probability of exceedance in a 50-year period (475-year return period) based on a site-specific probabilistic seismic hazard analysis (PSHA). The  $MCE_R$  event shall be as defined by the California Building Code and its referenced standard ASCE 7, having a site-specific PSHA response spectrum with deterministic cap. The spectra shall incorporate damping as appropriate for the type of structure to be designed and the level of damage expected under the two hazard levels.

In order to accommodate any phasing of the permitting and construction of the Facility (for example, with the Infrastructure Facility delivered first and the Joint Development Alternatives delivered at a later date, after completion of the Infrastructure Facility), the  $MCE_R$  ground motions for all scenarios defined in Section 2.8 (*Consideration of Joint Development Alternative Scenarios*) used for the purpose of resilience verification shall be determined according to one of following options:

1. The  $MCE_R$  response spectrum shall be developed from an envelope across all periods of the  $MCE_R$  spectra defined by ASCE 7-16 and ASCE 7-22 for the given site class. A suite of ground motions shall be developed according to ASCE 7 and amplitude-scaled or spectrally matched to the envelope  $MCE_R$  response spectrum.
2. A suite of ground motions shall be developed according to ASCE 7 and amplitude-scaled or spectrally matched to the ASCE 7-16  $MCE_R$  response spectrum. The suite shall be then amplitude-scaled by a scalar equal to the average ratio between ASCE 7-22  $MCE_R$  response spectra and ASCE 7-16  $MCE_R$  response spectra within target period range. This scale factor shall not be lower than a ratio between the spectral ordinate of ASCE 7-22  $MCE_R$  response spectra and ASCE 7-16  $MCE_R$  response spectra at the period of the elastic mode which captures the largest percentage of the Infrastructure Facility mass. The average of the suite of ground motion response spectra shall not fall below 90% of ASCE 7-22  $MCE_R$  response spectrum for any period within the target period range relevant to the seismic system.
3. The Facility shall be analyzed using a suite of ground motions developed according to ASCE 7 and amplitude-scaled or spectrally matched to ASCE 7-16  $MCE_R$  response spectra. The structural performance of the Facility shall be Life Safety according to ASCE 41.

---

<sup>2</sup> Arup, "REDi Rating System: Resilience-based Earthquake Design Initiative for the Next Generation of Buildings," Version 1.0, October 2013, <https://www.arup.com/perspectives/publications/research/section/redi-rating-system>

4. Any other rational approach of equivalent intent may be used upon review and approval by the City.

The design-level earthquake spectrum as defined by the California Building Code may not match the PSHA for all building periods at this site. The code-specified seismic hazard shall be utilized for confirming compliance with all code requirements. For evaluating structural and non-structural performance according to Section 2.5 (*Structural and Non-Structural Performance Requirements*), as well as for loss and downtime assessments according to Section 2.6 (*Loss and Downtime Assessment*), the PSHA shall be used in lieu of the code spectrum.

A structure designed solely according to code requirements will likely not meet the resilience requirements under the PSHA hazard. Therefore, the design team shall check these requirements at various stages of the design to ensure that appropriate decisions are made in a timely manner.

## 2.4 Structural Analysis Method

Principal Project Company shall conduct a nonlinear response history analysis (NLRHA) to validate compliance with the Project's resilience requirements. This analysis involves developing a detailed digital model of the Project's structural system and simulating the building's response to earthquake ground motions ("time history records") that have been selected specifically to match salient characteristics of the Project Site and nearby source faults.

Deliverables and their timeline are set forth in Section 2.8 (*Timeline of Deliverables*). Structural response parameters required by Section 2.5 (*Structural and Non-Structural Performance Requirements*) and Section 2.6 (*Loss and Downtime Assessment*) shall be obtained from such analysis, which shall be conducted at both the design-level earthquake hazard and the MCE hazard as applicable.

Time history records shall comply with ASCE 7 provisions. For this analysis, expected material properties may be used where appropriate and as defined in ASCE 41. Nonlinear analysis guidelines given by NIST GCR 17-917-45, "Recommended Modeling Parameters and Acceptance Criteria for Nonlinear Analysis in Support of Seismic Evaluation, Retrofit, and Design," are considered acceptable.

NLRHA need not be used for calculations to validate code compliance, unless required by the code.

## 2.5 Structural and Non-Structural Performance Requirements

The structural system of the Infrastructure Facility shall meet immediate occupancy performance as defined by ASCE 41 subject to the design earthquake. This performance level shall be deemed to satisfy the requirement of Section 2.2.4 of the REDi standard referenced above.

The structural system of the Infrastructure Facility shall additionally meet collapse prevention performance as defined by ASCE 41 subject to the MCE<sub>R</sub> hazard, unless life safety performance is required by Option 3 of Section 2.3 (*Seismic Hazard Definition*).

Non-structural performance for components necessary to the operations of the Infrastructure Facility shall meet, as a minimum, the operational nonstructural performance level as defined by ASCE 41 subject to the design-level earthquake, but not less than any code requirements. Compliance with this requirement shall be confirmed using mean accelerations and displacements derived from response history analysis.

Additionally, equipment required to be operational for resumption of the Infrastructure Facility's transit functions (as defined in Section 2.6 (Loss and Downtime Assessment)) shall be seismically certified according to the requirements specified in ASCE 7-22 Section 13.2.6. Other alternatives to seismic certification that can be confirmed to support functionality within the required recovery period may be used upon review and approval by the City.

## 2.6 Loss and Downtime Assessment

Principal Project Company shall conduct a downtime assessment as described in Section 4.3 of the REDi standard (referenced above) to confirm that the Project's requirement for post-earthquake recovery is met. The methods, assumptions and results of this assessment shall be documented in a written report as indicated in Section 2.8 (Timeline of Deliverables). This assessment shall utilize building response parameters extracted from the response history analysis at the 475-year hazard. The results corresponding to the 75% confidence level shall be used.

The direct financial loss assessment described in Section 4.2 of the REDi standard may be omitted. This assessment may, but need not, utilize the PACT software which is mentioned in the REDi standard.

For this analysis, functional recovery shall be achieved when the following systems are functional:

1. For the entire Facility:
  - a. Fire protection systems and fire-rated barriers
  - b. Sanitary sewer and storm drain systems
2. For the Infrastructure Facility (including consideration of the impacts of the Joint Development Alternatives on the Infrastructure Facility):
  - a. Power and lighting systems
  - b. Domestic hot and cold water systems
  - c. Bus maintenance equipment
  - d. Access controls systems
  - e. Security systems

In order to meet the REDi Gold standard, only aesthetic damage to the above systems shall be permissible immediately after the design earthquake, unless Principal Project Company can demonstrate that a given component in the above systems can be easily and readily replaced to achieve the same functional recovery criterion.

In January 2020, a City ordinance banned the use of natural gas in new construction. In addition, in the event of a large earthquake the City's existing supply of natural gas will very likely be disrupted for a period of time that is greater than the Project's required functional recovery time. For both of these reasons natural gas will not be permitted for the Project's systems which provide the above essential functions.

## 2.7 Seismic Resilience Peer Review

The City will retain a seismic resilience peer review consultant to perform the following scope of work:

1. Review of basis of design document, which shall include design criteria for structural and non-structural components
2. Review of structural analysis model assumptions and methods
3. Review of seismic hazard and ground motions used for analysis
4. Review of downtime assessments
5. General review of seismic system and non-structural detailing

The peer reviewer will be periodically engaged by the City to confirm design intent is being met. Principal Project Company shall prepare and submit deliverables, as described in Section 2.9 (*Deliverables and Timeline for Seismic Resilience Peer Review*), to the City for review and approval.

The Principal Project Company shall support the peer review process (e.g., by working with the peer review team and incorporating their comments) and incorporate the appropriate peer review check points into the PA Term.

The seismic resilience peer review does not replace any code mandated structural peer review.

## 2.8 Consideration of Joint Development Alternative Scenarios

The Infrastructure Facility and Joint Development Alternatives may be developed in separate phases. refer to Division 1 for the Project Description, and Division 3 (*Design Criteria Document*), including Appendix G (*Design Criteria Para-Transit*).

There are two Joint Development Alternatives – a Housing and Commercial Component adjacent to and atop the Infrastructure Facility, and a Paratransit Component atop the Infrastructure Facility.

Principal Project Company shall accommodate, at a minimum the following three Joint Development Alternative scenarios with respect to the use of the roof of the Infrastructure Facility. In all cases, the design of the Infrastructure Facility shall achieve the seismic resilience requirements set forth herein under any of the three alternative use scenarios.

All the applicable Technical Requirements for the Infrastructure Facility will apply to the Paratransit Facility if built.

The Joint Development Alternative scenarios are, as a minimum, defined in Table 1 as follows. Components of the Housing and Commercial Component Alternative planned to be built on the roof of the Infrastructure Facility are referred to as “Podium Roof HCC”.

**Table 1:** Requirements for alternative use scenarios for the roof of the Infrastructure Facility (in addition to those specified elsewhere in the Technical Requirements)

Joint Development Alternative Scenarios	Structural design requirements for the Infrastructure Facility (in addition to those specified elsewhere in these Technical Requirements)	Bus Yard Component operational continuity requirements (in addition to those specified elsewhere in these Technical Requirements)
1. Podium Roof HCC built after start of operation of the Infrastructure Facility	<ul style="list-style-type: none"> <li>• Design to support temporary construction loadings associated with at least one feasible method to realize the future construction of the Podium Roof HCC. Principal Project Company shall submit the temporary construction loading plan for SFMTA review and concurrence.</li> </ul>	<ul style="list-style-type: none"> <li>• Any modifications to the Infrastructure Facility required to accommodate the Podium Roof HCC shall be capable of being constructed without interrupting or disrupting operations in the Infrastructure Facility</li> </ul>
2. Paratransit Component built after start of operation of the Infrastructure Facility (see Appendix G of Division 3 of the Technical Requirements)	<ul style="list-style-type: none"> <li>• Design the roof level using the same live loads, programming requirements for superimposed dead and live loads (unless programming is updated), and structural performance requirements as for the bus maintenance and parking levels within the Infrastructure Facility (defined in Division 3 of the Technical Requirements)</li> <li>• Accommodate extension of the Bus Yard Component’s scissor bus ramp system to access the roof of the Infrastructure Facility</li> <li>• Design to support temporary construction loadings associated with at least one feasible method to realize the future construction of the Paratransit Component. The Principal Project Company shall submit the temporary construction loading plan for SFMTA review and concurrence.</li> <li>• Design the Infrastructure Facility roof to support a photovoltaic solar panel array</li> </ul>	<ul style="list-style-type: none"> <li>• Any modifications to the Infrastructure Facility required to accommodate the Paratransit Component shall be capable of being constructed in such a way as to <b>completely avoid</b>:                             <ul style="list-style-type: none"> <li>○ Interruption or disruption of operations in the Infrastructure Facility, except for Bus Yard Component Level 4 which shall not be interrupted for more than [30 days]</li> <li>○ Relocation or reconstruction of any facilities, rooms, equipment, and/or building systems necessary for operations in the Infrastructure Facility, unless expressly agreed by the City</li> </ul> </li> <li>• The Principal Project Company shall work with the SFMTA to further minimize the length of time and physical extent of any interruptions or disruptions to Bus Yard Component operations on Level 4</li> </ul>
3. No occupied use of the roof of the Infrastructure Facility (whether a temporary or permanent condition)	<ul style="list-style-type: none"> <li>• Verify that the seismic resilience requirements of Section 2.1 through 2.7 are met for the Infrastructure Facility in the absence of any other structure on top</li> <li>• The Infrastructure Facility roof shall be able to support a photovoltaic solar panel array</li> </ul>	

## 2.9 Deliverables and Timeline for Seismic Resilience Peer Review

Deliverable	Design Stage	Seismic Resilience Peer Review Actions
Structural drawings showing all sizes and connection details for elements of the primary seismic force resisting system	50% DD	Confirmation that design meets design criteria.
<p>Final Basis of Design Documents including final NLRHA results, and downtime assessment report. This shall include check of all Joint Deliverable Alternative scenarios, per the requirements of <u>Section 2.8</u> (<i>Consideration of Joint Development Alternative Scenarios</i>).</p> <p>Seismic Certification Plan. This plan shall include, for each nonstructural component required for essential functionality, the following information:</p> <ul style="list-style-type: none"> <li>• Required testing procedure including project specific testing plan, or</li> <li>• approvals based on past test results such as HCAI OSP or similar, or</li> <li>• Alternative approach with confirmation that the component will be operational within the required recovery time.</li> </ul> <p>The Seismic Certification Plan shall include a feasible timeline for carrying out the planned procedures that is compatible with the overall Project schedule.</p>	100% DD	<p>Confirmation that basis of design meets design criteria, and that sufficient NLRHA and downtime assessment results are presented to validate required performance.</p> <p>Confirmation that the Seismic Certification Plan meets the intent of the resilience standard.</p>
<p>Structural Drawings showing final configuration and sizing of seismic force resisting system and related details.</p> <p>Final Seismic Certification Plan, including any revisions to the 100% DD document and the status of planned testing.</p>	90% CD	Confirmation that no changes are made from the 100%DD structure/resolved peer review, including the Seismic Certification Plan, that materially alter the agreed design intent, unless accompanied by a new validation package (as required and specified above at the 100% DD stage).

---

## Division 5: Battery-Electric Bus Supplemental Criteria

**POTRERO YARD MODERNIZATION PROJECT**

**Exhibit 18:  
Technical Requirements**

**Division 05:  
Battery-Electric Bus Supplemental Criteria**

**November 06, 2024**

**FINAL DRAFT**

# Table of Contents

1.	Introduction .....	1
1.1.	Background .....	2
1.2.	2021 SFMTA 40-Foot BEB Pilot Program .....	3
2.	BEBs at Potrero Yard .....	4
2.1.	BEB Power Supply Approach .....	4
2.2.	BEB Power and Infrastructure Performance Requirements .....	5
2.3.	BEB Emergency Backup Power Requirements.....	6
2.4.	Reference Design Concept Figures Related to BEBs .....	7
2.5.	Requirements for Facility Conversion Phasing.....	8
3.	Exhibit A: Battery-Electric Bus Specifications .....	9
4.	Division 05 - Exhibit B: Basis of Design – Section 11 11 36.14 Commercial Electric Vehicle Charging Unit for Transit Depots.....	10
	SECTION 11 11 36.14 .....	11

# 1. INTRODUCTION

This Division 5 includes the Technical Requirements and planning criteria to enable a future transition of the Project's Bus Yard Component from supporting electric trolley buses (ETB) to supporting battery electric buses (BEB) while maintaining operational flexibility and minimizing disruptions.

The City's current fleet management strategy is to open the Project with a 100% ETB fleet and operate those initial vehicles through their useful lifetimes before potentially beginning the BEB transition at the City's discretion. This places the potential initial deployment of BEBs likely to begin no sooner than 2040.

The Technical Requirements for the BEB Charging Equipment solution and the associated electrical feed requirements described herein (refer to [Section 2.2](#) and Exhibit B) provide the minimum design requirements for the potential, future deployment of BEB to be served by the BEB Charging Infrastructure.

Principal Project Company shall design and construct the BEB Charging Infrastructure per the requirements in this Division 5. This includes but is not limited to the designed and maintained space for electrical distribution from the existing and future electrical feeds to the BEB Charging Equipment and charging positions, design and installation of wireways and raceways in the bus parking areas to allow for seamless transition to BEBs upon the staged transition from the overhead catenary system, and the Project to fully support the operational requirements of the detailed charging system below upon the City's direction to deploy the system at a date of their choosing.

As further detailed in [Section 2.2](#) of this Division 5, two electrical utility feeds are projected to serve the Infrastructure Facility upon the transition and deployment to BEB. The initial feed, for mixed-use service is indicated on WDT application as feeder 2, shall be in place at the time of Substantial Completion and will serve the needs of the entire Infrastructure Facility and all building functions except for the final one hundred twenty-eight BEB charging positions required for the ultimate BEB fleet projected.

The second feed, for BEB charging service is indicated on WDT application as feeder 1, may not be energized at the Project Site upon Substantial Completion, but Principal Project Company shall provide all of the space, building systems, conduit pathways, penetrations, wireways, raceways, and all other considerations necessary to enable distribution into, throughout, and within the Infrastructure Facility to facilitate its operation upon implementation and connection of this feeder 1.

This Division 5 contains detailed information on the City's BEB conversion planning and describes:

1. Envisioned implementation of BEB support infrastructure in the City's bus facilities in general, and in multi-level bus facilities in particular.
2. Specific approach to BEB improvements for this Project, including fleet conversion plans, and site-specific information that will assist Principal Project Company to deliver the City's vision during the Term.

For the purposes of designing the Infrastructure Facility and developing cost, schedule, and risk analyses, and during the Term, the Principal Project Company shall adhere to the following definitions and categories:

- **BEB Charging Infrastructure:** means the necessary layout space and clearances for future switchgear, power distribution systems (including any required feeders), housekeeping pads, housings, integrated structural components, space for mounting solution(s), and associated wire ways, conduit, and cable trays; space and penetrations for the required routing layout to support the future charging system's associated IT cabling (whether fiber optic or of other types), as set forth in Division 5 of the Technical Requirements.

Regardless of the design approach, the Charging Infrastructure shall include all Infrastructure Facility improvements installed upon Substantial Completion that enable the future deployment of BEBs and the proposed Charging Equipment detailed in this Division 5 without invasive or destructive measures needed to do so. The design of the facility structure shall adequately account for the weight requirements of the proposed future charging and electrical equipment. There shall be no major additional capital improvements needed to run the BEB system, unless agreed to and approved by the City, in its sole discretion to install those BEB Charging Infrastructure equipment and electrical distribution systems mentioned above. Charging Infrastructure feeds and supports the Charging Equipment, as described in the next item in addition to the BEB Emergency Power requirements defined in Section 2.3.

- **BEB Charging Equipment:** means the future overhead inverted pantographs, charging cabinets, dispensers, switchgear and associated wire ways, conduit, and cable trays that provide the point-to-point contact where individual BEBs connect to the overall charging system.

The BEB Charging Equipment must be capable of being connected to the BEB Charging Infrastructure to enable charging of a BEB fleet according to the performance requirements defined in this document and according to the City's BEB fleet growth plans. The BEB Charging Equipment shall include the charge management/operations software solution (including the Electric Vehicle Charge Management System) to enable the Infrastructure Facility to successfully operate a BEB fleet, meeting the requirements set forth by the City at the time of their future BEB deployment. The inclusion of BEB Charging Equipment in this Agreement is expressly excluded, and its inclusion shall be contingent upon the City's sole discretion to determine future scope.

The interface point between the BEB Charging Infrastructure and the BEB Charging Equipment shall be the termination point of all wire ways, conduit, and/or cable trays to the charging cabinets or future location of charging cabinets.

## 1.1. Background

Per the California Air Resources Board's Innovative Clean Transit regulations, the City must convert to a zero-emission bus fleet by 2040. To enable this transition, the City drafted a Zero Emission Facility and Fleet Master Plan (Zero-Emission Plan) through a partnership with WSP USA, Inc. The Zero-Emission Plan provides a roadmap for the City's successful facility and infrastructure transition and upgrade, and will position the City to put these capital projects forward for capital funding that may become available in the future for BEB facility projects.

The City currently operates the largest fleet of zero emission ETBs in North America. The City plans to transition all routes that are currently served by diesel/hybrid buses fully with BEBs; this move requires converting all of the City's existing bus maintenance facilities into facilities capable of charging, maintaining, and operating these vehicles.

The requirements in this Division 5 are based on current information available to the City and may be updated by the City from time to time.

As part of the City 's goal to achieve a 100% zero-emission fleet by 2040, the City will begin the large-scale procurement of BEBs in or around 2025.

Through the Zero-Emission Plan, the City is carefully charting a schedule for the adoption of new vehicles, gradual retirement of existing coaches, overhaul of existing facilities, and integration of BEB Charging Infrastructure.

## **1.2. 2021 SFMTA 40-Foot BEB Pilot Program**

Since 2021, the City has been conducting a pilot program to evaluate the performance, reliability, operability, and maintainability of the 40-ft BEBs that are currently available on the market, and to gain experience with BEB Charging Infrastructure to prepare for future fleetwide adoption (the "2021 40-ft Pilot"). The City anticipates the conclusion of this pilot program in mid-2024.

The City expects that the 2021 40-ft Pilot will provide valuable insight into the state of the BEB market and that the conclusion of the 2021 40-ft Pilot will pave the way for successful adoption of 40-ft BEB as part of the City 's future BEB procurement strategy.

The City is in the preliminary stages of implementing a 60-ft BEB pilot to evaluate the feasibility of those vehicles in the City 's operating environment; bus procurement for this pilot program is scheduled to begin in 2025.

As part of the 2021 40-ft Pilot, the City procured three 40-ft BEBs each (total of nine) from New Flyer, BYD, and Proterra, and one 40-ft BEB from Nova in summer 2021, with two additional Nova Bus 40-ft BEBs scheduled to be delivered by the end of 2023. These buses will be tested in regular revenue service in San Francisco for a period of 18 months. Upon the conclusion of the 2021 40-ft Pilot, the City will develop guidance on the following topics:

1. Which existing 40-ft BEB models can meet the City 's service requirements.
2. The routes and service roles, if any, that cannot be serviced by BEBs.
3. The maintenance requirements and practices for a BEB fleet.
4. The replacement ratio that will be required when transitioning from diesel hybrid buses and trolley buses to BEBs.
5. Which specifications and requirements (battery capacity, ground clearance, telematics systems, etc.) will be kept or modified for future full-scale procurements.
6. The charging methodology and operating profile required for sustained operation of BEBs in full-scale deployment.
7. Optimum bus yard storage and yard management practices.

## 2. BEBS AT POTRERO YARD

Potrero Yard currently houses 146 trolley buses: 53 40-ft buses and 93-60ft buses.

If and when the City directs the transition to BEBs in the future, the Infrastructure Facility shall accommodate the vehicle size and type specified in Exhibit A (Battery-Electric Bus Specification) of this Division 5 at a minimum. The BEB fleet shall be parked in a contiguous area in the Infrastructure Facility’s allocated bus parking layout, unless agreed to and approved by the City, in its sole discretion.

**Table 1** shows the capacity and fleet size allocation for the Project upon Substantial Completion. **Table 2** below shows the total planned capacity for the Project after the Infrastructure Facility is fully transitioned to BEBs.

Moving from the fleet capacities shown in **Table 1** to those in **Table 2** will require the City to perform off-site fleet management to move some 40-ft vehicles offsite, over time, to accommodate more 60-ft vehicles at Potrero Yard. It will also require modifications to the location of the overhead BEB charging equipment to serve the fleet in use at a given time.

Table 1: Potrero Bus Fleet Capacity upon Substantial Completion of the Infrastructure Facility

Location	BEBs		ETBs		Total Buses
	40'	60'	40'	60'	
Potrero Bus Yard	0	0	138	93	231

Table 2: Potrero Bus Fleet Capacity After Fully Transitioning to BEBs (no sooner than 2040)

Location	BEBs		ETBs		Total Buses
	40'	60'	40'	60'	
Potrero Bus Yard	53	160	0	0	213

### 2.1. BEB Power Supply Approach

The Facility shall be designed to support the operation BEBs using an optimized charging strategy. This strategy will integrate data from vehicle battery charge and depletion, the bus telematic system, and revenue route planning with available utility and power information at a minimum upon City’s direction to transition to BEBs. The optimized charging strategy requirements to meet this operational criteria will be further defined by the City upon their decision to begin the ETB to BEB transition process at the Potrero Yard.

Due to the timeline required for the electrical service applications and system studies, the City has submitted two applications for electrical service to the San Francisco Public Utilities Commission, which serves as intermediary for City departments for all communications concerning Hetch Hetchy Power with PG&E.

Electrical services requests may be re-evaluated for initial deployment and space provisions in Infrastructure Facility design considered for additional feeds and switchgear closer to commencement of the ETB to BEB transition (currently proposed to begin no sooner than 2040).

These applications have requested the full electrical load that has been estimated by the City to be required to operate the ultimate total anticipated 213 BEBs on an optimized charging strategy. This estimate is based off the ultimate BEB fleet projected to be operated from Potrero Yard after the completion of a transition from ETBs. This transition is projected to begin no sooner than 2040 and the associated load requirements may be re-evaluated between 2035 and 2038 to plan for 2040 deployment timeframe.

Per the applications for electrical service, the power supply for BEB's is expected to be split across two feeders upon its deployment to allow for immediate redundancy.

The City has been advised by the SFPUC that the maximum service request per application is 10 MW.

## **2.2. BEB Power and Infrastructure Performance Requirements**

During the Term, Principal Project Company shall prosecute and manage the ongoing electrical service applications and continue working with the SFPUC and PG&E toward a resolution of the engineering design and construction challenges, the cost, and the schedule to bring the requested electrical service to the Infrastructure Facility.

At Substantial Completion, the Facility's electrical room and all necessary electrical equipment, appurtenances, and provisions shall include a microgrid controller compatible to accommodate the BEB program at full build-out. Additionally, the Infrastructure Facility shall be capable of accommodating the full BEB program based on an optimized charging strategy, and shall adhere to the following requirements:

1. The Infrastructure Facility shall be equipped with all the BEB Charging Infrastructure to accept the future deployment of BEB Charging Equipment required to operate the full programmed fleet of 213 BEBs .
2. The BEB Charging Infrastructure shall be ready to connect to all future placement of additional BEB Charging Equipment in such a way to ensure minimal intrusion and disruption to transit operational continuity at the time of installation and connection of the future placement of all BEB Charging Equipment required to transition the facility from ETBs to BEBs.
3. The mounting provisions for the ETB OCS parking spaces shall be designed to ensure a seamless transition from ETB parking spaces to BEB parking spaces.

Principal Project Company shall ensure that adequate space is planned for and created in the Infrastructure Facility so that the future BEB Charging Equipment can be installed, operated and seamlessly integrated with the Charging Infrastructure without modification to the Infrastructure Facility.

The technical specifications that are the basis of design for the future deployment of BEBs at the site, along with select design modules of the BEB Charging Equipment, are attached as Exhibit B, C, and D to this Division 5. The BEB Charging Infrastructure design in Exhibit D (*Conceptual Design Module Package*) is a proof of concept for one approach to deploying the BEB Charging Equipment layout and technology. It is neither prescriptive nor restrictive, allowing for the development of alternative charging approaches, equipment layouts, required power analyses, or other physical arrangements and charging technologies. Refer also to general notes in Exhibit D for additional context.

The following are the basic technical requirements for the BEB Charging Equipment to be supported by the BEB Charging Infrastructure. Additional requirements may be developed during the Term.

- All charging shall be done within the Infrastructure Facility.
- Overhead DC inverted pantograph chargers shall be utilized for all bus parking spaces.
- Plug-in DC charging systems shall be programmed for all preventive maintenance bays that require overhead charging for the trolley bus configurations. These plug-in DC charging dispensers shall be installed at the rear left side of the maintenance bays with charging cable stored on a cable reel.
- All overhead in-yard charging systems shall be capable of providing a minimum charging level of 150 kW, and safely recharge 40-ft BEB energy storage system (ESS) from 10% state of charge (SOC) usable in vehicle to 90% SOC usable in vehicle in less than four (4) hours.
- All plug-in DC charging systems shall provide a minimum charging level of 50 kW, and safely recharge 40-ft BEB ESS from 10% SOC usable in vehicle to 90% SOC usable in vehicle in less than ten (10) hours.
- Plug-in charging systems shall utilize a concurrent charging enabled charger to energize multiple connected dispensers at once.
- The maximum charging cabinet to plug-in dispenser ratio is 4:1, so long as DC/communications 300-foot limit is maintained, and all other Technical Requirements are achieved.

While still meeting the number of maintenance bays required in Division 3 of the Technical Requirements, Principal Project Company shall evaluate and, if space in the bus parking area allows, provide an additional 18" width on the left side of each preventive maintenance bay equipped with plug-in charging systems to allow for safe staff movement around a BEB connected to a plug-in charge connector without interfering with the charge connector or port door.

The charging system shall be compatible, at a minimum, with the following long-range e-bus manufacturers:

1. Proterra
2. New Flyer
3. BYD
4. Nova Bus
5. Gillig

The BEB infrastructure industry is rapidly developing and innovating. Accordingly, the criteria described in Exhibits B and C are set forth as minimum standards and technical requirements.

### **2.3. BEB Emergency Backup Power Requirements**

PG&E reliability data from 2006 to 2015 show that there is an average of one power outage every two years. On average, a power outage in the San Francisco service environment lasts 78 minutes before service is restored. In recent years, power outages have been intentionally implemented by Northern California utility companies in anticipation of wildfires during summer months, which may increase outage length and frequency in future years.

As the City converts its fleet to BEB's, the fleet becomes heavily dependent on electrical utility partners and the resiliency of the SFPUC's and PG&E's electrical infrastructure. In the event of large-scale, sustained electrical outage, the BEB fleet would not have the ability to operate. The City is seeking cost-efficient methods of achieving electrical redundancy to continue providing service and emergency response functions.

The City's first layer of redundancy is in the electrical service applications, where the City has split the BEB fleet electrical loads into two separate applications. As such, two feeders will enter the site, allowing a portion of the fleet to be powered in the event one feeder is out of service. These applications, the City will also investigate the potential for the two feeders to be fed by two separate PG&E substations, which will add to the resiliency of the fleet.

Currently, the City is not considering procuring a completely redundant power supply from the SFPUC and PG&E (e.g., doubling the facility and BEB electrical requirement) due to cost.

However, the City wants built-in redundancy to power a portion of the BEB fleet once deployed, at City's discretion.

The following redundancy requirements shall be included in the Charging Infrastructure:

1. In addition to the emergency backup power requirements, 20% of the Potrero Division's fleet (approximately 43 vehicles) shall be connected to a redundant power supply, subject to applicable codes. This backup power requirement must fully charge 20% of the fleet vehicles in under 9 hours.
2. To the extent feasible, this backup power shall be provided by on-site renewable sources (e.g., photovoltaic panel and battery storage system) that are not dependent on fossil fuels.
3. To prepare for future needs, space shall be allocated for three energy storage system (ESS) battery packs, each approximately 10 feet by 40 feet (with clearances to be confirmed in the applicable code).
4. Space is available to serve the future resiliency solution when the BEB transition begins.
5. An emergency operations plan describing how the emergency fleet would function based on the Infrastructure Facility's backup power design.

Principal Project Company shall also consider the long-term role the City's proprietary DC traction power system could play in backup power, once the Facility transitions fully to BEB.

#### **2.4. Reference Design Concept Figures Related to BEBs**

This Division 5 includes a sample design solution for accommodating the required BEB Charging Infrastructure. The sample design includes an overhead gantry to mount pantographs and charging cabinets.

The City encourages creativity and innovation in the design of the BEB Charging Infrastructure to support the future deployment of the BEB Charging Equipment. While Principal Project Company shall comply with the minimum standards outlined in Section 2 (BEB's at Potrero Yard), they have flexibility to determine the spatial design approach.

## **2.5. Requirements for Facility Conversion Phasing**

Upon the City's start of the transition from ETBs to BEBs, 60-ft trolley buses are expected to be replaced with BEBs. The City requires that:

1. During Term, Principal Project Company shall work with the City to plan for the transition, including adapting to any changes that the City may need to implement to its fleet transition plan, and design the Facility to accommodate the opening day requirements with optimal flexibility.
2. Principal Project Company shall implement those plans and continue to work with the City to prepare for its fleet transition.

For the BEB transition, the City requires that:

1. The transition shall occur in phases, preferably one bus parking lane at a time to align with the procurement schedule of the BEB's
2. The OCS for the ETBs shall be replaced with the overhead Charging Equipment required for the BEBs.
3. Future BEB Charging Equipment shall seamlessly integrate with each prior phase's existing Charging Equipment and Charging Infrastructure and shall be backwards-compatible with existing BEBs.
4. Future BEB Charging Equipment shall be incorporated in the Infrastructure Facility's management solution upon activation/commissioning of the BEB Charging Equipment and any modifications to the BEB Charging Infrastructure.

### 3. EXHIBIT A: BATTERY-ELECTRIC BUS SPECIFICATIONS

**Table 3** as follows provides an example description of the potential fleet vehicle the City is likely to pursue upon transition to BEBs. The below general dimensions exclude exterior mirrors, marker and signal lights, flexible portions of the bumpers, and fender skirts.

Table 3: Coach Requirements

Item	40' E-bus	60' E-bus
Length, excluding bumpers	41' +/- 2'	60' +/- 2'
Width – exterior, excluding mirrors	102" max	102" max
Height Overall, without roof-mounted HVAC system	134" max	134" max
Height Overall, with roof-mounted HVAC system	140" max	140" max
Front Door Height from Ground (normal)	15.5" max	15.5" max
Front Door Height from Ground (kneeled)	13" max	13" max
Rear Door Height from Ground (normal)	17.5" max	17.5" max
Body Ground Clearance	8" min	8" min
Approach Angle with/without Over-raise Feature	9 degrees min	9 degrees min
Break over Angle with/without Over-raise Feature	8.9 degrees min	8.9 degrees min
Departure Angle with/without Over-raise Feature	9 degrees min	9 degrees min
Turning Radius (Outside Body Corners)	45 feet max.	45 feet max.
Axle Zone Clearance	5" min	5" min

BEBs will be equipped with overhead chargers compliant with SAE J3105 (ISO 15118 and IEC 61851 Parts 1 and 23). The center of the overhead charging rails shall be installed above the center of the front door of the coach.

Any charging system used shall be capable of 2-way communication with the Bus ESS and battery management system (BMS). The charge management/operations software solution shall include the following protections and driver alerts: (i) dynamic state of charge of the energy storage system, and (ii) charge rate. Both the bus and charger systems shall be capable of independently commanding an emergency stop of the recharge cycle should a critical fault occur. The City requires a contact style charging interface (SAE J1772 CCS Type 1) to be provided on the rear of the coach on both streetside and curbside.

**4. DIVISION 05 - EXHIBIT B: BASIS OF DESIGN – SECTION 11 11 36.14  
COMMERCIAL ELECTRIC VEHICLE CHARGING UNIT FOR TRANSIT  
DEPOTS**

The following design specifications and conceptual design modules for the BEB Charging Equipment provide the minimum requirements for sizing the BEB Charging Infrastructure, operational requirements, and minimum spatial needs of the proposed BEB Charging Equipment which shall be installed at a later date upon City's sole discretion and supported by the BEB Charging Infrastructure in place at Substantial Completion.

Note that any references to submittals in the following indicative design specifications are provided as guidance only and are not required to be adhered to as part of the Project.

## SECTION 11 11 36.14

### COMMERCIAL ELECTRIC VEHICLE CHARGING UNIT FOR TRANSIT DEPOTS

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. Guide specification of equipment items as listed below by Equipment Mark Number are provided to establish minimum performance requirements, operational criteria, and standards compliance of a DC charging system for commercial battery electric vehicles charged via automated connection to overhead charging rail on vehicle roof and by handheld manually inserted plug. Alternative systems that comply with these minimum performance requirements, operational criteria and standards compliance but are achieved by physically different equipment configurations than the guide layout and the components listed but achieve the same verifiable results will be considered and reviewed by the City as equivalents. DC overhead charging system to consist of:
1. CHARGING CABINET, BATTERY ELECTRIC BUS, 150kw DC POWER Equipment Mark Number: 8012
  2. CHARGING PANTOGRAPH, INVERSE, FACILITY MOUNTED Equipment Mark Number: 8020
  3. REMOTE PLUG-IN DISPENSER Equipment Mark Number: 8025
- B. Installation of equipment with labor, services, and incidentals necessary for complete and operational equipment installation.
- C. Utilities to be roughed in at location recommended by manufacturer.
- D. Coordination of equipment and vehicle to allow for automated operation and communication of the Charging Pantograph, Inverse, Facility Mounted, Equipment Mark Number: 8020 with the Owner's battery electric bus fleet. Coordination with other equipment and/or items shall include, but not necessarily be limited to, the following:
1. Equipment Mark Number 8030 Electric Vehicle Yard Management System as specified in Section 11 11 36.20 Electric Vehicle Yard Management System
- E. Coordination of equipment and vehicle to allow for corded handheld plug (charge connector) and communication of the Remote Plug-In Dispenser Mark Number: 8025 with the City's battery electric bus fleet. Coordination with other equipment and/or items shall include, but not necessarily be limited to, the following:
1. Equipment Mark Number 8030 Electric Vehicle Yard Management System as specified in Section 11 11 36.20

##### 1.2 QUALITY ASSURANCE

- A. Equipment shall be produced by a manufacturer of established reputation with a minimum of five years' experience supplying specified equipment

**B. Manufacturer's Representative:**

1. Installation: Provide a qualified manufacturer's representative at Project Site to supervise work related to equipment installation, check out and start up.
2. Training: Provide technical representative to train the City's maintenance personnel in operation and maintenance of specified equipment.
3. Testing: Provide technical representative for final testing of equipment.

C. Installation of this equipment item requires initial mock-up and acceptance by design team and the City. Refer to Part 3.02 of this specification section Installation for more details

**1.3 STANDARD AND REGULATORY REQUIREMENTS**

A. Equipment indicated within this specification section shall comply with all applicable Laws, including seismic, fire, and racking codes and regulations. Additional, more specific compliance requirements may be listed under individual equipment headings.

**1.4 SUBMITTALS**

A. Submittal requirements for all equipment items included in this section are listed below.

**B. Product Data:**

1. Submit product data in accordance with Division 1 - General Requirements of these specifications.
2. All product data submittals shall identify proposed project specific items marked by arrow, circle, underline, reproducible highlight, or other markings clearly discernable by the reviewer, to show which specific items, parts and accessories are being submitted for the project product data review. Non-marked or generic product data submittals with no marks indicating specific items, parts and accessories will be a cause for rejection.
3. Restrict submitted material to pertinent data. For instance, do not include manufacturer's complete catalog when pertinent information is contained on a single page.

**C. Operation and Maintenance Manual:**

1. Provide a complete parts list, operating instructions, and maintenance manual covering equipment at time of installation including, but not limited to:
  - a. Description of system and components.
  - b. Manufacturer's printed operating instructions.
  - c. Printed listing of periodic preventive maintenance items and recommended frequency required to validate warranties. Failure to provide maintenance information will indicate that preventive maintenance is not a condition for validation of warranties.

- d. List of original manufacturer's parts, including suppliers' part numbers and cuts, manufacturer's recommended spare parts stockage quantity and local parts and service source based on anticipated frequently replaced and or long lead (more than five workdays) components.
  2. Assemble and provide copies of manual in 8-1/2 by 11-inch format. Foldout diagrams and illustrations are acceptable. Manual to be reproducible by dry copy method. Provide copies per provisions of Division 1 - General Requirements.
- D. Shop Drawings: Submit shop drawings in accordance with Division 1 -General Requirements of these specifications.
1. Submitted shop drawings shall be project specific and shall include a minimum 1/8 inch to 1 foot scaled (or larger standard architectural imperial scale), dimensioned, graphical representation of the size, orientation, and location for all instances of submitted equipment in a floor plan view and reflected ceiling plan view for DC charging cabinets, dispenser (pantographs and remote plug-in cabinets) and other system elements. The drawings shall further include dimensions from structural elements or architectural grid lines, to each major charging equipment item (8012, 8020 & 8025) operational clearances, locations of any utility service connection points, power and communication output points, mounting requirements, and structural supports required for the submitted equipment. Indicate which specific dispensers are connected to and energized by which specific DC charging cabinet.
  2. Manufacturer's standard installation drawings will be accepted and reviewed but are not considered as a replacement to project specific shop drawings.
- E. Test Reports: Testing and Commissioning reports are required for all systems included in this specification and shall be included as part of the close-out documents. Provide to the equipment consultant a copy of all testing and commissioning reports for equipment specified herein. Refer to Part 3.03 Testing, of this specification.
- F. Required Documents for Permit and Local Jurisdictional Approval: Where required by local jurisdiction and/or code officials, the Principal Project Company shall be responsible for producing and submitting all documentation required for obtaining all applicable approvals related to the specified equipment. This documentation may include, but may not be limited to, engineered signed and stamped plans, details, anchorage layouts for equipment on stands and as racks to show compliance with locally adopted ASCE, seismic, fire, and other codes. A copy of these required documents shall be included with the product submittal to the design team/consultant team for their review.

## **1.5 WARRANTY**

- A. Warrant work specified herein for one year from Substantial Completion against defects in materials, function, workmanship and charging system operational design.
- B. Warranty shall include materials and labor necessary to correct defects including replacement of charging system operational elements with re-designed components.
- C. Defects shall include, but not be limited to loose, damaged and missing parts and abnormal deterioration of finish, excessive cord wear.

- D. Operational design defects include for pantograph charger and dispenser include systemic bent or non-flexing conductor rails, non-extending / retracting of pantograph due to factory installed elements, failure or intermittent failure to instigate charging process and pantograph deployment due to inability to connect and / or non-communications with vehicle properly aligned below pantograph, failure to deploy pantograph, initiate or complete charging process due to interference from adjacent installed pantographs is an operational design defect. Pantographs conforming to this performance specification are intended to perform in a dense bus parked environment with anticipated adjacent pantographs and battery electric buses on all four sides of surrounding each installed pantograph. Operational design defects for DC charging cabinet and plug-in dispenser include systemic bent charging and charging communications connector pins, damaged charging cord conductors and internal wiring, breakage and deterioration of charging plug-in mating elements (ports, charging connector) during routine daily use of charging system. Submit warranties in accordance with Division 1 - General Requirements of these specifications.
- E. All parts shall be readily available locally in the United States.

## **1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Deliver equipment in manufacturer's containers, appropriately packaged and/or crated for protection during shipment and storage in humid, dusty conditions. Equipment shall be stored per manufacturer's recommendation.
- B. Indelibly label all containers, including those contained in others, on outside with item description(s) per title and mark number of this specification.
- C. Provide equipment and materials specified complete in one shipment for each equipment item. Split or partial shipments are not permissible.

## **1.7 LABELING**

- A. Manufacturer shall securely attach in a prominent location on each major item of equipment a non-corrosive nameplate showing manufacturer's name, address, model number, serial number, and pertinent utility or operating data.
- B. All electrical equipment and materials shall be new and shall be listed by Underwriter's Laboratories, Inc. (U.L.), or other US National Recognized Testing Laboratory (NRTL) acceptable to both the design team and local code officials, in categories for which standards have been set by that agency and labeled as such in the manufacturer's plant.

## **PART 2 - PRODUCTS**

### **2.1 CHARGING CABINET, BATTERY ELECTRIC BUS, 150KW DC POWER EQUIPMENT MARK NUMBER: 8012**

- A. General:
  - 1. Description: Upright cabinet(s) connected to multiple charger dispensers including:

- a. Facility mounted inverse charging pantograph, and capable of automatically charging the connected battery electric bus (BEB) utilizing DC electrical power. Intended for long term charging of BEBs in overnight parking positions. Unit must be capable of operating in dense installation of multiple mark 8012 charging cabinet units located in same general area.
  - b. Facility mounted standalone stationary cabinet dispenser capable of charging a battery electric bus utilizing DC electrical power after being manually connected to a battery electric bus by a flexible power cord and handheld plug. Intended for short term charging of BEBs in maintenance and service bays.
2. Coordination: Specification information indicated herein is intended as general requirement only. Final design of the system shall be by the manufacturer and shall be presented in the project specific shop drawings in coordination with the Charging Pantograph, Inverse, Facility Mounted Equipment Mark Number: 8020 and Remote Plug-In Dispenser Mark Number 8025 as a fully coordinated, complete design.
3. Compliance: The equipment and final design shall comply with the most current editions of all applicable local, state, and federal codes and regulations, including, but not limited to, those listed below.
- a. SAE International Standard J3105, Electric Vehicle Power Transfer System Using a Mechanized Coupler, most recent edition
  - b. SAE International Standard J3105/1, Infrastructure-mounted Pantograph (Cross-
  - c. Rail) Connection
  - d. SAE J1772: SAE Electric Vehicle and Plug-in Hybrid Electric Vehicle Conductive Charge Coupler, most recent edition.
  - e. NFPA 70: National Electric Code (NEC), most recent edition.
  - f. NFPA 70E: Standard for Electrical Safety in the Workplace, most recent edition
  - g. Underwriter's Laboratory UL 2202, Standard for Electric Vehicle (EV) Charging System Equipment, most recent edition.
  - h. Underwriter's Laboratory UL 2231-1, Standard for Safety for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: General Requirements
  - i. Underwriter's Laboratory UL 2231-2, Standard for Safety for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: Particular Requirements for Protection Devices for Use in Charging Systems.
  - j. ANSI/IEC 60529: Degrees of Protection Provided by Electrical Enclosures (IP Code), most recent edition.
  - k. IEC 61851-1; 23; 24: Electric Vehicle Conductive Charging System, most recent edition.
  - l. IEC 61000-6-2: Electromagnetic Compatibility (EMC) – Part 6-2: Generic Standards – Immunity Standard for Industrial Environment.

- m. 29 CFR 1910.147: General Environmental Controls, The Control of Hazardous Energy (Lockout/Tagout), as enforced by OSHA, most recent edition.
  - n. International Electrotechnical Commission (IEC) 60309, most recent edition.
  - o. Federal Communications Commission (FCC) rules and regulations, as applicable.
  - p. Open Charge Point Protocol OCPP 2.0 or higher to allow charger control and monitoring by a third-party charge management system
4. Components:
- a. Power Cabinet(s).
  - b. All components, interconnecting cabling and conduits/ducts between components, software, and accessories for a fully and properly operational device.
- B. Capacities and Dimensions:
- 1. Cabinet equipment unit performance to allow total output charge power, DC: Nominal 150 kilowatts (kW), minimum capable to charge a 675kWh battery electric bus (BEB) from a ten percent usable by vehicle state of charge to ninety five percent usable by vehicle state of charge in a consecutive four-hour period from a single dispenser.
    - a. Systems that combine power outputs from two or more separate standalone cabinets to produce the total output charge power of the nominal 150kW minimum and charger time are acceptable and considered equivalent to a single 150kW cabinet unit.
    - b. Systems that employ a single larger kW cabinet with multiple outputs to dispensers that produce the total output charge power of the nominal 150kW minimum and charger time are acceptable and considered equivalent to a single 150kW cabinet unit.
    - c. Quantity of inverted pantographs charging dispensers in bus parking areas, output charge power from entire overhead DC charging system to be capable of charging full quantity of overhead electrically charged vehicles identified on the project drawings in a single consecutive (8) eight-hour period minimum inclusive of charge management peak power reductions, state of charge (SOC) diversity factor as described in addendums and other proposed and verifiable max charging power reduction systems. Additional chargers provided in maintenance and services bays are not to be factored in to charging systems ability to charge the identified BEB fleet size in an eight-hour period.
  - 2. Output voltage range: 200-1,000 volts, DC.
  - 3. Rated DC output current range: 3-250 Amps, bi-directional.
  - 4. Operating temperature range: -22 degrees Fahrenheit (F) to 113 degrees F.
  - 5. Input connections: 3 phase plus protected earth ground wire
  - 6. Input power rating: nominal 205 kVa (full load) / 100 VA (idle)

7. Input AC line-line voltage range: 480 VAC +6/-13%
8. Input AC phase current: nominal 283 amps, maximum / 385 amps fused.
9. Power factor, total harmonic distortion: 0.95, minimum.
10. Power conversion efficiency at full load: 96 percent, minimum.
11. Dielectric withstand: 3,000 volts, root mean square (RMS).
12. Network connection: 4G/LTE modem, minimum, utilizing Open Charge Point Protocol (OCPP) 2.0 or later network communication.
13. Protection: IP54 and IK 10 or equivalent NEMA rating.
14. Operational noise level: 85 decibels, maximum.
15. Overall dimensions, power cabinet(s), maximum nominal:
  - a. Width: 40 inches.
  - b. Depth: 40 inches.
  - c. Height: 91 inches.
  - d. Weight: 2,200 pounds.

C. Features and Construction:

1. Each electrical cabinet to be a standalone unit capable of meeting the specification herein. The cabinet shall include capability for entry of alternating current (AC) electrical supply, main isolation transformer cabinet, AC to DC power conversion, AC grid coupling and protective devices, DC output coupling and protective devices, controller for charger circuit and the communication equipment, and forced-air over coolant chiller functions.
2. Capable of being connected to power supply grid or low voltage power distribution station.
3. Charge cabinet configurable to support either multiple overhead pantograph dispensers or plug-in dispensers. Individual cabinet not required to be capable of being connected to and simultaneously or concurrently energizing a mix of both pantographs and plug-in dispensers. Concurrent charging is preferred but sequential charging systems in bus parking areas will be considered based on submitted charging performance. Concurrent charging only to be used at maintenance bay plug-in dispensers.
  - a. On concurrent controlled and powered dispensers, shared dispensers connected (dispenser A, dispenser B+), to a single DC power cabinet, the nominal output (voltage, current, power, charging telemetrics, and controls) to the simultaneously connected remote dispensers will be split from the DC power cabinet and, as controlled by the DC power cabinet's shared dispenser charging priority system, power one remote dispenser unit (dispenser A) up to the nominal maximum outputs while simultaneously and concurrently providing minimal or remaining DC

power cabinet's output to the other shared connected remote dispenser units (dispenser B+) until all BEBs connected to the shared charging dispensers are fully energized. During this concurrent controlled charging process, after BEBs initial dispenser connection, plug-in or pantograph connection at the beginning of the charging process, no manual re-plugging / disconnection, re-plugging / reconnection, re-paring or wireless connection of charge connector or pantograph will be necessary.

- b. On sequentially controlled and powered dispensers, shared dispensers connected to a single DC power cabinet, the nominal output (voltage, current, power) to the simultaneously connected remote dispensers (dispenser A, dispenser B+) will be shifted from the DC power cabinet and, as controlled by the DC power cabinet's shared dispenser charging priority system, power one remote dispenser (dispenser A) unit up to the nominal maximum outputs while not providing output to any other connected shared remote dispenser units (dispenser B+). As controlled by the DC power cabinet's shared dispenser charging priority system, the DC power cabinet's output will then automatically switch and shift the output (from dispenser A) to another connected and shared remote dispenser unit (dispenser B) up to the nominal maximum outputs (to dispenser B) while not providing output to any other connected shared remote dispenser units (dispenser A, C+). The shifting of power output between the various connected shared remote dispenser units continues until all BEBs connected to the shared charging dispensers are fully energized. During this sequential controlled charging process, after BEBs initial dispenser connection, plug-in or pantograph connection at the beginning of the charging process, no manual re-plugging / disconnection, re-plugging / reconnection, re-paring or wireless connection of charge connector or pantograph will be necessary.
4. Capable of being configured to operate dispenser configuration and energizing a minimum quantity of:
    - a. Two (2) Charging Pantograph, Inverse, Facility mounted Equipment Mark Number: 8020 and capable of providing charging power to each pantograph either sequentially or concurrently. Includes all interconnecting electrical cabling, data cabling, conduit / ducts, distribution boxes, DC switches (internal to charging cabinet and external from charging cabinet) and all other components necessary for interconnection.
    - b. Four (4) Remote Plug-In Dispenser Equipment Mark Number: 8025 and capable of providing charging power to each plug-in dispenser concurrently. Includes all interconnecting electrical cabling, data cabling, conduit / ducts, and all other components necessary for interconnection.
  5. Intended for, and fully capable of, installation in an outdoor environment, with a thermal and water-resistant enclosure. Cabinet(s) shall include an integral raised base for protection of equipment and fastening to sub-structure. Raised base should allow for mounting to an elevated steel support frame and not require direct to concrete pad installations.
  6. Includes an on-board transformer / rectifier, allowing the power cabinet to receive an alternating current (AC) input power connection from the facility electrical supply and convert it to DC electrical output to the charge box and connected bus.

7. Includes a chiller unit capable of maintaining manufacturer's required temperature for power conversion components. Chiller shall include protective air intake grill(s) and fan(s).
8. Include internal DC distribution box / DC Switch to control and manage DC outputs within the charger cabinet enclosure.
  - a. Charging cabinets relying on DC distribution boxes / DC switches that are external to the charging cabinet are acceptable but all components of the external multiple DC output control / management system are to be supplied and installed as part of the charging cabinet system including additional conduits, power and control wiring, DC distribution boxes / DC switches, mounting and supporting structural elements to locate the DC distribution boxes / DC switches from the building structure.
    - 1) All additional structural loading (weights and reactions), physical space requirements (sizes, clearances, requirements for manual interactions) of an external to charging cabinet DC distribution box / DC Switch to be included with initial approval submission of charging system by the City. Additional charging system components, installation labor, software, or physical controls added to approved charging cabinet system that were not presented as required in initial charging cabinet system review are grounds for negating original submission approval.
9. Unit is designed to be installed with multiple similar mark 8012 charging cabinet units in a dense location and vent locations of cabinets to facilitate close proximity installations between similar cabinets to sides and rear of unit.
10. Include forklift pockets at base of unit or lifting lugs on top and or side of unit. Units that utilize no mechanical connections for lifting and rely solely on wrapped / strapping connections around unit cabinet case to install, position or remove unit are not acceptable.
11. Controller shall include the protective ground connection, the DC output voltage connections, and the supervisory control components.
12. Communications portion of the controller equipment shall be capable of being connected to other computer networks, including networks with charge management systems, through Ethernet and/or wireless connection. The power cabinet shall be capable of communicating to that charge management system by means of an open source, non-proprietary, communication protocol.
13. Includes a cellular antenna, 4G/LTE or better, enabling connection to cellular networks.
14. Includes on-board computer and/or programmable logic devices, software, and wireless communication devices that, at a minimum, also provide the following functionality to the power cabinet:
  - a. Pantograph Dispenser
    - 1) To wirelessly detect BEB mounted transponders within each attached Facility Mounted Inverse Charging Pantograph's (Pantograph) operational area and ignore transponders outside each attached Pantograph's operational area

including similar transponders located on all four sides surrounding transponder installation. This process shall be automatic, and performed at system start-up / system re-start, and at programmable intervals and times, up to and including near continuous detection.

- 2) To initiate wireless signal with, receive wireless signal from, and establish a wireless communication protocol with any bus in the Owner's BEB fleet that is determined by the system as being parked within the pantograph's operational area, and that has an on-board transponder (by others).
  - 3) To communicate with, and automatically cause each attached individual Pantograph to descend once a BEB has been identified, communication established, and has been detected as 'parked' within that Pantograph's individual operational area. The equipment shall ignore BEBs passing through a Pantograph's operational area.
  - 4) Automatically cause an attached Pantograph to retract upon receiving a 'disengage' signal from a connected BEB that is parked in that Pantograph's operational area,
  - 5) Automatically cause each Pantograph to retract to a 'fail safe' state when receiving pertinent error codes, and upon facility power outages and major fluctuations. 'Fail safe' Pantograph retraction shall occur for individual isolated Pantographs and system wide for all Pantographs, depending on error code.
  - 6) Automatically terminate wireless communication with any BEB after a pre-programmed time, and after detecting the BEB is no longer in operational range, or when the BEB is disengaged.
- b. Plug-In Dispenser
- 1) To initiate signal with, receive signal from, and 'handshake' with any bus connected by means of the charge connector while charge connector is plugged into the charging port of a bus.
  - 2) To automatically start, stop, and regulate any charge to any bus battery connected by means of the charge connector while charge connector is plugged into the charging port of a bus.
  - 3) To communicate wirelessly collected bus information to a charge management system regardless of whether the charge connector is plugged into or disconnected from the charging port of a bus.
- c. Once wireless communication is established with the bus, to communicate with, request and receive from the BEB the following information: bus identification and battery information such as charge status, temperature, etc.
- d. Information collected shall be stored, and able to be transmitted to a charge management system.
- e. To automatically start, stop, and regulate any charge to any bus battery connected by means of the Facility Mounted Inverse Charging Pantograph or charge connector.

- f. To request, receive, and store bus battery information such as ID, charge status, temperature, etc. from the bus by means of wireless communication with the bus being charged.
  - g. To allow Owner's charge management system to control and report a minimum feature set of each charging cabinet in real time:
    - 1) Cabinet connected dispenser / pantograph status – connected to a vehicle / not connected to a vehicle
    - 2) Cabinet on (allowing charging to occur) / off (not allow charging to occur)
    - 3) Total cabinet power output
    - 4) Report vehicle ID connected to each dispenser / pantograph connected to DC charging cabinet
    - 5) Cabinet not operational / unit issuing trouble code
15. Lock-out / Tag-out functions – preference is for AC input to charging cabinet to enter at a charging cabinet internally integrated disconnecting means compliant with NEC 625.42 and not require a separate external disconnect. Systems requiring external disconnects will be considered but requirement of need for separate disconnect means and inclusion of external disconnects are required on all submitted product data and project specific shop drawings and charger layouts. Lock-out / Tag-Out functions shall include, at a minimum, the following:
- a. AC supply entry cabinet shall not be allowed to open under live grid conditions and shall only be allowed to open only if the main power supply to the charger is locked out.
  - b. Main transformer cabinet(s) and AC/DC converter cabinet shall not be allowed to open under live grid conditions and shall only be allowed to open if there are no live grid conditions to the charger and if the main power supply breaker is locked out.
  - c. The chiller cabinet shall not be allowed to open while the charger is energized but shall only be allowed to open if the charger is de-energized and the auxiliary switch is locked out.
16. Emergency Stop Button directly accessible on the outside of the power cabinet. Allows for emergency stopping of the charger and de-energizing of the charging system.
17. Group Remote Emergency Stop Button capable. Allows for connections to auxiliary emergency stop buttons remotely located in the facility and connected to multiple equipment mark 8012 charging cabinet units to stop / reset charging cabinet units as a group. Remote emergency stop reset should not require individual resetting of mark 8012 charging cabinet's factory installed cabinet integrated emergency stop button after remote emergency stop button reset.
18. Remote manual override controls for the Pantograph, capable of extending or retracting the Pantograph on demand and re-start charging wireless validation and the charging process without the need to physically re-park or reset individual vehicle parking brakes. Override controls shall include a key switch and keys for operation.

19. Includes all other components for necessary and proper function of the unit including, but not necessarily limited to, metal support frame and protective panel enclosure, foundation support base, air intake and exhaust vents, forced air cooling fans, air filters, grounding devices and connections, cables, cords, connectors, etc.

D. Finish: Exterior panels of power cabinet to have protective finish to prevent corrosion of enclosure. Provide in Owner's choice of manufacturer's standard colors.

E. Accessories:

1. Refer to Equipment Mark Number 8020 for Charging Pantograph.
2. Refer to Equipment Mark Number 8025 for Remote Plug-In Dispenser.
3. Coolant, in quantity and type as required by manufacturer.
4. Fabricated steel support stand, capable of elevating and properly supporting the DC power cabinet unit. Steel shall be hot-dip galvanized in accordance with ASTM A123 Standard. Refer to drawings for details.
5. Emergency Stop Button (E-Stop) – directly accessible on the outside of the DC power cabinet. Allows for emergency stopping / de-energizing output of all remote dispenser units connected to a single DC power cabinet whose E-Stop button is activated
6. Group Remote Emergency Stop Button (E-Stop) – in quantities and locations as shown on the drawing. Allows for emergency stopping / de-energizing output of all remote dispenser units connected to a multiple DC power cabinets in groupings as shown on the drawings.
7. External DC Output Distribution Box / DC Output switches if required

F. Utilities:

1. Electrical: 480 VAC, 3 Phase, 60 Hz, nominal 283 amps maximum / 365 amps, maximum inrush (fused).

## **2.2 CHARGING PANTOGRAPH, INVERSE, FACILITY MOUNTED EQUIPMENT MARK NUMBER: 8020**

A. General:

1. Description: An overhead facility mounted retractable pantograph capable of automatically connecting to the roof mounted charging contacts of buses in the Owner's battery electric bus (BEB) fleet, and then automatically charging the connected bus utilizing direct current (DC) electrical power via the connected Charging Cabinet, Battery Electric Bus, 150kw DC Power, Equipment Mark Number: 8012.
2. Coordination: Specification information indicated herein is intended as general requirement only. Final design of the system shall be by the manufacturer and shall be presented in the project specific shop drawings in coordination with the Charging Cabinet, Battery Electric Bus, 150kw DC Power, Equipment Mark Number: 8012 as a fully coordinated, complete design.

3. Compliance: The equipment and final design shall comply with the most current editions of all applicable local, state, and federal codes and regulations, including, but not limited to, those listed below.
  - a. SAE International Standard J3105, Electric Vehicle Power Transfer System Using a Mechanized Coupler, most recent edition.
  - b. SAE International Standard J3105/1, Infrastructure-mounted Pantograph (Cross-Rail) Connection
  - c. NFPA 70: National Electric Code (NEC), most recent edition.
  - d. Underwriter's Laboratory UL 2202, Standard for Electric Vehicle (EV) Charging System Equipment, most recent edition.
  - e. Underwriter's Laboratory UL 2231-1, Standard for Safety for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: General Requirements
  - f. Underwriter's Laboratory UL 2231-2, Standard for Safety for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: Particular Requirements for Protection Devices for Use in Charging Systems.
  - g. ANSI/IEC 60529: Degrees of Protection Provided by Electrical Enclosures (IP Code), most recent edition.
  - h. ANSI/IEC 61851-23: Electric Vehicle Conductive Charging Systems, DC Electric Vehicle Charging Station.
  - i. 29 CFR 1910.147: General Environmental Controls, The Control of Hazardous Energy (Lockout/Tagout), as enforced by OSHA, most recent edition.
  - j. International Electrotechnical Commission (IEC) 60309, most recent edition.
  - k. Federal Communications Commission (FCC) rules and regulations, as applicable
- B. Capacities and Dimensions:
  1. Pantograph:
    - a. Rated Voltage: 1,000 volts, DC, minimum
    - b. Rated charging current: 250 Amps (A), minimum.
    - c. Operating temperature range: -22 degrees Fahrenheit (F) to 150 degrees F
    - d. Pantograph operating range, from partial to full extension (nominal): 30 inches to 90 inches
  2. Pantograph controller and motor:
    - a. Supply voltage: 24 volts, DC
    - b. Current: 40A nominal.
    - c. Pantograph contact force with vehicle: 112 foot-pounds, maximum

- d. Total time to raise pantograph from full extension to full retraction: 5 seconds, maximum.
- e. Total time to lower pantograph from full extension to full retraction: 5 seconds, maximum.
- f. Compensation of pantograph to the parked bus, nominal:
  - 1) X-axis: 30 inches to the vertical axis
  - 2) Y-axis: +/- 12 inches to the transversal axis
  - 3) Z-axis: +/- 12 inches to the longitudinal axis
- 3. Compensation of angles: 5 degrees each direction
- 4. Wireless Communication System:
  - a. Wireless system communication: CAN bus with SAE J1939 communication protocol.
  - b. Wireless data interface between antenna and antenna controller: RS-232, Ethernet
  - c. Communication protocol between antenna and antenna controller: Serial.
  - d. Wireless antenna:
    - 1) Dimensions, nominal: 12 inches, 9 inches, 6 inches.
    - 2) IP Rating: IP 66 or equivalent NEMA rating
    - 3) Specified range: Capable of detecting bus mounted system transponder within an 8-foot radius of the antenna. Capable of transmitting to and receiving information from any bus mounted system transponder with the 8-foot radius from the antenna. Able to ignore similar surrounding transponders directly adjacent to but outside of the 8-foot radius.
- 5. Wireless Antenna Controller:
  - a. Dimensions, nominal: 36 inches, 28 inches, 16 inches.
    - 1) 1) IP Rating: IP 66 or equivalent NEMA rating
- 6. Wireless Transponder and Data Collector:
  - a. Connect to vehicle via SAE J1939 connectors.
- 7. Overall dimensions, nominal:
  - a. Length: 57 inches nominal maximum
  - b. Width: 40 inches nominal maximum
  - c. Height: 42 inches nominal maximum in retracted position

- d. Necessary clearance in x-axis: 2 inches
  - e. Necessary clearance in y-axis (length of rails + clearance): 25 inches + 2 inches
8. Dimensions of interface, nominal:
- a. Length (total): 57 inches
  - b. Length (single contact): 40 inches
  - c. Width: 30 inches
9. Pantograph positions, from mounting plane (underside of facility structure), as noted on drawings
- C. Features and Construction:
1. Pantograph and Pantograph Controller:
- a. 'Inverted' pantograph down design mounted to the facility structure and extending down to contact vehicle mounted charging contact bars.
  - b. Pantograph and pantograph controller shall have integrated fail-safe functions. Functions shall include automatic full retract of the Pantograph upon error code, power loss, or other system malfunction.
  - c. Independently insulated multi-pole contacts: positive, negative, protected earth (ground) and control pilot.
  - d. Zero electrical potential frame components.
  - e. Includes flexible head and spring-loaded connection allowing for compensation of the pantograph system.
  - f. Capable of raising and lowering the pantograph to pre-programmed height/positions.
  - g. Capable of both quick duration contact fast-charge and long duration depot charging.
  - h. Includes an internal sensor to provide a soft-stop landing on the bus roof rails.
  - i. Capable of being de-energized by charging cabinet e-stop systems (cabinet mounted e-stop and additional remote group e-stops)
2. Wireless Communications System Antenna and Antenna Controller: Shall be mounted in a fixed position near the pantograph and contain a programmable logic controller, or similar computing device, along with all accessories (such as cooling devices) necessary for proper operation. Together, the Antenna and Antenna Controller shall be able to perform the following functions:
- a. The Controller shall be able to compute relative distances of bus mounted transponders from the Antenna.

- b. The Controller shall be able discriminate between bus mounted transponder distances and acknowledge and communicate with any bus mounted system transponder located only within the programmed Pantograph operational area. Transponder signals outside of the operational area shall be ignored.
  - c. The Controller shall be able to instantly compare each Bus Identification Number received from a bus transponder signal within the specified range to a central Bus Identification Number Authorization File (or similar). The Controller shall continue to try and communicate with bus transponders allowed by the Authorization File and shall ignore signals from bus transponders disallowed by the Authorization File.
  - d. Upon initial detection of any bus transponder within the Pantograph operational area, and allowed by the Authorization File, the Controller will immediately search for confirmation signals that the same bus transponder is still within the operational area. If confirmation signals are detected, then the “handshake” communication protocol shall be established between the Controller and the transponder, via the Antenna. If confirmation signals are not detected, then no communication protocol shall be established, and the Antenna and Controller shall continue to search for a transponder signal within the operational area.
  - e. Upon successful establishment of the “handshake” communication protocol, a communication link shall be established to enable the Controller to read information from the bus mounted Transponder via wireless communication through the Antenna. For the duration of the communication link, the antenna will only accept information from the connected transponder. All other transponder signals shall be ignored.
  - f. During the life of the communication link, the Controller shall periodically ping the linked transponder and confirm the transponder is still within the specified range of the Antenna and Controller. If so, the communication link shall not be terminated. If not, the Controller shall immediately terminate the link, and begin to search for a transponder signal within the specified range.
  - g. Controller shall have a physical and/or wireless data connection to the Owner’s network, and capable of periodically accessing and reading the Owner’s Bus Identification Number Authorization File. Periodic access shall be programmable and shall occur at regular intervals.
  - h. Controller shall be capable of establishing a secure internet connection through the Owner’s network to regularly and periodically download software updates.
3. Wireless Communications System Software: Programs as necessary for functioning of each individual Antenna Controller, as well as a central software program for managing multiple Antenna Controllers within a single site. Central software program shall be web based, or compatible with Owner’s Windows compatible PCs.
  4. Includes all other components for necessary and proper function of the unit including, but not necessarily limited to, metal support frame and protective panel enclosure, foundation support base, grounding devices and connections, cables, cords, connectors, etc.

- D. Finish: Corrosion and wear resistant finish in Owner's choice of manufacturer's standard colors.
- E. Accessories:
  - 1. Modular metal framing system to provide support and stability to items suspended from facility structure. Configuration, quantity and spacing to be determined as part of contractor's final design.

## **2.3 REMOTE OVERHEAD DISPENSER EQUIPMENT MARK NUMBER: 8025**

### A. General:

- 1. Description: A stationary upright cabinet with a flexible power cord and corded handheld plug (charge connector) capable of being manually connected to the charging port of buses in the Owner's electric bus fleet, and then automatically charging the connected bus utilizing DC electrical power output generated from a connected Mark Number 8012 DC Power Cabinet.
- 2. Compliance: The equipment and final design shall comply with the most current editions of all applicable local, state, and federal codes and regulations, including, but not limited to, those listed below.
  - a. NFPA 70: National Electric Code (NEC), most recent edition.
  - b. SAE J1772: SAE Electric Vehicle and Plug-in Hybrid Electric Vehicle Conductive Charge Coupler, most recent edition.
  - c. ANSI/IEC 60529: Degrees of Protection Provided by Electrical Enclosures, most recent edition.
  - d. Open Charge Point Protocol OCPP 2.0 or higher to allow charger control and monitoring by a third-party charge management system.
  - e. NFPA 70E: Standard for Electrical Safety in the Workplace, most recent edition.
  - f. CFR 1910.147: Code of Federal Regulations, Occupational Safety and Health Standards, General Environmental Controls, The Control of Hazardous Energy (Lockout / Tagout), most recent edition.

### B. Capacities and Dimensions:

- 1. Output voltage range at the remote dispenser, refer to Equipment Mark Number: 8012
- 2. Output current at the remote dispenser, refer to Equipment Mark Number: 8012
- 3. Output power at the remote dispenser, refer to Equipment Mark Number: 8012
- 4. Overall dimensions, remote dispenser, nominal:
  - a. Width: 24 inches.
  - b. Depth: 9 inches.
  - c. Height: 32 inches.

- d. Weight: 60 lbs (including weight of cord and charge connector below)
- e. Cable length: 22 feet - nominal.
- f. Charging Connector – SAE J1772 CCS Level 2 plug-in connector with strain relief

C. Features and Construction:

1. Remote dispenser unit shall be connected to and receive power output (voltage, current, power, charging telemetrics and controls) from the DC power cabinet, then regulate and transmit that output to the bus, when manually connected by the charging connector.
  - a. Include glass fiber (or similar) communications lines between the DC power cabinet and remote dispenser, as well as all necessary protective conduits, seals, and fasteners.
  - b. Remote dispenser enclosure shall be rated IP65 protection, per ANSI/IEC 60529.
2. Dispenser cabinet to be mounted in locations shown on plans but anticipated to be mounted to existing facility structural elements or being suspended from overhead structural frame supported by existing facility structure. Ground mounted support stands for plug-in dispensing cabinet located in Maintenance and Service bays are not to be utilized unless specifically call for on plans.
3. Charging connector and attached cord shall be capable of being manually connected to, and disconnected from, the bus charger. Charging connector shall conform to SAE J1772 SAE standard.
4. Charger Status Indicator Light on bottom or side of remote dispenser cabinet and visible to an operator below the plug-in dispenser cabinet when mounted overhead. If charge status indicator light is standard on the top of the cabinet and cabinet orientation does not allow a user below to see the cabinet, providing a secondary cabinet mounted or adjacent mounted to facility structure remote charger status indicator light is acceptable. Three (3) color or more to indicate via color and blinking the following:
  - a. Charger Energized and Ready
  - b. Charger Connected and Charging
  - c. Charger Connected and Charge Complete
  - d. Charger Not Ready / Not Charging / Warning Indicator
5. Coordinate installation of the dispenser cord, the dispenser cabinet, and the charging connector in the field so that, once installed, there is minimal bending and/or twisting of the dispenser cord, or 'flipping' of the charge connector, when personnel attempt to plug the charge connector into a battery electric bus.
6. Emergency Stop Button directly accessible on the outside of the remote dispenser box. Allows for emergency stopping of the charger and de-energizing of the plug-in charging system.

7. Group Remote Emergency Stop Button capable. Allows for connections to auxiliary emergency stop buttons remotely located in the facility and connected to multiple equipment mark 8025 charging cabinet units to stop / reset charging cabinet units as a group. Remote emergency stop reset should not require individual resetting of mark 8025 charging cabinet's factory installed plug-in cabinet integrated emergency stop button after remote emergency stop button reset.
- D. Finish: Exterior panels of charger box to have protective powder coat finish in Owner's choice of manufacturer's standard colors.
- E. Accessories:
1. Modular metal framing system to provide support and stability to items suspended from existing horizontal or vertical structural facility elements. Configuration, quantity and spacing to be determined as part of contractor's final design. Kindorf or equal.
  2. Cord hook / rack to store and secure flexible power cord and charge connector at nominal five foot above finish floor when not in use.
  3. Remote secondary charge status indicator light as needed.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

- A. Coordinate location of rough-in work and utility stub-outs to assure match and/or non-interference with equipment to be installed.
- B. Inspect delivered equipment for damage from shipping and exposure to weather. Compare delivered equipment with packing lists and specifications to assure receipt of all items.

### **3.2 INSTALLATION**

- A. Perform work under direct supervision of foreman or construction superintendent with authority to coordinate installation of scheduled equipment with design team.
- B. Coordinate work with Manufacturer's Representative indicated in Part 1.02 of this specification section
- C. Install equipment in accordance with plans, approved shop drawings, and manufacturer's instructions:
  1. Initial City mockup for positioning pantograph Equipment Mark: 8020: At a parked bus charging position to be identified by the City, provide installation mockup of DC charging cabinet connected to an overhead pantograph, wireless communications system to allow for testing and proofing of DC charging system component mounting heights and overhead locations or components relative to parked bus. Mock-up to allow for in- field adjustment of individual charging components, including but not necessarily limited to, electrical junction boxes, mounting and support brackets, and pantograph orientation and auxiliary control connection points. In field adjustments shall consist of those necessary to allow the overhead pantograph to be deployed

automatically when a bus is properly parked in the charging position and wireless communications system is engaged. Mock-up shall be reviewed and approved by design team and the City prior to installation of other overhead charging components. Overhead components purchased or installed prior to mock-up approval shall be modified to conform to the approved mock-up without additional material or labor charges to the City

2. Positioning: Place equipment in accordance with any noted special positioning requirements generally level, plumb and at right angles to adjacent work.
3. Fitting: Where field cutting or trimming is necessary, perform in a neat, accurate, professional manner without damaging equipment or adjacent work.
4. Anchorage: Attach DC charging cabinet equipment securely to floor or elevated support frame, in conformance with manufacturer's instructions and as directed by design team, to prevent damage resulting from inadequate fastening and to resist seismic movement. Installation fasteners shall be installed to avoid scratching or damaging adjacent surfaces. Upon completion of work, finish surfaces shall be free of tool marks, scratches, blemishes, and stains.

### **3.3 TESTING**

- A. After final connections are made and prior to authorizing payment, specified equipment shall be tested for compliance with specification in the presence of the design team using acceptance procedures provided by the manufacturer.
- B. Final testing and post installation inspection are required and shall be performed by the manufacturer or the manufacturer's designated representative only. Final testing and inspection shall not be performed by the installer, unless the installer is also the manufacturer.
- C. Manufacturer / Installer shall provide a testing procedure and checklist that indicates proper testing of all major functions of the equipment. This procedure and checklist will form the basis of the testing process.

### **3.4 CLEANUP**

- A. Touch-up damage to painted finishes.
- B. Wipe and clean equipment of any oil, grease, and solvents, and make ready for use.
- C. Clean area around equipment installation and remove packing or installation debris from job site.
- D. Notify design team for acceptance inspection.

### **3.5 TRAINING**

- A. Direct the technical representative to provide specified hours of training to the City's designated maintenance personnel in operation and maintenance of the following equipment. Coordinate, with Owner, training schedule and list of personnel to be trained.
  1. CHARGING CABINET, BATTERY ELECTRIC BUS, 150KW DC POWER Equipment  
Mark Number: 8012

- a. Hours Required: 16
2. CHARGING PANTOGRAPH, INVERSE, FACILITY MOUNTED Equipment Mark Number: 8020
  - a. Hours Required: Included in training for Equipment items listed above.
3. REMOTE PLUG-IN DISPENSER Equipment Mark Number: 8025
  - a. Hours Required: Included in training for Equipment items listed above.
- B. Obtain, from technical representative, a list of the City's personnel trained in equipment operations and maintenance.
- C. Provide a Windows compatible movie file format recording on USB stick of the training session. The training movie can be a recording of a live session or a produced training video

**END OF SECTION**

---

## Division 6 – Testing & Commissioning and Operational readiness

# **POTRERO YARD MODERNIZATION PROJECT**

**Exhibit 18:  
Technical Requirements**

**Division 06:  
Testing & Commissioning and Operational Readiness**

**November 06, 2024**

# **FINAL DRAFT**

## TABLE OF CONTENTS

<b>6.</b>	<b>TESTING &amp; COMMISSIONING AND OPERATIONAL READINESS.....</b>	<b>1</b>
6.1	Introduction .....	1
6.1.1.	Definitions .....	1
6.2	Standards and Guidelines .....	2
6.3	LEED .....	2
6.4	Commissioned Systems.....	3
6.5	Commissioning Provider (CxP) .....	3
6.6	Commissioning Scope .....	4
6.6.1.	Summary.....	4
6.6.2.	Pre-Construction Requirements .....	5
6.6.3.	Construction Requirements .....	7
6.6.4.	Post Substantial Completion Requirements.....	12
6.7	Monitoring-Based Commissioning (MBCx).....	14
6.8	Operational Readiness (OR).....	15

## 6. TESTING & COMMISSIONING AND OPERATIONAL READINESS

### 6.1 Introduction

The purpose of Commissioning is to provide a systematic process of assuring by verification and documentation, from the design phase and throughout the Term, that all Project systems perform interactively in accordance with the Contract Documents. The parties acknowledge that because many Project systems are integrated, a deficiency in one or more components can result in sub-optimal operation and performance among other components. Remedying these deficiencies can result in a variety of benefits including: (i) improved productivity of Project users; (ii) lower utility bills through energy savings; (iii) increased satisfaction of Project users; (iv) enhanced environmental conditions, health conditions and comfort of Project users; (v) improved Project system and Project Equipment function; (vi) improved Project operation and maintenance; (vii) increased safety for Project users; (viii) better Project documentation; (ix) shortened occupancy transition period; and (x) significant extension of Project equipment and Project systems life cycles.

This Division 6 sets forth the minimum Commissioning requirements Principal Project Company is required to comply with.

#### 6.1.1. Definitions

All capitalized terms used in this Division 6 shall have the meaning given to them in this [Section 6.1.1](#) or, if not defined here, in Exhibit 1 to the Agreement.

**Commissioning or Building Commissioning:** A process consistent with ANSI/ASHRAE/IES Standard 202-2018 that focuses upon verifying and documenting that the Infrastructure Facility and all its systems and assemblies are planned, designed, installed, and tested to meet the Contract Documents.

**Commissioning Issues and Resolution Log:** Has the meaning set forth in [Section 6.5.2.3](#) of this division.

**Commissioning Provider (CxP):** The entity that leads, plans, schedules, and coordinates the Commissioning team to implement the Commissioning process.

**Commissioning Plan:** The plan prepared, submitted and updated by Principal Project Company that outlines the organization, schedule, allocation of resources and documentation requirements of the Commissioning process that meets the requirements of [Section 6.5.2.1](#) of this division, as approved by the City.

**Commissioning Report:** Has the meaning set forth in [Section 6.5.3.7](#) of this division.

**Commissioned Systems:** Has the meaning set forth in [Section 6.4](#) of this division.

**Commissioning Team:** The individuals who, through coordinated actions, are responsible for implementing the testing and Commissioning process as described in the Commissioning Plan. The team shall include Principal Project Company, City, D&C Contractor representatives, CxP, design professionals, Contractors, and manufacturer's representatives.

**Monitoring-Based Commissioning (MBCx):** Has the meaning set forth in [Section 6.7](#) of this division.

**Ongoing Commissioning Plan:** Has the meaning set forth in [Section 6.5.4.5](#) of this division.

**Operational Readiness Working Group (ORWG):** Has the meaning set forth in [Section 6.8](#) of this division.

**Operational Readiness (OR):** Has the meaning set forth in Section 6.8 of this division.

**Operational Readiness Plan:** Has the meaning set forth in Section 6.8 of this division.

**Seasonal Testing:** Has the meaning set forth in Section 6.5.4.2 of this division.

**Systems Manual:** Has the meaning set forth in Section 6.5.4.1 of this division.

## 6.2 Standards and Guidelines

The Infrastructure Facility shall be Commissioned in compliance with all, but not limited to, the latest editions of codes and standards listed below:

ASHRAE Standard 202- 2018; “Commissioning Process for Buildings and Systems”.

ASHRAE Guideline 0-2019; “The Commissioning Process”.

ASHRAE Guideline 1.1-2007; “HVAC&R Technical Requirements for the Commissioning Process”.

ASHRAE Guideline 1.4-2019; “Procedures for Preparing Facility Systems Manuals”.

ASHRAE Guideline 4-2019; “Preparation of Operating and Maintenance Documentation for Building Systems”.

NECA 90-2015; “Commissioning Building Electrical Systems”.

NFPA 3-2021; “Standard for Commissioning of Fire Protection and Life Safety Systems”.

NFPA 4-2024; “Standard for Integrated Fire Protection and Life Safety System Testing”.

ASTM E2813 – 2018; “Standard Practice for Building Enclosure Commissioning”.

ASTM E2947 – 2021a; “Standard Guide for Building Enclosure Commissioning”.

NIBS Guideline 3-2012; “Building Enclosure Commissioning Process BECx”

USGBC, Leadership in Energy and Environmental Design (LEED™).

CALGreen

Manufacturer guidelines for equipment testing.

NFPA 110 - 2022 Edition: “Testing of Emergency Power Systems.”

NFPA 21 - 2020 Edition: “Testing of Fuel Oil Systems.”

## 6.3 LEED

Principal Project Company is required to file for and achieve a gold level certification for the Project under the Leadership in Energy and Environmental Design (LEED™) V4 (or the most current fully released version of LEED) program, as detailed in Division 3, Section 3.4, of the Technical Requirements. As part of the LEED™ Gold certification, Principal Project Company shall meet the Energy and Atmosphere prerequisite, “Fundamental Commissioning and Verification” of the building energy systems and shall attain the “Enhanced Commissioning” credits in full (6 points).

In general, the Commissioning process as described in this Division 6 will meet and exceed LEED™ and CALGreen certification requirements.

## 6.4 Commissioned Systems

The Infrastructure Facility shall be delivered on a full turn-key basis in accordance with the Contract Documents, including the Commissioning of all systems, assemblies, and equipment provided and installed by Principal Project Company, which shall include:

- Mechanical, including HVAC&R equipment and controls;
- Plumbing, including domestic hot water systems, fire suppression system, pumps, controls and compressed air system; electrical, including service, distribution, lighting, and controls, including daylighting controls;
- Building Automated System;
- Emergency and standby power systems;
- Renewable energy systems (if applicable);
- Audio and visual systems;
- Security systems;
- Smoke control and fire alarm systems;
- Building enclosure systems and assemblies;
- SFMTA O&M Facilities and items on the Equipment List including but not limited to:
  - Bus maintenance lifts;
  - Traction power systems;
  - Compressed air connections to hose reels and process equipment for tire shop, paint shop, sheet metal shop, preventive maintenance bays, lower-level work area (LLWA) preventive maintenance bays, bus wash and service areas;
  - Loading dock systems;
  - IT room cooling;
  - Circulation fans;
  - Gear oil, differential fluid, coolant and power steering tank systems and tank monitoring system;
  - Used coolant collection and tank system, including monitoring;
  - Used oil collection and tank system, including monitoring;
  - Bus wash equipment and monitoring system;
  - Security management system;
  - Bus garage gas detection equipment;
  - Fire command center; and
  - Bridge crane – 5 ton

(together the “Commissioned Systems”).

## 6.5 Commissioning Provider (CxP)

Principal Project Company shall engage the services of a City-accepted CxP having technical background and in-depth expertise with the Commissioning process including verification techniques, functional performance testing, system equipment and operation and maintenance knowledge. The CxP must be an entity that specializes in building Commissioning and shall be commercially independent of any person already engaged by Principal Project Company for provision of the Contract Services.

The CxP shall bring a total building Commissioning perspective to the Project and be knowledgeable in (and where applicable, federal, State and local): (i) building fire codes; (ii) water-based extinguishing systems; (iii) detection systems; (iv) LEED; (v) energy codes, energy efficient design strategies; (vi) building envelope materials, components, assemblies, and systems; (vii) high performing building management and controls; and (viii) other building requirements.

The CxP will take the lead role in coordinating the entire Commissioning process on behalf of Principal Project Company, from preparation of the Commissioning Plan through to the completion of Commissioning. To fulfil all Commissioning requirements, the CxP may be one or more firms with special skillsets working together. In all cases, however, the CxP must be led by single firm with a designated individual responsible for all Commissioning work.

The CxP shall be Principal Project Company's only representative with respect to the Commissioning process, and shall be the only point of contact in respect of Commissioning matters for the City throughout the Commissioning process.

The CxP shall have specialized experience in Commissioning recently constructed buildings of similar complexity, size and type to the Infrastructure Facility. In the event that Principal Project Company proposes a CxP that the City reasonably believes cannot meet the requirements stated in this Division 6, Principal Project Company shall propose an alternative CxP that the City accepts. If the parties are unable to agree with the CxP, the CxP shall be selected in accordance with the dispute resolution procedures set forth in Article 18 (Partnering; Contract Dispute Procedures) of the Agreement.

Principal Project Company shall propose a person acceptable to the City who can act as a substitute for the named CxP in the event that the CxP is unavailable or otherwise unable to complete this role.

## **6.6 Commissioning Scope**

For the avoidance of doubt, all Commissioning procedures, processes, activities, and reporting will apply to all Commissioned Systems, including SFMTA O&M Facilities. The CxP shall report to Principal Project Company but be available to answer questions from the City and will coordinate with the City on site visits, testing activities, and trainings.

### **6.6.1. Summary**

Principal Project Company shall hire a CxP to perform the scope contained in this Division 6, as well as perform testing required elsewhere the Technical Requirements, such as Division 4 (Supplemental Design Criteria).

The CxP shall perform the following tasks, which are further detailed in subsequent sections:

- Review design documentation including the BODR;
- Prepare, update, implement, and comply with the Commissioning Plan;
- Confirm integration of Commissioning activities into the Project Schedule;
- Review Principal Project Company and D&C Contractor submittals pertaining to Commissioned Systems;
- Develop site observations reports during construction for Commissioned Systems;
- Develop construction checklists;
- Develop systems test procedures;
- Verify systems installation and operational performance;
- Maintain a Commissioning Issues and Resolution Log throughout the Commissioning process;
- Prepare and submit a Commissioning Report;
- Verify operator and occupant training delivery and effectiveness;
- Prepare, update, submit, and comply with the Systems Manual;
- Review SFMTA O&M Facilities operations 10 months after Substantial Completion;
- Development of an Ongoing Commissioning Plan; and
- Prepare a final Commissioning Report.

## 6.6.2. Pre-Construction Requirements

### 6.6.2.1. Commissioning Plan

The preparation and contents of the Commissioning Plan shall follow the requirements of ASHRAE Standard 202-2018.

Principal Project Company shall prepare and submit to the City for its review and approval no later than NTP2 a Commissioning Plan to evaluate and document that the design, construction, and operation of the Commissioned Systems comply with the Contract Documents. The purpose and intent of the Commissioning Plan is to ensure:

- (a) the planning, design, construction, and operational processes have achieved their intended outcome;
- (b) the continued efficient operation of the Infrastructure Facility during the IFM Period;
- (c) all participants follow an approved plan to ensure the completed Infrastructure Facility will realize its intended level of comfort for Project users;
- (d) all stakeholders in the Infrastructure Facility understand their responsibilities for Commissioning activities;
- (e) all Project users will be familiar with the Infrastructure Facility and will understand their continuous role in its efficient operation; and
- (g) the intended LEED NC Gold Certification for the Infrastructure Facility can be achieved and that LEED EBOM Gold Certification can be maintained through the IFM Period.

The Commissioning Plan shall include, at a minimum, the following information:

- Overview of the Commissioning activities developed specifically for the Project;
- Roles and responsibilities for the Commissioning Team throughout the Project;
- Documentation of general communication channels, including the distribution of the Commissioning Plan during the design and construction process;
- Detailed description of Commissioning activities that will occur between NTP2, Substantial Completion, and Final Acceptance;
- A schedule of activities and site visits, including any key meetings between Principal Project Company, City, and CxP;
- Project design documentation evaluation procedures;
- List of documents and materials to be provided for review by the D&C Contractor related to the Commissioned Systems;
- Guidelines and format that will be used to develop the Commissioning documentation, including Systems Manuals and training plans;
- List and format for design review's, checklists and testing forms, Commissioning Issues and Resolution Log, and Commissioning progress reports that will communicate and track critical Commissioning activities information;
- List of Commissioned Systems and description of evaluation procedures;
- A description explaining how the activities in the Commissioning Plan will verify the Commissioned Systems performance against the Contract Documents and the Infrastructure Facility's readiness for operations; and
- The process and procedures for whenever Commissioning evaluation does not comply with the Contract Documents

### **6.6.2.2. Review of Design Documentation**

The CxP is required to conduct a design review, similar in rigor to a peer review, of the BODR, specifications, and design drawings at the following proprietary design review stages (see Section 1.8.5 of Division 1 of the Technical Requirements):

- i. At completion of 100% Design Development stage; and
- ii. During the 90% Construction Documents stage.

This review shall assess the adherence of the design to the Contract Documents and any highlight any potential issues with meeting the intended performance of the Infrastructure Facility.

Evidence of these design reviews shall be documented, at a minimum, in the Commissioning Issues and Resolution Log.

In addition to the Commissioning Issues and Resolution Log, for each round of design review, the CxP shall prepare and submit to Principal Project Company a design review memorandum addressing:

- List of the documents reviewed;
- Laws, standards, and guidelines used to perform the review; and
- A summary of the review flagging and describing major issues discovered.

The CxP shall submit the design review memorandum and Commissioning Issues and Resolution Log to Principal Project Company, no more than two weeks after the Design Deliverables are submitted for City review. Principal Project Company shall review the comments and respond to each item with acceptance or a response to the comment. All the comments shall be settled by Principal Project Company, D&C Contractor, and CxP. A workshop(s) between the D&C Contractor, Principal Project Company and/or CxP may be held to discuss any comments requiring clarification or discussions or decision by Principal Project Company. The CxP can chair these workshop(s).

Any CxP reviews of design documentation prior to NTP 2 may take place before or during the preparation of the Commissioning Plan.

### **6.6.2.3. Commissioning Issues and Resolution Log**

Throughout the Commissioning process the CxP shall develop and maintain a Commissioning Issues and Resolution Log where deviations from the Contract Documents, system and component performance are identified and their resolution documented. The log shall identify, for each discipline in the Commissioning scope, the number of open issues, issues closed, and issued still pending, and shall be updated until final correction is made, verified, and closed.

The Commissioning Issues and Resolution Log shall be tabulated with the following information provided for each comment:

- Comment number;
- Comment date;
- Author;
- Referenced document, system, assembly, or equipment;
- Description of the issue;
- Reason for the comment (e.g. code compliance, coordination, operational impact.);
- Criticality of the issue; and
- Status of the issue (open, pending, closed)

The Commissioning Issues and Resolution Log shall be accessible at all times to Principal Project Company and the City.

#### **6.6.2.4. Training Requirements for Commissioned Systems**

Principal Project Company shall establish training requirements in the Commissioning Plan for Principal Project Company personnel involved in the operation, maintenance, safety, and quality-related activities of Commissioned Systems. The Commissioning Plan shall include recommended training procedures, materials, and records to ensure that the skills and professional judgment of Principal Project Company personnel are developed appropriately for their intended roles before Substantial Completion.

The CxP shall review and comment on any planned training as it relates to Commissioned Systems.

#### **6.6.3. Construction Requirements**

##### **6.6.3.1. General**

The CxP shall be responsible for the following:

- Coordinate and conduct all Commissioning activities as described in the Commissioning Plan in a logical, sequential, and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all parties, frequently updated timelines and schedules, and with technical expertise;
- Coordinate the Commissioning work with the D&C Contractor and their subcontractors and the Construction Manager and ensure that the Commissioning activities are being scheduled into Project Schedule;
- Revise, update and augment the Commissioning Plan in accordance with the requirements and format of ASHRAE standards and guidelines, as necessary;
- Coordinate and conduct the Commissioning kick-off meeting with the Commissioning Team within 60 days of NTP2 and issue meeting minutes;
- Review all Requests for Information (RFI) and change orders applicable to the Commissioned Systems for impacts on Commissioning and the Contract Documents.

##### **6.6.3.2. Submittals Review**

During construction the CxP shall review the Submittals stated in the Commissioning Plan as well as any construction Submittals generated by the D&C Contractor related to Commissioned Systems to verify compliance with the Contract Documents. The CxP shall enter all Commissioning Submittal reviews in the Commissioning Issues and Resolution Log. At a frequency determined by the Commissioning Plan, the CxP shall prepare and submit to Principal Project Company a Submittal review memorandum addressing:

- List of the documents reviewed;
- Codes, standards and guidelines used to perform the review; and
- A summary of the review flagging and describing major issues discovered.

The CxP shall notify Principal Project Company of any reviewed submittals that the CxP deems not to meet the requirements of the Contract Documents.

### 6.6.3.3. Site Visits/Field Observations

Throughout the D&C Period the CxP shall perform site visits as necessary to observe component and system installations. At a minimum, the CxP shall perform one site visit every two months during building construction.

If the CxP finds any work to be incomplete, inaccessible, incorrect, or non-functional, the CxP shall make note of deficiencies and report the deficiencies in writing to Principal Project Company and Construction Manager for remediation before system start-up work proceeds.

After each visit the CxP shall record noted deficiencies in the Commissioning Issues and Resolution Log.

Before system start-up begins, the CxP shall coordinate and perform a final installation verification audit with Principal Project Company and the Commissioning Team. The audit shall include a check of:

- Piping specialties including cleaning, flushing, hydrostatic testing, balance, control, and isolation valves;
- Ductwork specialty items including turning devices; balance, fire, smoke, and control dampers; and access doors;
- Control sensor types and locations;
- Identification of piping, valves, starters, gauges, thermometers, etc.;
- Documentation of pre-start-up tests performed, including manufacturers' factory tests;
- Circuit breaker settings;
- Maintenance accessibility to equipment; and
- Review HVAC (Air and water) pressure, leakage test procedures and flushing and witness their execution sufficient to be confident that proper procedures are being followed.

The CxP shall include all testing documentation in the Commissioning Report.

### 6.6.3.4. Pre-Functional Checklists and Start-up

The CxP shall provide a documented means to verify that equipment has been installed, and start-up has been completed in conformance with the Contract Documents and manufacturer's installations instructions.

Develop an enhanced start-up and initial systems checkout plan for equipment selected to be commissioned. The start-up and checkout results shall be clearly documented according to the manufacturer's written instructions and the Contract Documents.

1. A pre-functional and start-up checklist shall be developed by the CxP for each piece of commissioned equipment and shall include all required checks (mechanical, testing, adjusting and balancing (TAB), electrical and plumbing). The checklist shall be customized for the Project and refer to specific Contract Documents and manufacturer installation requirement as well as applicable codes and regulations;
2. Each checklist shall include a detailed points list and detailed control systems operation and calibration checks to ensure the building automation system (BAS) is fully checked, calibrated, and tested.

The pre-functional checklists are made up of the following:

1. **Equipment data:** Used to capture information that a maintenance management system would typically require. For example: tag number, make, model, serial number and location.

2. **Nameplate data:** Used to validate that the proper piece of equipment has been installed. Check to ensure that the installed equipment matches the approved equipment, use static information captured from the equipment nameplate as specified, as approved and as installed.
3. **Installation data:** Used to verify that the equipment has been properly installed and is a quality control check on the installation. Each check on the checklist shall be referenced to the Contract documents (specification section, drawing and specific detail) or manufacturer installation instruction specific page number.
4. **Start-up data:** Used to confirm that the equipment has been started in accordance with the manufacturers and specified requirements. Develop an enhanced start-up and initial systems checkout plan with contractors for equipment selected in the contract documents. The start-up and checkout results shall be clearly documented according to the manufacturer's written instructions and the Contract Documents.

The CxP shall verify/sample up to 10 percent of the D&C Contractor completed checks using randomly selected completed pre-functional checklists and report the results back to Principal Project Company. If the 10 percent sample fails, the D&C Contractor shall make the necessary corrections to all checklists and resubmit. The CxP shall then verify 20 percent of the resubmitted pre-functional checklists.

#### **6.6.3.5. Testing, Adjusting and Balancing (TAB) Verification**

The purpose of the HVAC TAB review is to verify the accuracy of the TAB work prior to commencing any functional performance test (FPT) activities that may be adversely affected by improper balancing. The CxP shall advise the D&C Contractor when systems are complete and ready for balancing, typically after the pre-functional checks are verified and accepted.

The CxP shall randomly sample the TAB report generated by the D&C Contractor and verify the system performance is accurately documented. This sample shall consist of 10 percent of documented measurements to verify and validate the reported results and reporting methods used. If significant issues are identified during the 10 percent verification, the D&C Contractor shall need to completely rebalance those systems as well as other similar systems and generate a revised TAB report, which shall be re-verified by the CxP.

To minimize any rework, the CxP may require that the D&C Contractor submit a customized TAB plan and procedures as required by the specifications prior to commencing TAB work. The CxP shall review the plan and meet with the D&C Contractor beforehand and discuss their approach to balancing the Project and provide guidance and assistance as needed. Results of review and meeting shall be documented.

Acceptance of TAB work by the CxP is a pre-requisite for starting Functional Performance Testing (FPT).

#### **6.6.3.6. Functional Performance Testing (FPT)**

During the acceptance phase of the Commissioning process, the CxP shall review the D&C Contractor's sequence of operations and clarify aspects and requirements that are ambiguous, incomplete, or not included. Where necessary the CxP shall rewrite the sequence in a format and language that help facilitate the writing of the program by the D&C Contractor. This sequence shall be used for testing. In the case where the FPT has been identified as failing the expected outcomes, the CxP shall allow for at least one re-test during the Commissioning process.

The CxP shall prepare FPT procedures for equipment and systems, using written, repeatable test procedures that are used to functionally test each system and assemblies. These tests shall be documented to clearly describe the individual systematic test procedures and the expected system response or acceptance criteria for each procedure.

Prior to testing, the CxP shall distribute the written procedures to be used during the test for review and pre-testing by the D&C Contractor.

The CxP shall also use the building management system control monitoring and historical data storage and trending capability to verify that the performance of the Commissioned Systems is achieved under varying load conditions throughout the building.

Functional performance testing (testing) shall address 100 percent of the Commissioned Systems. The CxP shall record all passes, failures, and deficiencies in the Commissioning Issues and Resolution Log. Failures and deficiencies shall be addressed by Principal Project Company and retested.

For HVAC systems specifically, the CxP shall:

- test the systems in automatic and normal mode (temperature, volume and pressurization control as well as of operations recovery after failure);
- test the systems in other significant modes, sequences, and control strategies including start-up, shutdown, unoccupied mode, manual mode, equipment component staging and backup upon failure (including air handling units, terminal boxes, fan coil units, fans, boilers, chiller, cooling towers, pumps, etc), modulation up and down of the unit's range of capacity, miscellaneous alarms, power failure, security alarm when impacted, and interlocks with other systems or equipment; and
- simulate high demand, off-season or unoccupied conditions through control system manipulation to verify proper system response and coordinated control, including alarms generation, operating and safety control functions.

For lighting systems specifically, the CxP shall verify and document configuration and calibration with all interior and exterior lights and lighting control equipment, which shall include but may not be limited to:

- occupancy sensors and daylight photocells, specifically, sensor location, sensitivity and time out settings suited for the application;
- verify and commission the system with the appropriate equipment, for example a light meter; and
- verify the lighting systems work in coordination with any building daylighting control systems.

The Principal Project Company shall be responsible for providing temporary network switches to enable IT / Comms system testing and any other testing. The City is not obligated to install its permanent network switches until after Substantial Completion but may do so earlier if the Project Schedule and Work progress allow and Principal Project Company agrees.

For clarity, the CxP shall not perform any of the testing required in this section and the CxP's actions shall not relieve Principal Project Company from any of Principal Project Company's obligations under the Agreement.

#### **6.6.3.6.1. FPT Noticing and Results**

Under the direction of the CxP, appropriately qualified personnel of Principal Project Company shall implement all testing as set forth in the Commissioning Plan. Principal Project Company shall give the City a minimum of 30 days' notice as to when the testing will begin and shall invite the City to witness and to comment on each aspect of the testing up until all testing is fully complete. Principal Project Company shall, together with such notice to the City, provide all information the City may reasonably require in relation thereto, including: (i) tests proposed; (ii) test methodology; and (iii) expected test results. The City shall be provided with full and reasonable access to all Commissioning activities to ensure the City remains fully informed of the process.

Within 15 Business Days following the last day of testing performed pursuant to this Section, Principal Project Company shall provide the City with testing results, certified as true, complete and correct by Principal Project Company.

#### **6.6.3.7. Commissioning Report**

After work described in Sections 6.5.3.1 through 6.5.3.6 above have been completed, the CxP shall tabulate and assemble all relevant findings and results into a Commissioning Report. Principal Project Company shall submit the Commissioning Report to the City for review and approval before Substantial Completion can be achieved.

The Commissioning Report shall include the following:

- A summary of Commissioning Plan including lists of participants and their role, building description, overview of the Commissioning scope, and a general overview of the testing and verification methods used;
- Description of Commissioning process benefits and results of the Commissioning process;
- A summary of the design review process;
- A summary of Submittal review process;
- A complete description of all FPT procedures, results and evaluation;
- An up-to-date and complete Commissioning Issues and Resolution Log with all entries resolved, plans for resolving any outstanding issues; all Commissioning activities to occur past Substantial Completion shall be clearly identified (if applicable);
- A clear, written confirmation that all failures or deficiencies in the Commissioning Issues and Resolution Log have been resolved;
- Clear, written confirmation that the individual systems and assemblies listed in Section 6.4 of this Division 6 meet the Contract Documents and that the Infrastructure Facility is ready for operations;
- Operations and maintenance materials (see Section 6.5.3.8 for requirements);
- Written evaluation of conducted training noting any further training needs or gaps; and
- Plan for resolution of any outstanding Commissioning-related issues

The Commissioning Report shall also include the following documentation as attachments:

- BODR;
- all design review and submittal review memoranda;
- Commissioning Plan;
- Meeting notes;
- Training records;
- Executed Pre-Functional Checklists;

- Start-up reports; and
- Trend logs.

#### **6.6.3.8. Operation and Maintenance Materials**

Principal Project Company shall ensure the IFM Provider and the City receive the following for information no later than Substantial Completion in accordance with ASHRAE Guideline 4, 2019 to enable efficient building operations and better ensure the results of Commissioning activities persist over time:

- A sequence of operations for the Infrastructure Facility;
- The Infrastructure Facility occupancy schedule;
- The equipment run-time schedules;
- The setpoints for all HVAC equipment;
- The lighting level settings throughout the building;
- The minimum outside air requirements;
- Any changes in schedules or setpoints for different seasons, days of the week, and times of day;
- A systems narrative describing the mechanical and electrical systems and equipment;
- A preventive maintenance plan for building equipment described in the systems narrative; and
- A Commissioning program that includes periodic Commissioning requirements, ongoing Commissioning tasks, and continuous tasks for critical facilities.

#### **6.6.4. Post Substantial Completion Requirements**

##### **6.6.4.1. Systems Manual**

The CxP shall prepare the Systems Manual for the Project in accordance ASHRAE Guideline 0–2019, Annex O. The Systems Manual shall include all the information necessary to operate, maintain, and re-commission all energy and water-consuming systems within the Infrastructure Facility. By its nature, the Systems Manual will be a collection of materials already produced by Principal Project Company, the D&C Contractor, or the CxP. Principal Project Company shall submit the Systems Manual to the City for review and acceptance no later than 180 days after Substantial Completion.

At a minimum the Systems Manual shall include the following:

- Executive summary;
- BODR;
- System single-line diagrams;
- Construction record documents and specifications;
- Approved submittals;
- As-built drawings;
- As-built sequence of operation;
- Original setpoints for all systems commissioned;
- Recommended schedule for recommissioning;
- Recommended schedule for sensor recalibration;
- Equipment operations and maintenance manuals;
- Equipment preventive maintenance schedules;
- Confirmation of completed training for IFM Provider and City personnel;

- Ongoing system optimization procedures; and
- Final Commissioning Report.

#### **6.6.4.2. Post Occupancy Review of Building Operations**

For purposes of complying with LEED Enhanced Commissioning and building envelope commissioning requirements, starting no later than 10 months after Substantial Completion, the CxP shall:

- review with Principal Project Company the current building operation and condition of outstanding issues and occupancy concerns related to the Contract Documents;
- interview the IFM Provider and SFMTA staff to identify problems or concerns they have with operating the Infrastructure Facility as originally intended and provide suggestions for improvements and record the changes in the Systems Manual;
- identify problems that are covered under warranty or under the original D&C Contract and make suggestions for improvements; and
- assist Principal Project Company and SFMTA staff in developing reports, documents.

The CxP shall provide written documentation to Principal Project Company on how to resolve outstanding Commissioning related issues within one (1) year after the Substantial Completion date to develop a final deficiency and action list. This documentation shall include requests for services to remedy outstanding problems. Principal Project Company shall provide the written documentation to the City for information.

Confirm execution of Monitoring-Based Commissioning (MBCx) plan, including:

- The review of metering and trend logs;
- The review the issues log showing results of the MBCx;
- Confirmation of the issues resolutions;
- Confirmation of ongoing operator training; and
- Update the Systems Manual with any modifications or new settings that differ from design, with explanations for the changes.

#### **6.6.4.3. Near Warranty End Post Occupancy Review**

Specifically for SFMTA O&M Facilities and certain Equipment List items, starting no later than 10 months after Substantial Completion, Principal Project Company shall:

- interview the SFMTA staff to identify problems or concerns they have with operating SFMTA O&M Facilities and certain Equipment List items as originally intended and provide suggestions for improvements and record the changes in the System Manual; and
- identify problems that are covered under warranty or under the original D&C Contract and implement improvements.

The PPC shall, one (1) year after the Substantial Completion date, provide written documentation to the City describing what was learned through interviews and investigations into performance of SFMTA O&M Facilities and certain Equipment List items, how issues will be resolved through warranties or other means, and develop a final deficiency and action list. This documentation shall include requests for services to remedy outstanding problems. Principal Project Company shall provide the written documentation to the City for information.

#### **6.6.4.4. On-going Commissioning Plan**

For purposes of complying with LEED Enhanced Commissioning and building envelope Commissioning requirements, the CxP shall produce and submit to Principal Project Company an Ongoing Commissioning Plan no later than one year after the Substantial Completion Date. The plan shall provide the Infrastructure Facility operating staff with procedures, blank test scripts, and a schedule for ongoing Commissioning activities.

The Ongoing Commissioning Plan shall include the following:

- The definition of the ongoing Commissioning process;
- Defined roles and responsibilities;
- Recommended schedule for recommissioning as-built systems;
- Continuous documentation and updating of Infrastructure Facility's operating plan to meet the requirements of the Contract Documents throughout the building's lifetime;
- Blank testing materials, including functional performance tests for all commissioned as-built systems in the building, as well as an issues log; and
- Direction for testing new and retrofitted equipment.

#### **6.7 Monitoring-Based Commissioning (MBCx)**

For purposes of complying with LEED Enhanced Commissioning and building envelope Commissioning requirements, Principal Project Company shall develop Monitoring-Based Commissioning (MBCx) procedures and identify points to be measured and evaluated to assess performance of energy- and water-consuming systems. MBCx requirements shall be included in the Commissioning Plan and shall address the following:

- Defining roles and responsibilities;
- Measurement requirements (meters, points, metering systems, data access);
- The points to be tracked, with frequency and duration for trend monitoring;
- The limits of acceptable values for tracked points and metered values (where appropriate, predictive algorithms may be used to compare ideal values with actual values);
- The elements used to evaluate performance, including conflict between systems, out-of-sequence operation of systems components, and energy and water usage profiles;
- An action plan for identifying and correcting operational errors and deficiencies;
- Training to prevent identified errors; and
- Planning for repairs needed to maintain performance.

In addition, the MBCx requirements in the Commissioning Plan shall:

- Define analysis procedures, including the frequency of MBCx-related analyses in the first year of occupancy (at least quarterly);
- Outline the evaluation process and determine the procedure for handling system conflicts, usage profiles, and out-of-sequence operations;
- Include preventive planning and maintenance procedures necessary to meet performance goals; and
- Determine measurement requirements and decide whether predictive algorithms can be used in conjunction with metered points.

Principal Project Company shall work with the CxP to ensure that requirements for MBCx are included in all Commissioning-related documents, including:

- specific trends to track in the BODR;
- Metering and monitoring required for MBCx;
- Single-line or riser diagrams for location of building and system meters in the design submittals;
- Controls sequences for specification of appropriate monitoring points in the design submittals;
- Submittal reviews of meters, energy analysis software, and drawings of controls for compliance with Principal Project Company's MBCx metering and monitoring requirements;
- Creation and completion of pre-functional tests for MBCx-related equipment, such as meters and energy analysis software programs; and
- IFM Provider educational materials regarding measurement techniques, energy analysis software tools, and fault detection and fault resolution, are incorporated into training documentation for the IFM Provider.

After MBCx activities are complete, the CxP shall update the Systems Manual with any modifications or new settings and give the reason for any modifications from the original design. Principal Project Company shall submit any revised Systems Manual to the City and the IFM Provider.

## **6.8 Operational Readiness (OR)**

Principal Project Company acknowledges that the City will be preparing for day one performance of the SFMTA O&M Services (see Section A.2.1.2 of Division 7). The City requires Principal Project Company support to ensure SFMTA staff are ready to perform the SFMTA O&M scope of work.

Principal Project Company shall develop and implement a process with the City for transitioning from construction to full operation and achieving day one operational success operating the equipment and facilities related to SFMTA O&M Services. This process may be termed in a variety of ways, including but not limited to ensuring 'operational readiness.'

Principal Project Company, in consultation with and with contributions from the City and selected stakeholders, shall develop an integrated Operational Readiness Plan that details:

- Stakeholder engagement plan;
- Operational readiness governance structure and points of contact;
- Schedule for all familiarization, maintenance, and operational training consistent and coordinated with other training requirements in the Technical Requirements;
- Proving trial program for all; and
- Handover and post-transition support plan that includes success factors for day one operations

[The City shall provide Principal Project Company with SFMTA Bus Yard Standard Operating Procedures (SOPs) that describe the intended City operations and process flows in the Infrastructure Facility. Principal Project Company shall review the SOPs and shall check for alignment or conflict with Principal Project Company's operations and design documents.] The City will identify and provide contact information for SFMTA's operational readiness and transition team members.

Principal Project Company shall prepare the Operational Readiness Plan and submit it to the City for review and approval no later than 180 days prior to the scheduled Substantial Completion Date. Principal Project Company shall amend and reissue the plan if changes are required. All activities in the Operational Readiness Plan shall be either: (1) completed no later than the Substantial Completion Date; or (2) completed after the Substantial Completion Date as part of the Bedding-In Period activities.

Principal Project Company shall allow for appropriate engagement with designated City staff in the implementation of the Operational Readiness Plan. This shall be accomplished through an Operational Readiness Working Group (ORWG) comprised of Principal Project Company and City staff, and other stakeholders as appropriate. The ORWG shall communicate closely with the [Transition Committee] (see Section [B-25] of Division 7 of the Technical Requirements) and ensure the Operational Readiness Plan is coordinated with the Bedding-In Period and move-in activities and schedule.

Principal Project Company shall provide a dedicated Operational Readiness Point of Contact (OR POC) during the operational readiness period. This Point of Contact shall participate in operational readiness governance and the ORWG, and shall be responsible for coordinating and implementing the Operational Readiness Plan with the ORWG. Specifically, the Point of Contact shall be responsible for coordinating the provision of resources to support Operational Readiness activity, any rectification needs, and act as liaison between the ORWG and the other stakeholders onsite such as the D&C Contractor and the CxP.

The ORWG shall be formed no later than 270 days prior to scheduled Substantial Completion Date and shall initially meet on a monthly cadence to contribute to, review, comment on, and complete the Operational Readiness Plan. However, to be specified in the Operational Readiness Plan, it is anticipated that meeting frequencies will increase as the transition date nears. It is anticipated that during the trial period meetings will be weekly with go-no-go calls the day prior to every trial. In the countdown period immediately prior to transition the ORWG will likely need to meet daily.

Operational Readiness stakeholders, including the ORWG, will require access to the Project Site prior to Substantial Completion to plan for operations, transition and perform early trials. Principal Project Company shall facilitate the City's and other stakeholder's safe and secure site access and to manage this process, noting the control of the site.

Principal Project Company shall provide input on the Operational Readiness assessment and ensure that building systems and equipment necessary to support scheduled trials will be ready. Principal Project Company shall make allowance for safe access to such areas within the site as necessary to facilitate the City's transition team and SFMTA operational staff as necessary to allow a successful transition to the facilities becoming operational.

Principal Project Company shall fully engage with the City's transitioning team and shall allow for provision of a full and effective handover. This will include timely provision of the Systems Manual and any other necessary documentation to allow the transition to take place.

Principal Project Company shall support the City with post-opening support as required and requested by the City. This may include systems hand-holding support, snagging, and lessons-learned sessions.

---

# Division 7: Infrastructure Facility Management (IFM) Specifications

# **POTRERO YARD MODERNIZATION PROJECT**

## **Exhibit 18: Technical Requirements**

### **Division 07: Infrastructure Facility Management Specifications**

November 15, 2024

**FINAL DRAFT**

# TABLE OF CONTENTS

<b>Definitions</b> .....	<b>1</b>
<b>Section A - Introduction</b> .....	<b>2</b>
A.1 Guiding Principles .....	2
A.2 City/ PPC Division of Responsibilities .....	2
<b>Section B - General Requirements</b> .....	<b>6</b>
B.1 Overview .....	6
B.2 Comprehensive Service .....	7
B.3 Legislative Requirements.....	7
B.4 City Standards and Policies .....	7
B.5 Annual Service Plan.....	7
B.6 IFM Services Procedures.....	8
B.7 Special Occasions, Visits and Events .....	10
B.8 Human Resources .....	10
B.9 Management Interfaces & Communications .....	13
B.10 Periodic Reporting .....	17
B.11 Monthly Reporting.....	18
B.12 Annual Reports .....	19
B.13 Annual Scheduled Maintenance & Renewal Work schedule.....	19
B.14 Risk Management .....	19
B.15 Document Management.....	20
B.16 Quality & Performance Management Services .....	20
B.17 Occupant Satisfaction Surveys .....	21
B.18 Performance Monitoring Program .....	23
B.19 Help Desk Services.....	25
B.20 Computer Aided Facility Management System (CAFM).....	27
B.21 Utilities Management Services.....	28
B.22 Environmental Management Services.....	29

B.23 Emergency Management Services ..... 31

B.24 Fire Management & Evacuation ..... 32

B.25 Move-In Services ..... 33

**Section C - IFM Project Site & Infrastructure Facility Operations ..... 35**

C.1 Security Services ..... 35

C.2 Solid Waste Collection, Recycling, & Removal Services ..... 37

C.3 Pest Control Services ..... 38

C.4 Maintenance Services..... 39

C.5 Cleaning Services ..... 41

C.6 Maintenance Services..... 42

C.7 Service & Maintenance Requirements..... 45

**Section D - Ad Hoc Services..... 63**

**Section E - Renewal Work..... 64**

E.1 General Requirements ..... 64

E.2 Renewal Work Plans and Reports ..... 64

E.3 Commissioning ..... 65

E.4 Facility & System Condition Index..... 65

**Section F - Handback Requirements ..... 66**

F.1 Handback Services ..... 66

F.2 Handback ..... 67

**Section G - Performance Measurements..... 68**

**Appendix A – Space Tolerances ..... 77**

**Appendix B - Summary of Reports ..... 82**

**Appendix C – Handback Residual Life Schedule ..... 85**

**Appendix D – PPC Spaces..... 86**

# Definitions

[Note: All terms have been moved to Exhibit 1 (Abbreviations and Definitions) of the DBFOMA.]

## Section A - Introduction

### A.1 Guiding Principles

- (1) The IFM Services detailed within these IFM Specifications form various aspects of what is expected to be a fully integrated and coordinated service. PPC will integrate and coordinate each IFM Service with all other services to provide an integrated and complete service solution.
- (2) While the IFM Services are described by their traditional functional titles, City encourages innovative approaches and task configurations to support maximum effectiveness in service delivery in supporting the continuous operation of the Infrastructure Facility in its delivery of services such that there is a minimized impact on the delivery of the IFM Services or risk to Building Occupants and the surrounding community.
- (3) This document describes the IFM Services that PPC is required to provide throughout the IFM Period.
- (4) These obligations are organized into IFM Services categories.
- (5) These IFM Specifications do not necessarily list all of the activities and steps that PPC must perform in order to fulfil the requirements for the Infrastructure Facility. PPC shall tailor its solutions and services to these requirements.

### A.2 City/ PPC Division of Responsibilities

Pursuant to Division 1 (General Provisions) of Exhibit 18 Technical Requirements, this document outlines the responsibilities as between PPC and the City related to the Infrastructure Facility consisting of the Bus Yard and Common Infrastructure.

This section is a brief overview of responsibilities and is meant to be read in conjunction with the rest of the document and other related documents outlining scope and responsibility. It is not meant to be all inclusive.

#### A.2.1.1. IFM Services

IFM Services Item	Description
<b>Building Systems</b>	
Structural system	PPC is responsible for the complete structural system of the BYC and the Common Infrastructure (i.e., the Infrastructure Facility). This encompasses the portions of the vertical and lateral structural system of the BYC needed to support the HCC. This includes: (a) the BYC's roof structure supporting the HCC over it; (b) the vertical structure and complete foundations system; and (c) the BYC's complete lateral force resisting system including foundations, collectors, etc.

IFM Services Item	Description
Building Envelope	PPC is responsible for the complete exterior envelope of the entire Infrastructure Facility, including cladding, waterproofing, and insulation. The building envelope includes the waterproofing system of the roof structure supporting the HCC over the podium.
Demising walls separating the BYC from the HCC	<p>If PPC’s approach for the Project provides demising walls that are designed and constructed as a single wall assembly, then demising walls will be considered to be part of the Common Infrastructure for which PPC has responsibility.</p> <p>If PPC’s approach for the Project provides demising walls that are designed and constructed as two separate and independent wall assemblies – one facing the BYC and the other facing the HCC –, then each will be considered to be part of the corresponding Project component and PPC shall have responsibility for the wall assembly directly facing the BYC.</p>
Signage and Wayfinding	PPC is responsible for all signage and wayfinding components for spaces allocated to the Common Infrastructure
Building mechanical, electrical, and plumbing systems and common utility systems	<p>PPC is responsible for the complete HVAC, plumbing, electrical, lighting, fire and life safety systems, MEP system controls, and Building Automation System serving the Infrastructure Facility. The MEP systems include hot and chilled water physical plants, electrical distribution systems, and backup power systems. The Compressor Equipment System shall also be PPC’s responsibility.</p> <p>If PPC’s approach for the Project includes common Utility systems for the Facility as a whole, as described in Division 4 (Supplementary Design Criteria) of Exhibit 18 (Technical Requirements), then the common utility systems will be part of the Common Infrastructure for which PPC is responsible. In this case, they will include the Facility-wide Building Management System.</p>
Fire and life-safety systems	<p>PPC is responsible for fire and life-safety within the Infrastructure Facility.</p> <p>If PPC’s approach for the Project includes an integrated Facility-wide fire and life-safety system, then the fire and life-safety system will be considered part of the Common Infrastructure for which PPC is responsible. In this case it will include the Facility-wide fire and life-safety control systems. This includes annunciation (speakers) and fire protection devices (alarms, detectors, sprinklers heads and extinguishers)</p>
Information Technology, Communications, and Security Systems	For IT, communication, and security systems, PPC’s responsibilities will be according to the scope of work allocation defined in Table 5 and Table 6 of Appendix A of Division 1 (General Provisions) of Exhibit 18 Technical Requirements.
Civil and Utility Systems	For civil and Utility systems, the IFM Services will be for the full Infrastructure Facility according to the scope of work allocation defined in Section 2.1 (Common Infrastructure) of Exhibit 18 (Technical Requirements).
<b>Building Spaces</b>	
Building system spaces	PPC is responsible for rooms for civil and Infrastructure Facility Utility systems, MEP systems, and/or common Utility systems that are allocated to the Common Infrastructure as described above and as described in <u>Section 2.1 (Common Infrastructure)</u> of Exhibit 18 (Technical Requirements).

<b>IFM Services Item</b>	<b>Description</b>
Vertical circulation	PPC is responsible for all stairs, emergency egress, escalators, and elevators in the Infrastructure Facility that have shared uses for each PPC component as described in <u>Section 2.1</u> (Common Infrastructure) of Exhibit 18 Technical Requirements. This includes all the shared mechanical and electrical systems for vertical conveyance.
Common-use spaces	PPC is responsible for all common use enclosed or open spaces (whether public or private, including the podium roof open space), shared entrance lobbies, shared restrooms (whether public or private), and shared service areas (e.g., loading docks, storage spaces, waste handling facilities) as described in Section 2.1 (Common Infrastructure) the Exhibit 18 (Technical Requirements).
<b>Public right-of-way improvements</b>	
Public Right-Of-Way Improvements	PPC is responsible for all specialty paving and public sidewalks, but excluding bike racks, and exterior signage included in the Project to meet the Technical Requirements.

### A.2.1.2. SFMTA O&M Services

<b>SFMTA O&amp;M Services</b>	<b>SFMTA O&amp;M Facilities</b>
Transit vehicles	City is responsible for O&M and lifecycle of City buses and Non-Revenue Vehicles.
Maintenance and Transit Spaces and FF&E	City is responsible for O&M and lifecycle of the maintenance bays, shops, and transit vehicle maintenance equipment; specifically, any space or equipment used solely in connection with the SFMTA O&M Services. This includes all Maintenance and Transit Spaces and includes management of replacement parts inventory. Includes O&M of the FF&E installed and used in these spaces, excluding the Compressor Equipment and System that will be the responsibility of PPC.
Transit vehicle traction power systems	City is responsible for O&M and lifecycle of the trolley bus OCS
Transit communication, security, and IT systems	City is responsible for IT, communication, and security systems, the SFMTA O&M Services will be according to the scope of work allocation defined in Table 5 and Table 6 of Appendix A of Division 1 (General Provisions) of Exhibit 18 Technical Requirements.
Office / Admin and Training Spaces and FF&E	City is responsible for O&M and lifecycle of Office / Admin and Training Spaces including Office / Admin and Training Spaces FF&E.
Ancillary facility services	City is responsible for O&M and lifecycle activities related to the BYC such as custodial, building security, uniforms, catering, and other such services that the City customarily performs in its existing transit maintenance and storage facilities.

### **A.2.1.3. City Responsibility**

For clarity, within the Maintenance and Transit Spaces and the Office / Admin and Training Spaces, the following are the responsibility of the City where the City is responsible for O&M and lifecycle in accordance with Section A.A.2.1.2:

- All City equipment used for bus operations or bus maintenance.
- AV equipment and related cabling, mounting hardware, etc.
- All Ethernet and Wi-Fi equipment, cabling, etc.
- Appliances (refrigerators, microwaves, dishwashers, coffee machines.)
- Wall finishes (panels, drywall, paint, moldings).
- Ceiling (suspended from the floor slab. Any kind, whether finished drywall or suspended, including HVAC grills).
- Flooring (any finishes on top of the concrete floor slab, including epoxy finish).
- Doors (including hinges, locks, door closers, door stops, handles, etc. on both sides of the door).
- Light fixtures, ballasts, bulbs, including emergency lights.
- Outlets and switches in the walls, including ethernet, cable, electrical, AV)
- Plumbing fixtures, including shut off's and piping from shutoff to fixtures.
- Ventilation grills.
- Millwork (cabinets and counter tops, lockers, built-in furniture)

### **A.2.1.4. PPC Responsibility**

The PPC is responsible for O&M and lifecycle of spaces which is not City's under Section A.2.1.3 and as otherwise defined in Appendix D ("PPC Spaces") in accordance with Section A.2.1.1.

## Section B - General Requirements

### B.1 Overview

- (1) Read in conjunction with the entirety of the Agreement, these IFM Specifications set out the requirements for the IFM services to be provided by PPC during the IFM Period.
- (2) These IFM Specifications include all Maintenance Services required to ensure the Maintained Elements meet the Performance Requirements and to ensure that the Infrastructure Facility remains operational throughout the IFM Period.
- (3) PPC shall provide all services that are required to ensure the integrity of the Infrastructure Facility during the IFM Period.
- (4) The IFM Services detailed within these IFM Specifications form various aspects of what is expected to be a fully integrated and coordinated service. PPC will integrate and coordinate each Service Category with all other Service Categories to provide an integrated and complete facilities management solution.
- (5) PPC shall deliver IFM Services to the required standards, including the following:
  - (a) Provide all IFM Services 24 hours per day, 365(6) days per year as required.
  - (b) Fully integrated, coordinated, and organized IFM Services to provide an integrated, comprehensive facilities management solution for City.
  - (c) Services, materials, repairs, replacements, and renewals at a minimum to meet the standards outlined in this section and the Technical Requirements.
  - (d) Maintain a safe, compliant, functional working environment at the Infrastructure Facility.
  - (e) Provide all parts, materials, supplies, systems, and other components in new condition unless prior written consent is received from City.
  - (f) Provide integrated, high quality, efficient, innovative, and flexible IFM Services at all times to achieve the Technical Requirements.
  - (g) Maximize efficiency of and minimize disruption to SFMTA O&M Services.
  - (h) Provide a full audit trail of activities involved in delivery of the IFM services.
  - (i) Implement improved techniques, procedures, materials, supply, and service delivery methods in keeping with leading practices in facilities management over the Term.
  - (j) Cooperate with City in their planning and management of special events or visits by guests of City.

- (6) Where the term “free from” is used, the service requirement will be to ensure that the equipment, component, or finish is maintained in accordance with Good Industry Practices for similar facilities.

## **B.2 Comprehensive Service**

- (1) PPC shall provide, purchase, deliver and install or implement, unless otherwise expressly provided, all requisite resources, services, supplies, consumables, parts, plant, equipment, apparatus, tools, or other materials required for the proper execution of all IFM Services and/or related services.
- (2) PPC acknowledges that there may be services or tasks to be performed that are not described in the Agreement, but are related or necessarily ancillary to the delivery of the IFM Services and these shall be performed by PPC as part of the IFM Services in accordance with the intent of this Section and as otherwise required by Good Industry Practice. PPC shall perform or provide those services as if they were included in this Section. This will not constitute additional scope of services.

## **B.3 Legislative Requirements**

- (1) PPC shall:
  - (a) Advise City of any orders, warnings or non compliance citations issued by any relevant Authority(ies) Having Jurisdiction that PPC becomes aware of, along with plans to rectify or address any related requirements imposed by the relevant authorities.
  - (b) Provide an annual report on permits, licenses and approvals associated with work conducted by PPC.
  - (c) Ensure the status on all statutory testing is reported to City on a monthly basis or otherwise as required by Applicable Law and Standards.

## **B.4 City Standards and Policies**

- (1) PPC shall adhere to City standards or policies, including Standards and Specifications, existing as at the Setting Date.
- (2) Changes in Standards and Specifications are subject to Section 7.2.4 of the Agreement.

## **B.5 Annual Service Plan**

### **B.5.1. Annual Service Plan**

- (1) PPC shall develop the Annual Service Plan in accordance with the items listed below at a minimum. PPC may include additional information as appropriate.

- (a) A brief narrative overview or executive summary of PPC's approach to delivery of the IFM Services.
  - (b) The plan for delivery and provision of each of the IFM Services, including upcoming procurement activities, changes, audits, etc. along with potential impacts to City.
  - (c) A detailed organizational and staffing plan for the upcoming Contract Year.
  - (d) Activities or initiatives that may cause disruption to Building Occupants and the methods and/or accommodations PPC will implement to minimize such disruptions.
  - (e) An analysis of past performance and upcoming changes to improve delivery of the IFM Services.
  - (f) Recommendations for changes to any joint service protocols and procedures between PPC and City.
  - (g) Any proposals for changes to IFM Services or the procedures that may impact SFMTA O&M Services.
- (2) The Annual Services Plan shall be reviewed and revised by PPC annually and re-submitted to City.

## **B.6 IFM Services Procedures**

- (1) IFM Services Procedures are intended to guide the on-going service delivery by PPC and their Contractors at the Infrastructure Facility.
- (2) PPC shall develop IFM Services Procedures for the service areas as outlined below, at a minimum, to provide IFM Services in accordance with the relevant sections of these IFM Specifications. These may be incorporated in PPC's overall procedure documentation and may be standard procedures, however all unique City requirements are to be addressed.
- (3) The IFM Services Procedures shall, at a minimum, include the following:
  - (a) General Management
    - i. Communications & Committee Procedures
    - ii. Human Resources
    - iii. Occupational Health and Safety/Risk Management.
    - iv. Quality Management Plan.
    - v. Periodic Reporting (process and templates)
    - vi. Performance Monitoring Program
    - vii. Help Desk Services.

- viii. Utilities Management Services
  - ix. Environmental Management System, relative to Environmental and Sustainability Services.
  - x. Emergency Management, including operational risk assessment
  - xi. Fire Management Plan.
- (b) IFM Project Site & Infrastructure Facility Operations
- i. Security Services
  - ii. Solid Waste Collection, Recycling, and Removal Services.
  - iii. Pest Control Services
  - iv. Grounds Maintenance Services.
  - v. Cleaning Services
  - vi. Maintenance Services
  - vii. Renewal Work Services.

### **B.6.1. IFM Services Procedures Submission Process**

- (1) For all IFM Services Procedures required under these IFM Specifications, PPC shall:
  - (a) Submit a schedule of Submittals required under these IFM Specifications at least ten (10) months prior to Substantial Completion Deadline, to commence no later than eight (8) months prior to Substantial Completion Deadline and the final submitted no later than one (1) month prior to Substantial Completion Deadline.
  - (b) Include in the schedule timelines for 2 drafts and 1 final version of each Submittal required under these IFM Specifications and be staggered, taking into account City resource requirements. Meetings to review the Submittals shall be included in the schedule.
  - (c) Identify in advance, requirements needed from City for information, additional meetings, and access to City subject matter experts, City procedures and other information needed by PPC to develop the IFM Services Procedures.
- (2) City will review the Submittals in accordance with Exhibit 11 (Submittals Review Process) of the Agreement and will provide comments to PPC for changes by PPC in the subsequent Submittals where they do not meet Good Industry Practice for facilities procedures, do not adequately demonstrate that the IFM Services Procedures will result in the IFM Services being delivered in accordance with these Contracts or otherwise as set out in the Submittal Review Process.

- (3) Regardless of City's comments and resulting changes, PPC retains full responsibility to ensure that its obligations are carried out in accordance with the Agreement.
- (4) The IFM Services Procedures shall be reviewed by PPC annually following the Substantial Completion Deadline and if changes are required, revised IFM Services Procedures are to be re-submitted to City for review.

## **B.7 Special Occasions, Visits and Events**

- (1) City will provide PPC with a list of planned special occasions and events planned which may impact the activities at the Facility and consequently, PPC activities that are required.
- (2) PPC shall lower and raise the flags at the times and on the days required based on instruction from City. These requirements will be based on local, state and federal protocols.
- (3) PPC shall make provision for and cooperate with City to prepare for visits by guests of City.

## **B.8 Human Resources**

### **B.8.1.1. Delivery organization**

- (1) Without limiting Article 9 of the Agreement, PPC Shall:
  - (a) Provide and have in place a delivery organization with sufficient qualified, trained and competent resources and related support to deliver the IFM Services.
  - (b) Introduce all resources to City and clearly identify roles and responsibilities, as well as reporting hierarchy.
  - (c) Have in place a policy and process for addressing employees or Contractor employees who do not follow City policy when on-Infrastructure Facility, including progressive discipline and possible release or re-assignment, including at the request of City acting reasonably.
  - (d) Have in place policies and procedures to deal with all human resources issues and in particular to be compliant with relevant City policies and procedures.

### **B.8.1.2. PPC Representative**

- (1) PPC shall provide an IFM Manager to represent PPC and manage IFM Services at the Infrastructure Facility. This representative (or qualified delegate) shall be available 24 hours per day/365(6) days per year and directly contactable by the City Authorized Representative.
- (2) The IFM Manager shall be in place at least 6 months prior to Substantial Completion Deadline and be involved in Move- In processes.

### **B.8.1.3. Infrastructure Facility Security Screening**

- (1) PPC shall ensure that all new staff do not commence work at the IFM Project Site until the results of a recent criminal record check and background screening have been provided and proved satisfactory to City.
- (2) PPC shall ensure any PPC employees or Contractor employees for whom these screenings are outstanding and who is required to perform IFM Services at the IFM Project Site shall be escorted and continually supervised by a PPC employee who has passed the criminal record check and whose background screening has been proved satisfactory to City.
- (3) City has the right, acting reasonably, to refuse access to the IFM Project Site to any individual failing to meet the City security clearance requirements, at any time during the IFM Period.

### **B.8.1.4. Work Wear and Attire**

- (1) PPC shall ensure that all PPC employees and Contractor employees shall be properly and presentably dressed and where required in appropriate uniforms and work wear including necessary personal protective equipment (PPE).
- (2) PPC employee or Contractor employees shall:
  - (a) Not wear articles of clothing or other accoutrements that express personal opinions or which others may find offensive or as harassment.
  - (b) Wear identification badges, in accordance with City security policies, which will at a minimum include the PPC authorized individual's photo, name and company name, at all times. The identification badges will be provided by PPC at their cost.
  - (c) Abide by City dress code and other policies as applicable.

### **B.8.1.5. Training and Qualifications**

- (1) In addition to orientation and OH&S training, PPC shall:
  - (a) Provide all employees with and ensure all Contractor employees are provided with training on their specific job responsibilities, duties, and tasks.
  - (b) Ensure that all employees and Contractors have up-to-date certification, training and qualifications related to their responsibilities.
  - (c) Ensure that all personnel providing IFM Services at the Infrastructure Facility hold the required professional designations or certifications to perform the work in accordance with the relevant Governmental Entity(ies).
  - (d) Maintain training records and certification records for each individual and provide to City as requested for review but in no case less than annually.

### **B.8.1.6. Infrastructure Facility Orientation**

- (1) All PPC employees and Contractor employees providing IFM Services at the Infrastructure Facility shall be provided with an orientation course prior to commencing work at the Infrastructure Facility. PPC shall provide orientation material to City for review and also provide an updated list of PPC employees and Contractor employees with confirmation of their orientation date. Orientation will include:
  - (a) PPC specific company orientation related to their position and responsibilities shall including at a minimum:
    - i. Job role descriptions, tasks and responsibilities.
    - ii. Reporting relationships for each job.
    - iii. Geography of the IFM Project Site and Infrastructure Facility.
    - iv. Interaction with lines of communication between PPC and City.
    - v. Knowledge of Applicable Law and Standards.
    - vi. Knowledge of PPC policies on health and safety, and all other policies.
    - vii. IFM Project Site and equipment safety.
    - viii. Customer satisfaction and customer interaction.
    - ix. Personal hygiene.
    - x. Appropriate dress and rules of conduct while on the IFM Project Site or in the Infrastructure Facility.
    - xi. Fire risks and fire precautions.
    - xii. Respectful workplace / workplace harassment policies.
    - xiii. Familiarization with SFMTA O&M Services.
    - xiv. CAFM user instructions, building automation and Help Desk
    - xv. Confidentiality agreement.
    - xvi. Communication Protocols.
  - (b) PPC orientation shall also include City-specific orientation related to working in and around SFMTA O&M Services, as provided by City for delivery by PPC or to be provided by City at their option.

### **B.8.1.7. Occupational Health & Safety**

- (1) PPC shall have a comprehensive health and safety procedure and ensure it is available to, and used by, all PPC employees.
- (2) PPC shall provide training to all employees and ensure Contractor employees receive training including:
  - (a) Fall arrest training, where applicable.
  - (b) WHMIS training.
  - (c) Safe lifting.
  - (d) Emergency and pandemic preparedness plans.
  - (e) Infrastructure Facility evacuation training.
  - (f) Workplace violence prevention.
  - (g) Personal protective equipment.
  - (h) Respiratory protection program.
  - (i) Health & Safety policy statement.
  - (j) Hazard/Incident reporting.
  - (k) Incident/Accident investigation.
  - (l) Obtaining first aid.
- (3) PPC shall participate as a guest in City's Occupational Health and Safety committee meetings as requested to address Infrastructure Facility-based occupational health and safety issues and address concerns raised by City.
- (4) PPC shall report all recordable injuries and near miss incidents to City in a prescribed format and at a frequency agreed upon with City, at a minimum at the scheduled monthly meetings with City.

## **B.9 Management Interfaces & Communications**

### **B.9.1.1. Communications Protocol**

- (1) PPC shall work with City to:
  - (a) Establish the responsibilities and lines of communication between City and PPC.
  - (b) Coordinate all communications between PPC, PPC's Contractors, City, Other Contractors and other nominated parties as required by the City.

- (c) Provide City with information required by City for communication to internal or external parties such as relevant authorities, the media and the public. PPC shall provide the information in a timely manner but not more than 48 hours after the request.
- (d) Notify City immediately using the agreed communication protocol when PPC becomes aware of issues or failures that may impact SFMTA O&M Services.
- (e) Refer all external requests for information related to the Infrastructure Facility to City.

### **B.9.1.2. IFM Operations Committee**

- (1) Not later than 8 months prior to the Substantial Completion Deadline PPC shall establish a monthly IFM Operations Committee to deal with operational interface and communications at the Infrastructure Facility, both prior to and during the IFM Period including:
  - (a) The transition from the Existing Facilities to the Facility.
  - (b) Any joint review of the IFM Services and the Technical Requirements.
  - (c) Any changes to the IFM Project Plans.
  - (d) Any performance issues.
  - (e) Any interface issues between the IFM Services and SFMTA O&M Services.
  - (f) Any special matter referred to the IFM Operations Committee by City or PPC.
  - (g) Any community and media relations issues.
  - (h) Any other issues pertaining to the IFM Services.
- (2) The IFM Operations Committee does not relieve PPC from communicating on a regular and timely basis directly with City as required.
- (3) PPC shall communicate to the IFM Operations Committee at a minimum regarding the following:
  - (a) Upcoming Maintenance Services.
  - (b) Renewal Work.
  - (c) Changes or anticipated changes in personnel, progress of recruitment.
  - (d) Status of PPC Resources training.
  - (e) Analytics and statistics for the purposes of proactively identifying issues and opportunities.
  - (f) Status on the implementation of tasks identified by the IFM Operations Committee.
  - (g) Status on other tasks and/or action plans.

- (h) Other operational plans or activities.
  - (i) Status of Change Orders.
  - (j) Reports that are required to be delivered to City.
  - (k) Status of rectification activities as a result of an order by authorities having jurisdiction.
- (4) City shall communicate to PPC information related to City specific activities that may impact PPC's day-to-day performance of the IFM Services.
- (5) PPC shall present reports to the City including Performance Monitoring Reports, summarize activity, present any future plans and upcoming changes that may impact the day-to-day operations of the Infrastructure Facility and discuss performance management results, staff complaints and any related corrective plans.
- (6) PPC Responsibilities for the IFM Operations Committee shall include:
- (a) Develop and maintain procedures and schedules for the conduct of the activities of the IFM Operations Committee in mutual agreement with City, as appropriate from time to time;
  - (b) Prepare the agenda and provide at least five Business Days in advance of the meeting; and
  - (c) Prepare minutes and provide them to City not more than five Business Days following the meeting. Minutes shall include issues, discussion summary and action items which will be tracked and reported at each meeting. Unless City notifies Principal Project Company within five Business Days of receipt of the minutes that City disagrees with the contents of the minutes, City and Principal Project Company shall be deemed to have approved such minutes. Principal Project Company shall maintain a complete set of all minutes of the meetings of the IFM Operations Committee and shall make such minutes available for inspection by City during regular business hours.
- (7) The IFM Operations Committee shall not have authority to make decisions with respect to or approve:
- (a) Any amendment to or waiver of any provision of the Agreement;
  - (b) Any change that may materially adversely affect PPC's ability to perform IFM Services or SFMTA's ability to perform SFMTA O&M Services; or
  - (c) Any matter with respect to which City has a right of consent pursuant to the Agreement.
- (8) The Committee shall be composed of:
- (a) Two PPC Representatives
  - (b) One City FM Representative
  - (c) One City Maintenance Representative

(d) One City Authorized Representative

- (9) City shall select the chairperson of the IFM Operations Committee.
- (10) City shall be entitled to replace any of their respective representatives on the IFM Operations Committee by written Notice to Principal Project Company. City will use commercially reasonable efforts to deliver prior written Notice of any such replacement to Principal Project Company. Principal Project Company may replace its representative on the IFM Operations Committee with the prior written consent of City, not to be unreasonably withheld or delayed.
- (11) The Committee shall meet:
  - (a) Monthly unless otherwise mutually agreed by the members of the IFM Operations Committee or the Parties.
  - (b) Ad hoc as required by PPC or City to address specific issues or topics. Special meetings of the IFM Operations Committee may be convened on not less than 5 Business Days' Notice to all members of the IFM Operations Committee identifying the agenda items to be discussed at the special meeting, provided that, in an Emergency, a meeting may be called at any time on such Notice as may be reasonable in the circumstances.
- (12) Unless otherwise agreed by the members of the IFM Operations Committee, the IFM Operations Committee shall meet at the IFM Project Site or another location in San Francisco, California. Meetings of the IFM Operations Committee may be held by means of such telephonic, electronic or other communication facilities as permit all persons participating in the meeting to communicate with each other simultaneously and instantaneously. A person participating in a meeting by such means will be deemed to be present at such meeting, provided that each member of the IFM Operations Committee must attend in person at least once each calendar quarter.
- (13) Members of the IFM Operations Committee may invite, on prior Notice to all members, such advisors and consultants as they require from time to time to attend meetings and provide briefings to the IFM Operations Committee.
- (14) One representative of City and one representative of Principal Project Company shall constitute a quorum at any meeting of the IFM Operations Committee. A quorum of members may exercise all the powers of the IFM Operations Committee. The members shall not transact business at a meeting of the IFM Operations Committee unless a quorum is present.

### **B.9.1.3. Operational Issues Resolution**

- (1) PPC shall develop and implement an operational issues resolution process that is acceptable to City and consistent with the Agreement. The process shall define resolution timelines and enable escalation of issues to more senior levels, including, as necessary, following Article 18 (Contract Dispute Procedures).

#### **B.9.1.4. City Orientation & Training**

- (1) PPC shall develop and implement, in collaboration with City, a service orientation program for relevant City Personnel which they will conduct initially prior to the Substantial Completion Deadline and then when City changes City Personnel, or from time to time acting in accordance with Good Industry Practice, at the Infrastructure Facility. The service orientation program shall be in accordance with City requirements.
- (2) PPC shall develop and distribute, at City's discretion, a summary of the IFM Services.
- (3) PPC shall ensure that City Representative has updated, correct and timely information about the CAFM, security system and any other PPC provided system which City operates or interfaces with.
- (4) PPC shall provide training to the required City Personnel initially as directed by the City Representative on equipment and systems for related to the SFMTA O&M Services.
- (5) The Help Desk Services shall also include formal communications (electronic information or paper flyer, at City discretion) and ad-hoc training as may be required to ensure City staff are aware of the Help Desk Services.
- (6) PPC shall develop and implement, in collaboration with City, an electronic training program for City staff that operate, use, or interface with any of the Maintained Elements. City shall implement a "train the trainer" program; however, PPC shall be required to conduct training program or refresher every 2 years for the trainer and any other staff required by City. In addition, if the equipment, procedures or software related to the Maintained Elements changes, PPC shall provide revised training related to the changes.

### **B.10 Periodic Reporting**

- (1) PPC shall provide periodic reporting as outlined further below. Periodic reporting shall include all reporting requirements outlined in this IFM Specification.
- (2) All reports shall be made available in print and searchable electronic format. Data related to reporting shall be made available for download or export in original electronic format that permits analysis and drill-down as applicable.
- (3) The Monthly Reporting further below outlines specific requirements but does not relieve PPC from periodic reporting responsibilities outlines elsewhere in these IFM Specifications or in the Technical Requirements as it relates to the IFM Services. Reports are expected to provide City with sufficient information to verify PPC's performance of their responsibilities however should also provide useful information for PPC to manage their service performance.

## **B.11 Monthly Reporting**

- (1) PPC shall deliver the monthly reports set out in this Section B.11 to City five Business Days following the last day of the month. In all cases, reported information should include comparisons to previous months and previous year where available, provide information in graphic formats and be accompanied by analysis and plans for improvement or change where relevant.
- (2) City will review the report within 10 Business Days following receipt of the report and notify PPC of any errors or omissions or changes it deems required.

### **B.11.1. Performance Monitoring Report**

- (1) PPC shall prepare a monthly report of the Performance Monitoring Program (the “Performance Monitoring Report”), comprised of a summary of all Service Failures and Availability Failures and the related performance details and applicable financial adjustment to the invoice in accordance with Exhibit 4 (Payment Schedule)
- (2) For each Contract Quarter, the Performance Monitoring Report shall present quarterly information to support the invoicing and payment of Quarterly Availability Payments in accordance with Exhibit 4 (Payment Mechanism). This Quarterly Performance Monitoring Report shall be a roll-up of the preceding months’ information as outlined above in Section B.11.1(1).

### **B.11.2. Operational Report**

- (1) PPC shall prepare a monthly operational report with the following:
  - (a) An executive summary.
  - (b) A summary of major activities and issues during the past month for each IFM Service category as well as general responsibilities such as quality, risk management, OH&S, Contractor procurement and management, etc.
  - (c) A summary of all demand requests with statistics, graphs and analysis of trends and action to be taken based on the results.
  - (d) Human resources reporting including training, orientation, certificates, personnel and organizational changes, etc.
  - (e) Statutory compliance.

### **B.11.3. Maintenance Status Report**

- (1) PPC shall provide a monthly report detailing the following:
  - (a) Past month’s performance on Demand Maintenance
  - (b) Past month’s performance on Scheduled Maintenance

(c) Monthly Scheduled Maintenance activities for the upcoming month.

#### **B.11.4. Renewal Work Report**

- (1) PPC shall provide a monthly report detailing the following:
  - (a) Completed Renewal Work projects year-to-date.
  - (b) Renewal Work activities for the upcoming month.

### **B.12 Annual Reports**

- (1) City will review the report within 20 Business Days following receipt of the report and notify PPC of any errors or omissions or changes it deems required. In all cases, reported information should include comparisons to previous Contract Year, provide information in graphic formats and be accompanied by analysis and plans for improvement or change where relevant.

#### **B.12.1. Annual IFM Services Report**

- (1) The Annual Summary report shall be provided by PPC to City no more than 20 Business Days following the completion of each Contract Year. This report shall be in a similar format to the Monthly Reporting however with an annual summary of results and information.

### **B.13 Annual Scheduled Maintenance & Renewal Work schedule**

- (1) PPC shall provide the annual Scheduled Maintenance schedule one month prior to the end of each Contract Year outlining major maintenance activities planned for the next Contract Year that may impact SFMTA O&M Services.
- (2) PPC shall provide a planned Renewal Work schedule to the City each Contract Year on a date to be agreed with the City. This schedule shall include the proposed start and completion dates of each project.

### **B.14 Risk Management**

- (1) PPC shall review their services and identify areas of risk and put risk management plans in place to mitigate the risks.
- (2) Where PPC identifies any risk or issue that may affect SFMTA O&M Services, whether within the service responsibility of PPC or not, PPC will report the risk to City.

## **B.15 Document Management**

- (1) Without limiting Article 21 of the Agreement, PPC shall manage all documentation related to the Infrastructure Facility and ensuring documents are well organized, stored, secured, backed-up, maintained and eventually handed over to City.
- (2) All information is to be made available to City in non-proprietary format. Where the operational processes use a proprietary format, such as facility management software, PPC shall ensure that information can be extracted and provided in a non-proprietary format that meets the requirements of City.
- (3) PPC shall ensure that all relevant literature from suppliers and manufacturers required in the normal course of providing the IFM Services is obtained, updated and stored appropriately.
- (4) PPC shall manage and maintain at the Infrastructure Facility up-to-date copies of all applicable literature, records, permits, licenses and approvals and other documentation related to IFM Services.
- (5) Prior to providing any information required under Applicable Law and Standards to the appropriate Governmental Entity(ies), PPC shall provide a copy to City in advance for review and approval. This requirement shall not mitigate PPC's responsibilities under Applicable Law and Standards to deliver information to the appropriate Governmental Entity(ies) within the required timelines.

## **B.16 Quality & Performance Management Services**

### **B.16.1. General Requirements**

- (1) PPC shall develop, maintain and implement a system for managing quality for all services recording and acting on occupant feedback and satisfaction with respect to the IFM Services.

### **B.16.2. IFM Quality Management Plan**

- (1) PPC shall implement an IFM Quality Management Plan to manage and measure the quality of IFM Services.
- (2) The Quality Management Plan shall include the following, in accordance with accepted quality management processes and systems and Good Industry Practice:
  - (a) A commitment to quality.
  - (b) An overview to describe the PPC's approach to maintaining and managing the quality system.
  - (c) The roles and responsibilities of individuals and management related to managing quality.
  - (d) Records management requirements for the quality management system, including managing procedures and policies.

- (e) Quality processes, including measuring, testing, reporting and acting on quality and performance management results.
- (f) Inspection and auditing process to test quality and adherence to established procedures.
- (3) PPC shall conduct quality audits of each service in accordance with its Quality Management Plan at least annually. The IFM Provider shall report on the results of the quality audits in the month following the audits.

## **B.17 Occupant Satisfaction Surveys**

- (1) PPC shall propose the questions and methodology for City approval and agreement of the occupant satisfaction surveys at least two months in advance of the survey being conducted. PPC shall adjust their survey based on City's comments. The occupant satisfaction survey questions are to remain the same in future years unless approved by City.

### **B.17.1. Occupant Satisfaction Surveys:**

- (1) PPC shall conduct occupant satisfaction surveys of City employees annually commencing within the first 6 months after Substantial Completion Deadline and cover each of the relevant IFM Services for which City employees would be able to provide an opinion.
- (2) Subsequent survey shall be conducted annually unless otherwise directed by City to conduct the survey at a frequency less than annually.
- (3) The occupant satisfaction survey shall be distributed to all City employees at the Infrastructure Facility using a web-based survey methodology, supplemented with paper surveys where necessary. The methodology shall be discussed with and agreed by City.

### **B.17.2. Transaction Satisfaction Surveys:**

- (1) PPC shall conduct Transaction Surveys within 3 months after Substantial Completion Deadline. Transaction surveys may be ongoing or conducted at a minimum quarterly during the IFM Period and cover at least 15% of all transactions (Help Desk calls or web requests) quarterly.

### **B.17.3. Baseline Survey Results**

- (1) The first survey results shall become the baseline survey for performance management purposes.
- (2) Every 5 Contract Years, the baseline for each separate service category is reset to the average of the previous 5 Contract Years.

## **B.17.4. Satisfaction Survey Report**

- (1) PPC shall:
  - (a) Provide survey results and analysis to City within one Month of the close of the survey for the occupant satisfaction survey or within one Month after each Quarter for the Transaction Survey.
  - (b) Provide an action plan to City within 45 days of the close of the survey for any of the following conditions:
    - i. Overall average below that of the previous survey.
    - ii. Specific services/questions below the results from the previous survey
    - iii. Specific services/questions below the overall average of the current survey.
    - iv. Conditions identified as being of specific concern to City.
  - (c) Review and agree with City on the action plan steps and activities to be implemented along with timelines to improve satisfaction results.

## **B.17.5. City Surveys**

- (1) City may choose to administer surveys of its own or in participation with other organizations. The surveys may include questions related to the IFM Services.
- (2) City may request that PPC prepare Performance Action Plan(s) where applicable.
- (3) PPC will provide the action plan within fifteen (15) Business Days of receiving the request from City. The action plan will summarize the results, identify areas for improvement and indicate strategies to be used to improve results, including the timeframe for implementation.

## **B.17.6. City Inspection and Audit**

- (1) PPC shall, within twenty-four (24) hours' Notice from City:
  - (a) permit City to access, review, inspect and audit the Infrastructure Facility and PPC's service delivery related records, information, reports and other Books and Records maintained by PPC to confirm that:
    - i. the Performance Monitoring Program adequately stores information and has the capacity to generate reports readily available for audit.
    - ii. the Infrastructure Facility is being maintained in accordance with the terms of the Agreement.
    - iii. PPC is otherwise meeting its obligations under the Agreement related to the IFM Services.

- (2) PPC shall assist City with any audit or inspection of the Infrastructure Facility, the IFM Services, or the Performance Monitoring Program.

## B.18 Performance Monitoring Program

- (1) PPC shall monitor performance of IFM Services including Availability Failures and Service Failures and provide a Performance Monitoring Report for results in the month within five business days of the end of each month.
- (2) The Performance Monitoring Report shall document all results and related Availability Failures or Service Failures along with the related Deductions in accordance with Exhibit 4 (Payment Mechanism.)
- (3) The Performance Monitoring Report shall also include a space trending report showing space temperatures during the period and identifying any rooms which have missed the required Performance Requirements.

### B.18.1.1. Priority Descriptions

- (1) The following describe the basis for establishing the priority for application to the Response Times and Rectification Times.
  - (a) **Priority 1** – Situations requiring immediate action to return the Infrastructure Facility to normal operations, stop accelerated deterioration, or correct a safety hazard that imminently threatens life or serious injury to public and/or City employees.
  - (b) **Priority 2** – Situations that will imminently become critical, if not corrected expeditiously, includes intermittent interruptions and/or potential safety hazards.
  - (c) **Priority 3** – Conditions requiring appropriate attention to preclude deterioration or potential downtime and associated damage or higher costs if deferred further. Items representing a practical improvement to existing conditions. These items are not required for the most basic functions of the Infrastructure Facility but will improve the overall usability and accessibility and/or reduce long-term maintenance.

### B.18.1.2. Response and Rectification Times

Category	Response Time	Rectification Time
Priority 1	15 minutes	4 hours (for all Functional Component Rank categories)
Priority 2	The longer of 30 minutes or prior to the resumption of core work hours	The longer of 8 hours or prior to the resumption of core work hours (for all

Category	Response Time	Rectification Time
		Functional Component Rank categories)
Priority 3	The longer of 2 hours or prior to the resumption of core work hours	7 calendar days

### B.18.1.3. Availability Failure Response and Rectification Times

Functional Component Rank Category	Response Time	Rectification Time
5	15 minutes	4 hours
4	15 minutes	8 hours
3	The longer of 30 minutes or prior to the resumption of core work hours	12 hours
2	The longer of 30 minutes or prior to the resumption of core work hours	24 hours
1	The longer of 60 minutes or prior to the resumption of core work hours	48 hours

### B.18.2. Performance Action Plans

- (1) Where the City (directly or through the PPC) observes a significant or consistent non-performance on any IFM Services, the PPC shall prepare a Performance Action Plan (“PAP”), upon request by the City. The PAP will be due either five Business Days from the request or an alternate later date as identified by City.
- (2) The PAP submitted to City will, at a minimum, contain a summary of the issues raised by City, an analysis of the root causes of the issues, the steps that will be undertaken by PPC to address the issues and specific timeframes for such steps.

## **B.19 Help Desk Services**

### **B.19.1. General Requirements**

- (1) PPC shall ensure the Help Desk acts as a method to receive, track and dispatch Service Requests as well as managing various communications, tracking work activity, reporting and analysis of Service Requests.
- (2) PPC shall work with City when developing Help Desk procedures to develop a listing of typical Priority 1, Priority 2 and Priority 3 issues and use this as a training tool with the Help Desk agents and City staff as appropriate to ensure accurate and timely categorization of Service Requests.

### **B.19.2. Hours and response requirements**

PPC shall ensure:

- (1) The Help Desk shall be available and receive phone calls 24 hours a day, 365(6) days a year. In addition, web access to the Help Desk for users to enter web Service Requests shall be available 24 hours a day, 365(6) days a year.
- (2) The Help Desk agent shall respond to all enquiries and Service Requests, track all calls with information as required further below, prioritize the calls in accordance with these Technical Requirements and dispatch to a qualified resource to address the Service Request.
- (3) All calls to the Help Desk shall be answered by an agent within 30 seconds. Web Service Requests are to be acknowledged via email to the requestor within 15 minutes.
- (4) There is a backup Help Desk available in the event that the main Help Desk becomes unavailable.
- (5) It communicates the Help Desk contact number and web address to City employees and re-communicate as needed periodically to ensure occupants and City employees are reasonably informed.
- (6) The Help Desk allows Failure Events to be reported by the City to the Help Desk as soon as possible after City becomes aware of the Failure Event.
- (7) All service requirements and Failure Events identified at any time by PPC or its Contractors shall be promptly reported to the Help Desk.

City shall make reasonable efforts to route issues identified by employees through their supervisors or administrative resources who will then call or enter a web request on their behalf for non-emergency Service Request calls to moderate and consolidate the number of calls for Priority 2 or Priority 3 Service Requests.

### **B.19.3. Information Requirements**

- (1) PPC shall use a system to receive, track, record, take action and report on Service Requests of all types.
- (2) Help Desk data and reports shall be made available to City on-line with read-only access to the software used by PPC.
- (3) PPC shall ensure the Help Desk provides emergency incident support by raising alarms, reporting events to internal and external authorities and logging details of emergencies.
- (4) The Help Desk shall ensure the information of all Service Requests and calls are tracked. This includes the following:
  - (a) Help Desk operator's name or other identifier;
  - (b) Requester's name;
  - (c) Date and time of request;
  - (d) Affected location as relevant;
  - (e) Repair or correction required;
  - (f) Service Failure, and/or Availability Failure;
  - (g) Event Category (Priority 1, Priority 2 or Priority 3);
  - (h) Unique request reference identifier;
  - (i) Employee or Contractor and contact info to which the request was dispatched;
  - (j) Date and time request was dispatched;
  - (k) Action taken and by whom;
  - (l) Response Time and Rectification Times; and
  - (m) Duration of Availability Failure.
- (5) PPC shall not delete or alter any details recorded by the Help Desk unless approved in writing in advance by City and the following information is recorded:
  - (a) The exact nature and impact of the alteration or deletion;
  - (b) The reason for the alteration or deletion; and
  - (c) The name of the person who authorized the alteration or deletion.

## **B.19.4. Redirection**

- (1) When calls or web Service Requests are received by PPC for activities that are not within PPC's scope or responsibility, PPC shall redirect the calls or Service Requests based on the redirection guidance provided by City. This may be to provide an alternate number or web link for the requestor to contact or, if possible, transfer them to another extension if the request is by phone.
- (2) PPC shall log these Service Requests along with customer information and who they were redirected to and the date/time within their CAFM system for verification of the redirection and for reporting of redirections to City as part of Help Desk reporting.

## **B.19.5. Reporting**

- (1) PPC shall report all Help Desk activities and performance within the required reports outlined by this specification. This will include analysis and action plans based on the results.

# **B.20 Computer Aided Facility Management System (CAFM)**

## **B.20.1. Infrastructure Facility Management**

- (1) The PPC shall utilize a CAFM as the basis for development of the Asset Management Plan and specifically to manage the Infrastructure Facility. The CAFM shall be developed in coordination with the Project's BIM. City will have access to the Infrastructure Facility's CAFM for auditing purposes and submission of task orders into the system.
- (2) The CAFM system, including hardware and software, shall allow for the following Infrastructure Facility management functions:
  - (a) Long-range and annual Infrastructure Facility planning.
  - (b) Infrastructure Facility financial forecasting.
  - (c) Work specifications, installation, and space management.
  - (d) Architectural and engineering planning and design, with floor plans, area and room numbers, doors, keys and key card access system.
  - (e) New construction and/or renovation.
  - (f) Maintenance and operations management, including both Scheduled Maintenance, Demand Maintenance and Renewal Work.
  - (g) IFM Services order execution and organization.
  - (h) Materials purchasing.

- (i) Spare parts inventory management.
- (j) Telecommunications integration, security, and general administrative services.
- (k) Sustainability monitoring, reporting, and forecasting.
- (l) Subcontracts, suppliers, and personnel management.
- (m) Customer satisfaction auditing.
- (n) Document management.
- (o) Interface with BAS (described below).

## **B.20.2. CAFM Interface with Hexagon EAMS**

- (1) PPC shall work with City to enable City to implement an integration within their system between the PPC system and City's existing EAMS system.
- (2) The intent is to achieve the following:
  - (a) Reduce the necessity for City staff to use two systems.
  - (b) Enable the creation of a Service Request in City's system that will automatically populate the PPC system and be managed by PPC as if it was entered through PPC's Help Desk or from within the PPC system.
  - (c) Ability for City to check status/updates to PPC's system's work order from within the City system as well as the ability to generate reports.

## **B.21 Utilities Management Services**

### **B.21.1. General Requirements**

- (1) PPC shall manage Utilities to meet the requirements of SFMTA O&M Services in consultation with City, including managing utilities in an efficient, economical manner with due regard for initial design, LEED designations and environmental responsibility, in accordance with Exhibit 12 (Energy Management).
- (2) PPC shall ensure connections to Utility Owner are maintained 24 hours per day, 365(6) days per year to appropriate Technical Requirements and adequate capacity to meet the requirements of City, including provisions for backup in accordance with the design requirements.

## **B.21.2. Management**

- (1) PPC Shall monitor, plan and inform City of all scheduled interruptions that may impact SFMTA O&M Services immediately upon notice related to the Utility Owner, and managing the impact of the interruptions to minimize the disruption.
- (2) PPC shall interface with the Utilities providers as needed, including receiving and posting/administering all notices related to utility services.

## **B.21.3. Energy Conservation**

- (1) PPC shall developing and implementing, with City input, an awareness and communication plan to promote conservation initiatives.

## **B.21.4. Analysis and Reporting**

- (1) PPC shall:
  - (a) Monitor all consumption and provide reporting in compliance with Exhibit 12 (Energy Management)
  - (b) Maintain a database of all consumption related information, including historical data from Substantial Completion. The database must be made available to City on request in a non-proprietary format, downloadable into Microsoft Excel or similar spreadsheet software as designated by City.
  - (c) Advise City on consumption and cost implications for SFMTA O&M Services requirements, process changes, modernization, equipment changes or renovations.
  - (d) Prepare, maintain and provide all information, including historical and statistical records, consumption data, meter readings and related building operations data as may be reasonably required by City for their own purposes or by Authorities related to legislative requirements.

## **B.22 Environmental Management Services**

### **B.22.1. General Requirements**

- (1) All IFM Services shall be performed in accordance with PPC's Environmental Management System to minimize environmental impact and minimize impacts on the health of Building Occupants.
- (2) PPC shall provide an annual environmental compliance statement in a form acceptable to City.

## **B.22.2. Environmental Management System**

- (1) PPC shall have in place and follow an Environmental Management System that includes relevant policies and processes to address the following areas:
  - (a) Energy conservation.
  - (b) Water conservation.
  - (c) Greenhouse gasses emission reduction.
  - (d) Green materials use.
  - (e) Halocarbons management.
  - (f) Storage tank management (fuel, lubrications, chemicals, etc.).
  - (g) Potable water quality management.
  - (h) Indoor air quality management.
  - (i) Material storage and use.
  - (j) City employee communications.
  - (k) Training.
  - (l) Testing, inspection and auditing.

## **B.22.3. Environmental Conditions**

- (1) PPC shall deliver services using environmentally responsible processes, materials, equipment and supplies to minimize effects on the environment.
- (2) PPC shall develop and implement a procurement policy that encourages environmentally friendly product and material selection and use and service delivery from subcontracted services.
- (3) PPC shall conduct a minimum of annually IAQ testing as well as IAQ tests where IAQ complaints are made or persistent IAQ issues are observed in order to identify and rectify the source of the complaint.

## **B.22.4. LEED**

- (1) PPC shall manage services to maintain the standards initially required to meet the LEED certification requirements, including when implementing maintenance, renewal projects and operational practices.

- (2) PPC shall obtain LEED EBOM certification, commensurate with the LEED NC certification obtained after the construction period, within five years of Substantial Completion of the Infrastructure Facility and maintain the certification throughout the IFM Period.

## **B.23 Emergency Management Services**

### **B.23.1. General Requirements**

- (1) PPC shall be responsible for Infrastructure Facility operations and related contingency response during an emergency. This includes all resources necessary as they relate to IFM Services, in coordination with City as required during an emergency.
- (2) In collaboration with City, PPC shall develop Emergency management and contingency plans and protocols, including decision making, for the IFM Project Site related to PPC's responsibilities that tie in with City's own emergency management plans and meet City's emergency management requirements.
- (3) PPC shall provide to City an up-to-date contact list of employees and Contractor employees, including afterhours contact information. City shall provide PPC with an up-to-date contact list of City contacts, including afterhours contact information.
- (4) PPC shall conduct an operational risk assessment within 3 months before and then revised no later than 3 months after Substantial Completion Deadline to identify risks that have the potential to impact SFMTA O&M Services. This assessment will result in a report to City, identifying risk, impact, likelihood and mitigation. Specific areas of risk may require a management plan by City. The assessment will be updated as required if there are material changes that impact the operational risk profile.
- (5) PPC shall develop an Earthquake Inspection Plan to minimize delay in re-occupying the Infrastructure Facility follow in significant seismic event as part of the City of San Francisco's Building Occupancy Resumption Program (BORP), developed and maintained by the City of San Francisco.

### **B.23.2. Emergency Response**

- (1) PPC shall respond and address emergency requirements at the IFM Project Site with sufficient resources as necessary.
- (2) PPC shall have in place specific response and mitigation plans for all possible emergency situations that may impact IFM Services or impact SFMTA O&M Services. This includes:
  - (a) Utility disruptions.
  - (b) Natural disasters.
  - (c) Flood/Water leaks.
  - (d) Heating/Cooling failure.

- (e) Weather Events.
  - (f) Bomb threats.
  - (g) Fire (including evacuation plan).
  - (h) Environmental spill / Hazardous Material release.
  - (i) Medical emergency.
  - (j) Structural collapse.
  - (k) Pandemics.
- (3) PPC shall provide an emergency action report following an Emergency that outlines the emergency, action taken and recommended mitigation to prevent future occurrences.
  - (4) PPC shall provide all necessary assistance to facilitate activities associated with post- event reoccupation including inspections (as part of the City of San Francisco’s Building Occupancy Resumption Program (BORP), developed and maintained by the City of San Francisco).

### **B.23.3. Contingency Planning**

#### **B.23.3.1. IFM Project Site Based**

- (1) PPC shall have in place contingency plans for common failures or external events that impact the delivery of IFM Services (including such events that have a corresponding impact on the SFMTA O&M Services). This includes events such as power failure, leaks, chiller failure, water supply failure, lighting failure, natural disasters, pandemics, heating failure, etc.
- (2) PPC shall work with City to integrate their contingency planning with City’s contingency plans to ensure they align with City requirements.

#### **B.23.3.2. PPC Business / Services**

- (1) PPC shall have in place contingency plans for IFM Services including for related services and processes that have the possibility of impacting the Infrastructure Facility.

### **B.24 Fire Management & Evacuation**

- (1) PPC shall develop fire management and evacuation plans for the Infrastructure Facility and the IFM Project Site in conjunction with City.
- (2) PPC shall submit the fire safety and evacuation plan to the local fire authorities in accordance with legislative requirements prior to Substantial Completion Deadline. PPC will keep the plan up-to-date and make changes as needed to accommodate SFMTA O&M Services.

- (3) PPC shall organize, plan and implement fire drills with the involvement and cooperation from City. Timing of training and fire drills is to be agreed by City.
- (4) PPC shall provide training for City and fire warden representatives.

## **B.25 Move-In Services**

### **B.25.1. General Requirements**

- (1) PPC shall provide resources to plan, coordinate, manage and execute the physical move-in into the Infrastructure Facility and represent PPC on the Move-In Committee no later than eight months prior to Substantial Completion Deadline.
- (2) The Move-In Resource shall manage PPC's Move-In and integrate with City and other parties for all activities of PPC's Move-In. The Move-In Advisor will also interface with City and related Move-In Subcommittee for the Move-In of SFMTA O&M Services from the current location to the Infrastructure Facility.
- (3) PPC shall develop and submit a Move-In Plan related to their services to City no later than six months prior to Substantial Completion Deadline. PPC shall develop the plan with the input and involvement of City and take into account the SFMTA O&M Services.
- (4) The Move-In Plan shall include:
  - (a) Implementation plan for the IFM Services.
  - (b) A timetable for completion of all activities required for Move-In in traditional project schedule format.
  - (c) Information and input required from City.
  - (d) Communication plans for City employees, Contractors, etc.
  - (e) Timelines for all documents and plans required by these IFM Specifications.
  - (f) Development of processes and procedures in conjunction with City, including change management interaction with City.
  - (g) Information requirements and transfer.
  - (h) Progress meeting schedule.
  - (i) Status and reporting mechanism.
  - (j) Resourcing requirements, including Move-In staff, hiring and procurement of Contractors.
  - (k) Training and orientation of PPC, Contractors and relevant City staff.

- (5) The IFM Resource and key operational staff shall be hired and at the Infrastructure Facility during the Move-In period sufficiently in advance to enable a smooth Move-In and ensure training and orientation on facility systems, SFMTA O&M Services and participate in commissioning activities. At a minimum before Substantial Completion Deadline:
- (a) IFM Manager no less than six months in advance.
  - (b) Move-in Resource no less than eight months in advance.
  - (c) Operational and technical staff no less than two months in advance.
  - (d) Admin/support staff no less than two weeks in advance.

## **Section C - IFM Project Site & Infrastructure Facility Operations**

### **C.1 Security Services**

#### **C.1.1. City Security Services**

- (1) City is responsible for physical security related to the Infrastructure Facility, including exterior security.
- (2) City is responsible for monitoring the following [at the Infrastructure Facility] and initiating action, as required, including notifying PPC as necessary for the following:
  - (a) Intrusion alarms.
  - (b) Access control system.
  - (c) Fire alarms and initiating automated announcements as required. PPC is responsible for monitoring the fire panel alarms and trouble alerts.
  - (d) CCTV.
  - (e) Elevator emergency phone and any related elevator emergency alarms.
- (3) City is responsible, as a user of the security access system, for providing and issuing access cards to City and PPC personnel. PPC shall submit requests to the City for access for their personnel.
- (4) City is responsible for providing and issuing keys to City and PPC personnel for Maintenance and Transit Spaces and Office / Admin and Training Spaces. PPC shall submit requests to the City for access for their personnel.

#### **C.1.2. PPC Security Services**

- (1) PPC is responsible for:
  - (a) Providing access and training to the City on the CCTV, intrusion alarm and access control system for coordination and enabling the City to monitor their responsibilities.
  - (b) Securing any doors or windows which may present a security risk and advising the City of this breach of Security.
  - (c) Receiving notification from the City of any incident brought to City's attention and take action to investigate, report and mitigate.

- (d) Communicating with and identify security issues or suspicious activity, including potential criminal activity (including graffiti and other forms of Vandalism), as required based on the nature of the issue and in accordance with established procedures, immediately upon discovery and taking independent action and/or direction as necessary regarding these security issues.
- (e) Providing and issuing keys to City and PPC personnel for PPC Spaces.

### **C.1.3. Security Systems Training**

- (1) PPC shall ensure City Personnel are trained on the safe and effective operation of all security and surveillance systems installed at the Infrastructure Facility and changes to these systems by:
  - (a) Conducting initial training of City's personnel both SMFTA employed or contracted on the safe and effective operation of security and surveillance systems and equipment (including making changes to CCTV camera settings and alarm parameter settings) and ensuring that City is capable of training new City Personnel on security and surveillance systems (including the provision of training resources accepted to City).
  - (b) Coordinating with City and conducting the initial training to City Personnel on new, revised or replacement of security and surveillance systems, equipment, or software as they come online.
  - (c) Initiating additional training / retraining to City Personnel for security and surveillance systems and equipment on an annual basis.

### **C.1.4. Surveillance and Alarm Systems:**

- (1) PPC shall Respond to and act on alarm conditions in accordance with emergency management plans established in conjunction with City.
- (2) PPC shall reset the fire alarm and any systems that are connected to the fire alarm when cleared by the Fire Department.
- (3) PPC shall maintain and update all firmware and software of the active equipment on a regular basis or as required by the system manufacturers to keep current. PPC shall ensure that the software, hardware and physical elements, including security features, access doors and related security devices and systems (including cameras and alarms) are functional and do not encourage or enable security risks or intrusions to the Infrastructure Facility. Records of software versions shall be kept up to date and available for verification at all times.

### **C.1.5. Incident Reporting, Emergency Assistance and Crime Prevention**

- (1) PPC shall:
  - (a) Summon the police where a crime is committed, where a crime is suspected of being committed or in any other situation where Police Service assistance is required.

- (b) Respond to any alarm activated by any security system or any request for assistance by any user anywhere in the Infrastructure Facility or on the IFM Project Site immediately. In any case attend at the Infrastructure Facility of the alarm or request, as appropriate.
- (c) Develop and implement a risk assessment plan to deal with all security matters which may occur at the Infrastructure Facility in consultation with City, including, terrorism, Vandalism, and serious assault (including sexual assault) on any Building Occupants or their property. This plan is to be reviewed at least annually with City and any relevant authorities.

### **C.1.6. Access Control**

- (1) PPC shall ensure that access keys/key cards issued to any PPC-Related Entity by the City are tracked and managed to maintain security and not lost or misplaced and are not used by unauthorized persons.
- (2) If any PPC-Related Entity misplaces keys which then requires re-keying to maintain a secure facility, PPC will pay for the cost of any re-keying services.

## **C.2 Solid Waste Collection, Recycling, & Removal Services**

### **C.2.1. General Requirements**

- (1) City shall:
  - (a) collect, store and remove from the IFM Project Site all City generated waste.
  - (b) confidentially shred, remove and dispose of shredded materials related to their own operations from the Infrastructure Facility.
  - (c) collect, store and dispose of waste arising from SFMTA O&M Services, including that from the Office/Admin and Training Spaces.

#### **C.2.1.1. Bus & Maintenance Waste**

- (1) City shall collect, store and dispose of waste, arising from SFMTA O&M Services. City shall also dispose of waste collected by PPC under Section 2.1.1(2)(b).
- (2) PPC's shall:
  - (a) Collect and store from the IFM Project Site all waste generated by PPC in the performance of IFM Services.
  - (b) Transfer collected waste into City bins within the centralized waste storage areas.

- (c) At all times, keep the Infrastructure Facility free from accumulations of waste materials, recyclable materials or rubbish.
- (d) Collect, store and dispose of all excessive construction waste generated by PPC in performance of IFM Services.

### **C.2.1.2. Hazardous Waste**

- (1) City shall collect, store, and dispose of Hazardous Waste generated by SFMTA O&M Services with the appropriate health and safety measures at all times.
- (2) PPC shall be responsible for Hazardous Waste used by PPC in the performance of IFM Services as well as typical Hazardous Waste generated from PPC office activities and from PPC equipment.
- (3) PPC's Hazardous Waste shall be properly stored, secured and disposed of through approved, certified waste handlers.
- (4) PPC shall provide a list of hazardous waste materials and typical volumes stored on the IFM Project Site to City annually, with updates whenever the list of waste materials changes.
- (5) PPC shall track the collection and disposal of hazardous waste materials and provide the paper trail demonstrating proper handling and disposal to City on request.

## **C.3 Pest Control Services**

### **C.3.1. General Requirements**

- (1) PPC shall develop and implement a pest control procedure to provide routine preventive and reactive (on-call) pest control services in an integrated manner. In particular, implement aggressive application of best practices for humane and effective abatement and deterrence measures for pigeons and other birds.
- (2) PPC shall provide a quarterly chemical usage report detailing actual chemicals, volumes, and/or equipment containing chemicals and devices used including providing all safety data sheets as well as providing a monthly inspection report as part of the regular monthly meetings.
- (3) PPC shall provide a quarterly bird and pest control report detailing bird and pest abatement and deterrence measures and the ongoing maintenance of the relevant measures installed in the Infrastructure Facility
- (4) Pest Control services shall be designed to minimize environmental impact, be humane and maximize effectiveness, including both preventive and reactive control methods for all types of pests, including insects, rodents, birds or larger animals.

- (5) Where chemical treatments are applied, they shall be strictly controlled and monitored. PPC shall advise City in advance of their application, provide the safety data sheet and it's specific usage and application. Where requested, PPC will prepare a communication / notice for City employees prior to application. City reserves the right to approve or deny use of any chemical treatments.

## **C.4 Maintenance Services**

### **C.4.1. General Requirements**

- (1) PPC shall properly maintain the Infrastructure Facility and the IFM Project Site to ensure that they:
  - (a) Meet these IFM Specifications and Technical Requirements;
  - (b) Meet all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.
- (2) PPC shall maintain the IFM Project Site to ensure that:
  - (a) Concrete, asphalt or other hard surface materials have no uneven surfaces resulting in tripping hazards, spalling, holes, damaged or broken curbs and are free of potholes, open cracks, and sinking;
  - (b) Curbs and edgings are sound, with no chips, cracks, breaks;
  - (c) All areas drain as set out in these IFM Specifications and otherwise as required by the Technical Requirements;
  - (d) The drainage system, including all gutters and drains, are kept clean and unblocked and function in accordance with these IFM Specifications and otherwise as required by the Technical Requirements;
  - (e) All roadway, lane and parking lot lines are clear and complete;
  - (f) All roadway, lane, parking and pedestrian areas are swept and/or power washed annually at a minimum to remove accumulated materials and clean the surfaces.
  - (g) Barrier-free access is maintained, where applicable;
  - (h) Exterior signs including informational, directional and parking signs are legible, free from rust, corrosion, peeling or fading, with all posts maintained plumb;
  - (i) Exterior structures including flagpoles, fencing, railings, bicycle racks and exterior wall signage are safe, sound, secure, operational and free from rust, corrosion, peeling or fading;
  - (j) Flagpoles are maintained plumb;

- (k) Fencing and gates are sound, free from rust, corrosion or peeling, not sagging and gates function as required; and
- (l) Permanently fastened fixtures are maintained in a safe condition, securely fastened and free from rust, corrosion or peeling.

## **C.4.2. Landscaped Areas**

- (1) The landscaped areas include all grass, trees, shrubs and other decorative plants at the Infrastructure Facility.

## **C.4.3. Maintenance Requirements:**

- (1) PPC shall properly maintain the landscaped areas to ensure that the landscaped areas:
  - (a) Meet these Technical Requirements;
  - (b) Meet all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.
- (2) PPC shall maintain the landscaped areas to ensure that:
  - (a) The landscaped areas free from visible weeds and are in a healthy growing condition, with edges neatly trimmed;
  - (b) Trees and shrubs are regularly pruned and fertilized, with dead growth removed;
  - (c) Dead or diseased trees or shrubs are promptly removed and replaced, as required;
  - (d) Tree and shrub growth does not interfere with walkways and does not cause a safety hazard or become unsightly;
  - (e) Mulch or other ground cover is in place with uniform and complete coverage;
  - (f) All landscaped areas drain as required in these IFM Specifications and otherwise as required by the Technical Requirements;
  - (g) Edging is completed once per month or more frequently as needed to meet the obligations in (a).
  - (h) Grass height is maintained between 2.5 and 3.0 inches;
  - (i) Fertilizer is applied as required to maintain healthy growth;
  - (j) Cleaning following the winter season to remove accumulated leaves, trash and other debris from landscaped areas and hard surface areas; and
  - (k) Aerating is done annually.

- (3) PPC shall monitor the landscaped areas in accordance with PPC's Maintenance Plan. All replacement shrubs, trees or decorative plants shall meet these Technical Requirements and relevant Regulatory Approvals.

## **C.5 Cleaning Services**

### **C.5.1. City Provided Cleaning**

- (1) Except as set out in Section C.5.2, below City provides cleaning services for SFMTA O&M Facilities.

### **C.5.2. PPC Provided Cleaning**

- (1) PPC shall provide cleaning services as provided in this Section C.5.2 for the PPC Spaces as defined in Appendix D and will include :
  - (a) All specialty interior areas of the building that are designated for the PPC's use in providing the IFM Services.
  - (b) Electrical and mechanical rooms.
  - (c) Service spaces.
  - (d) Utility closets (except for custodian closets, which are the responsibility of City.
  - (e) PPC spaces including designated offices and toilets  
(together the "Cleaning Services").
- (2) PPC shall provide all interior and exterior window cleaning for the Infrastructure Facility as follows::
  - (a) Exterior windows for the entire Infrastructure Facility shall be cleaned annually.
  - (b) Interior windows shall be cleaned semi-annually at a minimum, or as required, for PPC Spaces.
- (3) PPC shall provide Cleaning Services to all areas and elements within PPC Spaces that cannot be accessed without the use of tools or specialized equipment including:
  - (a) Entrance grills and drains.
  - (b) Glazing, finishes, walls, rails and other architectural elements that require special equipment (including lifts) to access or to clean.

- (4) PPC shall provide deep cleaning services which are part of the overall preventative maintenance for the Infrastructure Facility, including:
  - (a) An annual power-sweeping / power washing of the entire parking and maintenance bay areas.
  - (b) Grease, oil drippings and other stains are to be removed twice per Contract Year with an appropriate degreaser except in Bus parking and maintenance areas.
- (5) Where City conducts cleaning services for surfaces, fixtures, equipment or other assets for which PPC is responsible for maintenance, repair and Renewal Work, PPC shall provide City employees or contractors with appropriate training and guidance on the techniques and products to use in the care of all surfaces, fixtures, and in-contract equipment. If at any time, PPC believes that the maintenance, repair or Renewal Work is being negatively affected by City's cleaning activities, PPC shall immediately identify and notify City in writing their concerns and work with City to rectify or mitigate. If PPC fails to immediately notify City in writing then City shall not be responsible for any maintenance, repair or Renewal Works costs that may result from City cleaning activities.

## **C.6 Maintenance Services**

### **C.6.1. As Built & Drawing Management**

- (1) All As-Built Drawings shall be updated by PPC as required to reflect the Maintenance Services, Renewal Work, or Changes to the Infrastructure Facility. The City will be responsible for making updates, as required, to reflect changes made through SFMTA O&M Services and notify the PPC of such updates. City will not update As-Built Drawings for minor changes to FF&E. The maximum time for completing such updates to the As-Built Drawings shall be two months after completion of the work.
- (2) All drawings shall be maintained by PPC in an electronic format and available in non-proprietary format and access is to be provided to City when requested.
- (3) In addition, PPC shall maintain electronic files and any paper copies in well-organized and indexed system in searchable format. The electronic files must be backed-up off-Infrastructure Facility.

### **C.6.2. Commissioning**

- (1) Commission or re-commission components or systems shall be performed following Maintenance Services based on Good Industry Practice and in particular where they may impact operational efficiency or effectiveness of the system or component.
- (2) Commissioning plans are to be provided to the City for review.
- (3) Results of commissioning activities are to be provided to City for their information.

### **C.6.3. Scheduling of Maintenance Services**

- (1) PPC shall provide City with a monthly schedule at least 1 month in advance of Scheduled Maintenance activities being carried out.
- (2) PPC may only carry out its Maintenance Services obligations as follows:
  - (a) Demand Maintenance required to address an Emergency may be undertaken by PPC as needed to protect life and property. PPC Shall notify the city as soon as possible before or after the Demand Maintenance in accordance with agreed communication plans.
  - (b) Maintenance Services which do not impact SFMTA O&M Services can be undertaken at any time.
  - (c) If PPC has Scheduled Maintenance and City determines that it will disrupt SFMTA O&M Services or other City planned activities and requests PPC to modify its maintenance schedule or activities, then PPC will accommodate such change in the performance of its Maintenance Services obligations unless otherwise approved by City.

### **C.6.4. Graffiti & Vandalism**

- (1) PPC shall work jointly with City to minimize and appropriately manage acts of graffiti and Vandalism.
- (2) PPC shall remove graffiti that is publicly visible or offensive within 24 hours. All other graffiti shall be removed within 72 hours.
- (3) PPC shall repair and rectify all acts of Vandalism based on the Response Time and Rectification Time and the Vandalism's classification as Priority 1, Priority 2 or Priority 3 depending on the Vandalism's impact on the Infrastructure Facility or SFMTA O&M Services.

### **C.6.5. Demand Maintenance Activity**

- (1) PPC shall respond to Demand Maintenance requests or requirements as they are identified, whether from City, Building Occupants or as a result of PPC activity.
- (2) PPC shall ensure all Demand Maintenance activity is documented and tracked electronically in the Help Desk system for performance evaluation and to provide information for analysis and reporting. Where relevant, Demand Maintenance activity shall be documented with the relevant asset receiving Demand Maintenance activity.

### **C.6.6. Scheduled Maintenance Activity**

- (1) PPC shall provide a comprehensive Scheduled Maintenance program with Scheduled Maintenance activities for all Maintained Elements and also legislative compliance routines and major activities for all IFM Services.

- (2) All relevant assets shall be included in a CAFM to track both Scheduled Maintenance and actual work performed, including relevant operational measurements and observations related to the asset receiving Scheduled Maintenance activity.
- (3) An annual audit shall be conducted on all assets due no later than the anniversary date of occupancy.
- (4) The CAFM system shall track document work orders generated and work orders completed within each planned period for performance reporting.
- (5) The CAFM system shall record and maintain the following information on the assets:
  - (a) A logical, hierarchical based identification method for systems and components.
  - (b) Description of each system / component, (i.e. make, model, serial #, capacity, etc.)
  - (c) Physical location of the asset (i.e. room number as relevant)
  - (d) Scheduled Maintenance tasks with detailed description
  - (e) Frequency and scheduled dates for tasks / components
  - (f) Maintenance history including Scheduled Maintenance and Demand Maintenance and Renewal Work activity along with notes, recommendations, observations, etc.
  - (g) Resources dispatched
  - (h) Date work order produced, due and completed, for performance reporting purposes

## **C.6.7. Scheduled Maintenance Plans**

### **C.6.7.1. 1 Year Scheduled Maintenance Plan**

- (1) PPC shall provide a 1 year Scheduled Maintenance Plan with detailed schedule which highlights IFM Services activities which may impact SFMTA O&M Services, identify implications and provide plans on how the potential impact will be mitigated or eliminated. The 1 Year Scheduled Maintenance Plan is to be provided at least 3 months prior to the start of the Contract Year at the IFM Operations Committee.

### **C.6.7.2. 5 Year Scheduled Maintenance Plan**

- (1) PPC shall provide a 5 year Scheduled Maintenance Plan which identifies all major IFM Services activities which may impact SFMTA O&M Services. The 5 Year Scheduled Maintenance Plan is to be provided at least 3 months prior to the start of the Contract Year at the IFM Operations Committee.

## C.7 Service & Maintenance Requirements

### C.7.1. Infrastructure Facility Envelope

- (1) This section refers to all the Elements of the Infrastructure Facility envelope, which include roof systems, walls, doors, and windows, subject to Reasonable Wear and Tear

### C.7.2. Roof Systems

- (1) A roof is the system of interacting components and materials designed to weatherproof and insulate the top surface of the Infrastructure Facility including all structural components, roof fabric, flashings, copings, vents, drains, stacks, parapets and other penetrations. In addition, the roof system includes eaves and fascia.
- (2) PPC shall properly maintain the roof system of the Infrastructure Facility to ensure that the roof system:
  - (a) Meets the Availability Conditions and Performance Requirements applicable to the roof system;
  - (b) Functions and operates safely and performs in accordance with these IFM Specifications and otherwise as required by the Technical Requirements;
  - (c) Meets all Applicable Laws and Standards and Regulatory Approvals; and
  - (d) Meets the Handback Requirements at the end of the Term.
- (3) In addition, PPC shall maintain the roof system of the Infrastructure Facility to ensure that:
  - (a) The roof is weather tight with continuity of membrane and sealant;
  - (b) The roof is structurally sound, with a uniform and even surface;
  - (c) The roof is free of Defects affecting performance or safety;
  - (d) Coverage is continuous and complete across entire surface of the roof of the Infrastructure Facility;
  - (e) The roof is free of leaks, damp penetration, spalling, noticeable sagging, decay, cracks, rust, corrosion, damage, distortion or displacement and mold;
  - (f) All parts of the roof system are tightly fastened and structurally sound;
  - (g) Eaves and fascia are structurally sound and secure;
  - (h) Roof drainage is free flowing and performs in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (i) Drains and vents are free of debris and obstruction;

- (j) Water is dispersed from the roof in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (k) The insulation is intact, dry and performing in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements; and
  - (l) Any other performance requirement set out in these IFM Specifications and otherwise in accordance with the Technical Requirements are being met.
- (4) PPC shall regularly inspect roof systems in accordance with the Maintenance Plan, including Thermographic scans (and cut samples, if necessary)

### **C.7.3. Exterior Walls and Foundations**

- (1) Exterior walls and foundations include all structural components, claddings, cappings, exhaust and supply vents, chimney stacks and flues, drainage systems, soffits, other penetrations and attachments, such as landings, ramps, stairwells, fire exits, steps, porches, decks, walkways, entrances, safety barriers (bollards), walkways and insulation.
- (2) PPC shall properly maintain the exterior walls and foundations of the Infrastructure Facility to ensure that the exterior walls and foundations:
  - (a) Function and operate safely and perform in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meet all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.
- (3) In addition, PPC shall maintain the exterior walls and foundation of the Infrastructure Facility to ensure that:
  - (a) The foundation is structurally sound, and free of Defects affecting performance of the foundation or safety;
  - (b) There is no subsistence or differential settlement of the foundation;
  - (c) The exterior walls and foundation are weather tight with continuity of material across the entire surface;
  - (d) The exterior walls, attachments and the foundation are free from hazardous materials, cracks, deflections, rust, corrosion, damage, distortion or displacement;
  - (e) The exterior walls are free from leaks and dampness penetration and mold;
  - (f) The exterior walls are uniform in color and pattern;
  - (g) All structural components of the exterior walls are structurally sound and securely fastened;

- (h) All joints and penetrations to the exterior walls and foundations are properly sealed, weather tight and performing in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (i) Chimney stacks and flues are structurally sound and secure and the flue is free from blockages and excess soot;
  - (j) Drainage systems are free flowing, with no blockages;
  - (k) Exhaust and supply vents are free of any blockages; and
  - (l) Attachments to the exterior walls and foundations shall be structurally sound, securely fastened and functioning in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements.
- (4) PPC shall regularly inspect all exterior walls in accordance with PPC's Maintenance Plan. All repairs and renewals of the exterior walls and foundation performed by PPC shall meet these IFM Specifications and otherwise in accordance with the Technical Requirements and all Applicable Laws and Standards.

#### **C.7.4. Exterior Doors**

- (1) Exterior doors includes all entrances, including steel, aluminum or wood doors and frames, overhead and coiling doors, automatic entrances, door tracks and jambs, air vents, other ventilation outlets, glass, kick plates and finishes, as well as all door hardware components, including, hinges, locks, catches, door closers and handles, weather stripping, electronic hardware parts and strikes and all overhead door opening equipment, controls and wiring.
- (2) PPC shall properly maintain the exterior doors to ensure that the exterior doors:
  - (a) Function and operate safely and perform in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meet all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.
- (3) In addition, PPC shall maintain the exterior doors to ensure that:
  - (a) The exterior doors are weather tight;
  - (b) The exterior doors are free of Defects affecting performance, safety and security;
  - (c) The exterior doors are intact, properly fitted, open and close freely without scraping or binding and latch securely and seal tightly when closed;
  - (d) Door finishes are uniform in color and free from peeling, scratches, chips or other similar damage.

- (e) Door tracks, doorjambes and all door hardware items including hinges, locks, closers, catches and handles are securely fastened and operate without binding, rubbing or catching in any way;
  - (f) Air vents, grills and other ventilation outlets are not blocked;
  - (g) Exterior door glass is complete and free of cracks, chips or other damage;
  - (h) All hardware and other attachments are fastened securely with no loose or missing parts and glass and, where applicable, are free of cracks or broken pieces; and
  - (i) The exterior doors are secure, with the door security system fully operational at all times.
- (4) Any damage to an exterior door that prevents the Infrastructure Facility from being secured is deemed to be a Priority 1 Failure. Temporary Repairs in accordance with the Agreement that ensure adequate security of the Infrastructure Facility will not be unreasonably refused by City.
- (5) PPC shall regularly inspect all exterior doors in accordance with the Maintenance Plan. PPC shall perform all repairs and renewals of the exterior doors to meet these Technical Requirements, all applicable Laws and the relevant Standards and Guidelines.

### **C.7.5. Exterior Windows**

- (1) Exterior windows include standard and specialized windows, curtain wall windows and entrance windows including glazing, seals, frames, tracks, ledges and finishes as well as motorized window blinds supplied by PPC.
- (2) PPC shall properly maintain the exterior windows of the Infrastructure Facility to ensure that the exterior windows:
  - (a) Function and operate safely and perform in accordance with these Technical Requirements;
  - (b) Meet all applicable Laws and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.
- (3) In addition, PPC shall maintain the exterior windows to ensure that:
  - (a) The exterior windows operate to manufacturers' specifications;
  - (b) The exterior windows are safe and are free of Defects affecting performance and security;
  - (c) The exterior windows are intact and properly fitted and sealed;
  - (d) The exterior windows are weather tight and free of condensation;
  - (e) The exterior windows, frames, tracks and ledges are securely fastened and free from cracks, breaks, thermal seal failures or other impairments;

- (f) All movable components operate freely and easily with no loose or missing parts;
  - (g) Where applicable, exterior windows open and close without binding; and
  - (h) Exterior windows and components are uniform in color and free from corroded or cracked finishes or cracked, broken or twisted frames.
- (4) PPC shall maintain motorized window blinds to ensure they:
- (a) Are complete and securely fixed;
  - (b) Are free of noticeable sagging;
  - (c) Are properly fitted providing complete coverage;
  - (d) Open and close properly;
  - (e) Meet the manufacturer's performance requirements; and
  - (f) Are free from tears, holes or other similar damage
- (5) Any exterior window that is broken (beyond cracking or chipping) shall be deemed to be a Priority 1 Failure. Temporary Repairs in accordance with the Agreement that ensure adequate security of the Infrastructure Facility will not be unreasonably refused by the City.
- (6) PPC shall regularly inspect all exterior windows and motorized window blinds in accordance with the Maintenance Plan. PPC shall perform all repairs and renewals of the exterior windows and motorized window blinds to meet these IFM Specifications and otherwise in accordance with the Technical Requirements, all Applicable Laws and Standards.

### **C.7.6. Infrastructure Facility Interior**

- (1) The Infrastructure Facility interior includes ceilings, walls, floors and floor coverings, fixtures and fittings, doors, windows and finishes.

### **C.7.7. Ceilings**

- (1) Ceilings include all ceiling materials and components, including, acoustic tile, gypsum board or metal linear ceiling surfaces and all structural support frames and components.
- (2) PPC shall properly maintain the ceilings to ensure that the ceilings:
- (a) Function and operate safely and perform in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meet all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.

- (3) In addition, PPC shall maintain the ceilings to ensure that:
  - (a) The ceilings are intact, properly fitted and sealed, and are structurally sound and secure;
  - (b) The ceilings are complete and level, with a uniform and even surface;
  - (c) Ceiling joints are flush with no loose, missing or broken pieces or components;
  - (d) The ceilings have no noticeable cracks, damaged finishes, deflections, water marks, staining or damp surfaces;
  - (e) The ceilings are free from mold, asbestos and other hazardous materials;
  - (f) The ceilings are uniform in color and pattern with finishes continuous over the surface; and
  - (g) The ceilings are free of any impairment which would pose a safety hazard.
- (4) PPC shall regularly inspect all ceilings in accordance with PPC's Maintenance Plan. PPC shall perform all repairs and renewals of the ceilings to meet these Technical Requirements, all applicable Laws and the relevant Standards and Guidelines.

### **C.7.8. Interior Walls and Partitions**

- (1) Interior walls and partitions include all interior walls, partitions, components and finishes and all supporting elements.
- (2) PPC shall properly maintain the interior walls and partitions to ensure that the interior walls and partitions:
  - (a) Function and operate safely and perform in accordance with these Technical Requirements;
  - (b) Meet all applicable Laws and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.
- (3) In addition, PPC shall maintain the interior walls and partitions to ensure that:
  - (a) The interior walls are structurally sound and safe;
  - (b) The interior walls are adequately protected, uniform and have an even surface;
  - (c) The interior walls are free from asbestos and other hazardous materials;
  - (d) The interior walls and partitions have continuity of material across its entire surface;
  - (e) The interior walls and partitions are free from cracks, deflections, damage, distortion or displacement;
  - (f) The interior walls and partitions are free from dampness and mold;

- (g) Finishes and coverings are complete, uniform in color and pattern and are free from peeling, rips, tears or discoloration.
  - (h) Ventilation penetrations are not blocked;
  - (i) The interior wall tiling and backsplashes are water tight and free of chipping or lifting; and
  - (j) The interior wall penetrations, including ventilation grills, are securely fastened.
- (4) PPC shall regularly inspect all interior walls and partitions in accordance with the Maintenance Plan. PPC shall perform all repairs and renewals of the interior walls and partitions to meet these Technical Requirements, all Applicable Laws and Standards.

### **C.7.9. Floors**

- (1) Floors include hard floors including ceramic tile, terrazzo, concrete and wood flooring, resilient flooring, recessed entry mats and all soft or carpeted floors.
- (2) PPC shall properly maintain the floors to ensure that the floors:
  - (a) Function and operate safely and perform in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meet all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.
- (3) In addition, PPC shall maintain the floors to ensure that:
  - (a) The floors are structurally sound, intact and properly fitted;
  - (b) The floors are fully supported at all bearing points;
  - (c) The floors are water tight with no damp spots;
  - (d) The floors have no subsidence or differential settlement;
  - (e) The floors and support systems are free of holes, tears, scoring, cracks, breaks, uneven surfaces, heaving or other impairments;
  - (f) The floors do not creak or squeak;
  - (g) Floor coverings are to be fully adhered to the floor, do not pose any tripping or other safety hazard and are uniform in color and pattern.
  - (h) Flooring does not bubble, blister or stretch;
  - (i) There is no lifting, tears or cracking at joints or corners;
  - (j) Repairs, patches and replacements shall match the color and pattern of existing floor coverings;

- (k) Recessed entry mat frames are properly fitted with no tripping hazards or loose parts;  
and
  - (l) Recessed entry mats are functioning as intended, without material deterioration or wearing.
- (4) PPC shall regularly inspect all floors and floor coverings in accordance with the Maintenance Plan. PPC shall perform all repairs and renewals of the floors and floor coverings to meet these IFM Specifications and otherwise in accordance with the Technical Requirements, all Applicable Laws and Standards.

### **C.7.10. Fixtures, Fittings, Millwork and Equipment**

- (1) Fixtures, fittings, millwork and equipment include all fixed in place millwork such as overhead cabinets, cupboards, counters, storage cabinets, bookcases as well as the doors, drawers and shelving and related hardware, bathroom, toilet and change / locker room partitions, lockers and benches.
- (2) PPC shall properly maintain the fixtures, fittings, millwork and equipment to ensure that the fixtures, fittings, millwork and equipment:
  - (a) Function and operate safely and perform in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meet all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.
- (3) In addition, PPC shall maintain the fixtures, fittings, millwork and equipment to ensure that:
  - (a) Fixtures, fittings and millwork are intact with no missing or damaged parts;
  - (b) Equipment is fully operational, with no missing or damaged parts;
  - (c) Fixtures, fittings, millwork and equipment are properly secured, fastened and fitted;
  - (d) All finishes and countertop surfaces are firmly attached and free from discoloration or broken pieces;
  - (e) Cabinet doors and drawers open and close freely;
  - (f) Cabinet hardware operates smoothly with no missing parts;
  - (g) Washroom and change / locker room partitions, doors and lockers are securely fastened;
  - (h) Washroom and change / locker room partition, door and locker finishes are free from peeling and uniform in color;
  - (i) Washroom and change / locker room doors and locker doors swing freely, closing and locking without binding;

- (j) Equipment performs to manufacturers' specifications;
- (k) Interior signage provided by PPC is legible and securely fastened in place; and minimum repair or replacement size is one matching length, sheet or single component.
- (l) PPC shall regularly inspect the fixtures, fittings, millwork and equipment in accordance with the Maintenance Plan. Equipment shall be maintained in accordance with manufacturers' specifications. PPC shall perform all repairs and renewals of the fixtures, fittings, millwork and equipment to meet these IFM Specifications and otherwise in accordance with the Technical Requirements, all Applicable Laws and Standards.

### **C.7.11. Interior Doors**

- (1) Interior doors include hollow metal, steel and solid or hollow wood core doors, and all associated hardware and components such as door frames, tracks and jambs, hinges, locks, catches, closers, handles and glass, where applicable.
- (2) PPC shall properly maintain the interior doors to ensure that the interior doors:
  - (a) function and operate safely and performs in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements,
  - (b) meet all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) meet the Handback Requirements at the end of the Term.
- (3) In addition, PPC shall maintain the interior doors to ensure that:
  - (a) the interior doors are free of Defects affecting performance, safety and security;
  - (b) the interior doors are intact, properly fitted, open and close freely, without scraping or binding and shall latch securely when closed;
  - (c) door finishes are uniform in color and free from peeling, scratches, chips or other similar damage.
  - (d) door tracks, doorjambs and all door hardware items including hinges, locks, closers, catches and handles are securely fastened and operate without making noise or binding, rubbing or catching in any way;
  - (e) air vents, grills and other ventilation outlets are not blocked;
  - (f) interior door glass is complete and free of cracks, chips or other damage;
  - (g) all hardware and other attachments are fastened securely with no loose or missing parts and glass and, where applicable, are free of cracks or broken pieces; and
  - (h) minimum repair or replacement size is one matching length, sheet or single component.

- (4) PPC shall regularly inspect all interior doors in accordance with the Maintenance Plan. PPC shall perform all repairs and renewals of the interior doors to meet these IFM Specifications and otherwise in accordance with the Technical Requirements, all Applicable Laws and Standards.

### **C.7.12. Interior Windows**

- (1) Interior windows include standard and specialized windows, interior wall windows and entrance windows including all frames, tracks, coverings and ledges that form part of the interior window.
- (2) PPC shall properly maintain the interior windows to ensure that the interior windows:
  - (a) Function and operate safely and performs in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements.
  - (b) Meet all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.
- (3) In addition, PPC shall maintain the interior windows to ensure that:
  - (a) The interior windows operate to manufacturers' specifications;
  - (b) The interior windows are safe and are free of Defects affecting performance;
  - (c) The interior windows are intact and properly fitted and sealed;
  - (d) The interior windows, frames, tracks and ledges are securely fastened and free from cracks, breaks, missing parts, broken parts or other impairments;
  - (e) All movable components, where applicable, are secure and operate freely and easily with no loose or missing parts; and
  - (f) The interior windows and components are safe and in good operating condition with no broken or cracked glass or other missing or broken parts.
- (4) PPC shall regularly inspect all interior windows of the Infrastructure Facility in accordance with the Maintenance Plan. PPC shall perform all repairs and renewals of the interior windows shall meet these IFM Specifications and otherwise in accordance with the Technical Requirements, all Applicable Laws and Standards.

### **C.7.13. Infrastructure Facility Systems**

- (1) Infrastructure Facility systems include the plumbing system, heating and ventilation system and air conditioning, electrical system, communication system, fire prevention equipment, fire alarm system and elevators.

### C.7.13.1. Plumbing System

- (1) The plumbing system includes:
  - (a) Domestic hot and cold water service including piping system, hot water heater, recirculation pumps and piping and branch piping, non-freeze hose bibbs, supply and drainage lines;
  - (b) Sanitary sewer including piping, traps or interceptors, drainage lines; and
  - (c) Plumbing fixtures including toilets, urinals, flush valves, faucets, sinks, non-refrigerated drinking fountains, shower fixtures.
- (2) PPC shall properly maintain the plumbing system to ensure that the plumbing system:
  - (a) Functions and operates safely and performs in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meets all applicable Laws and Regulatory Approvals; and
  - (c) Meets the Handback Requirements at the end of the Term.
- (3) In addition, PPC shall maintain the plumbing system to ensure that:
  - (a) A constant supply of hot and cold water is produced for sinks, toilets and urinals on demand;
  - (b) Domestic hot water must be generated and distributed at temperatures in accordance with the Technical Requirements;
  - (c) Piping insulation is intact and free from dampness or deterioration to ensure no heat loss;
  - (d) Piping and the parts and components thereof are securely fastened;
  - (e) Piping and the parts and components thereof are free of all drips or leaks;
  - (f) Taps, valves and other related parts and fittings function and operate in accordance with IFM Specifications and otherwise in accordance with the these Technical Requirements;
  - (g) All fixtures, including toilets, urinals, sinks and drinking fountains, showers, etc. are securely fastened, free of all drips or leaks, with all moving parts including taps, flush valves, drain stoppers and water fountains operating freely and easily;
  - (h) All sanitary sewer pipes, drainage traps and interceptors are free flowing and unblocked;
  - (i) The sanitary sewer system provides safe conveyance of sewage or waste to the disposal system and contains the odours produced; and
  - (j) The plumbing system operates with minimal noise and prevents the transmission of discernable vibration into office areas.

- (4) PPC shall regularly inspect the plumbing system in accordance with the Maintenance Plan. PPC shall perform all repairs and renewals of the plumbing system to meet these IFM Specifications and otherwise in accordance with the Technical Requirements, all Applicable Laws and Standards.

### **C.7.13.2. Heating and Ventilation System and Air Conditioning**

- (1) The heating and ventilation and air conditioning system includes all equipment and components relating to such system including chillers, HVAC units, boilers, compressors, furnaces, pumps, motors, controls, duct work, vents, mixing boxes and dampers relating to the delivery of heating, cooling, ventilation, air and humidity to the Infrastructure Facility. The heating and ventilation system also includes the BAS.
- (2) PPC shall properly maintain the heating and ventilation system and the air conditioning to ensure that the heating and ventilation system and the air conditioning at the Infrastructure Facility:
  - (a) Functions and operates safely and performs in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meets all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meets the Handback Requirements at the end of the Term.
- (3) In addition, PPC shall maintain the heating, cooling and ventilation system to ensure that:
  - (a) The heating, cooling and ventilation system operates to prevent the transmission of discernable vibration into office areas;
  - (b) All equipment, parts and components are securely fastened and functioning according to these IFM Specifications and otherwise in accordance with the Technical Requirements to ensure energy efficiency;
  - (c) The heating, cooling and ventilation system meet the performance requirements set out in the Technical Requirements;
  - (d) Humidity, temperature, air flow, air exchange and IAQ is maintained such that it meets the performance requirements set out in the Technical Requirements and otherwise in accordance with the Performance Requirements;
  - (e) All duct work and controls functions without air leakage;
  - (f) Piping and equipment operates with no missing parts;
  - (g) Piping and equipment is free of leaks, rust or corrosion;
  - (h) Where applicable, insulation is intact and free of damage or holes;
  - (i) Filtration media is maintained and replaced as necessary to maintain indoor air quality and the efficient operation of the heating and ventilation system;

- (j) The BAS is maintained to ensure optimum operation of the heating, cooling and ventilation system and electrical system, including:
    - i. resetting the air and water supply temperatures;
    - ii. resetting the humidity from outside air; and
    - iii. controlling the lighting and car plugs;
  - (k) The BAS operates in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements and initiates the appropriate alarms as required.
- (4) PPC shall regularly inspect, test, verify and calibrate the heating, ventilation system, air conditioning and BAS in accordance with the Maintenance Plan. PPC shall perform all repairs and renewals of the heating and ventilation system, air conditioning and BAS to meet these IFM Specifications and otherwise in accordance with the Technical Requirements, all Applicable Laws and Standards.

## **C.7.14. Electrical System**

- (1) The electrical system includes interior lighting, exterior lighting and the components described as “Electrical – Other” below.

### **C.7.14.1. Interior and Exterior Lighting**

- (1) Interior and exterior lighting includes all light fixtures, lamps, tubes, luminaires, ballasts, room lighting controls, light poles and emergency and exit lighting.
- (2) PPC shall properly maintain the interior and exterior lighting to ensure that the interior and exterior lighting:
  - (a) Functions and operates safely and performs in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meets all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meets the Handback Requirements at the end of the Term.
- (3) PPC shall maintain the interior lighting to ensure that:
  - (a) Interior lighting is fully functional and safe;
  - (b) Interior lighting meets the lux levels set out in the Technical Requirements;
  - (c) Flickering or burned out lamps or tubes are replaced;
  - (d) Lamps and tubes operate with no sign of visual deterioration;

- (e) Interior light fixtures are kept securely fastened and free from tarnishing, cracks, chips, peeling or other similar damage;
  - (f) All shades, light switches and controls are free of cracks, breakage, chips or similar damage;
  - (g) Lighting controls operate in accordance with manufacturers' specifications and in accordance with IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (h) Emergency and exit lighting is kept fully charged and operational at all times;
  - (i) Emergency and exit lighting meets the requirements of the applicable legislative requirements;
  - (j) All other interior lighting parts and components meet all Applicable Law and Standards; and
  - (k) Interior lighting does not create a fire hazard.
- (4) In addition, PPC shall maintain the exterior lighting to ensure that:
- (a) Exterior lighting is fully functional and safe;
  - (b) Exterior lamps and tubes are replaced when flickering or burned out;
  - (c) Exterior light fixtures and poles are maintained in good operating condition;
  - (d) Exterior light fixtures are kept clean and in good repair with no visible corrosion, peeling or discoloration;
  - (e) Exterior light fixtures have no missing or broken parts;
  - (f) Exterior light fixtures and poles are structurally sound and operate safely;
  - (g) Exterior light poles shall be maintained plumb within 0.5 inches in 3.5 feet;
  - (h) Exterior light covers shall be secure and free from cracks, broken or missing parts or discoloration; and
  - (i) Exterior lighting does not create a fire hazard.
- (5) PPC shall regularly inspect and test the interior and exterior lighting in accordance with the Maintenance Plan. PPC shall perform all repairs and renewals of interior and exterior lighting shall meet these IFM Specifications and otherwise in accordance with the Technical Requirements, all Applicable Laws and Standards.

### **C.7.14.2. Electrical – Other**

- (1) “Electrical – Other” includes the electrical distribution system, transformers, switchgear, switchboards and panel boards, electrical distribution panels and controls, feeders, circuit breakers, electrical outlets and receptacles, car plugs and posts, conduit, raceway and wiring. “Electrical – Other” also includes the emergency lighting system.
- (2) PPC shall properly maintain the components of “Electrical – Other” to ensure that the components of “Electrical – Other”:
  - (a) Functions and operates safely and performs in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meets all Applicable Laws and Standards Regulatory Approvals; and
  - (c) Meets the Handback Requirements at the end of the Term.
- (3) PPC shall maintain the components of “Electrical – Other” to ensure that:
  - (a) The power distribution system constantly supplies power to the Infrastructure Facility;
  - (b) The power distribution system provides a safe and sufficient power supply in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (c) The power distribution system functions as designed, without undue noise or vibration;
  - (d) The main distribution system equipment and components is fully operational and free of Defects that affect proper operation of the system;
  - (e) All raceways, conduit, boxes, wiring, fittings, fixtures, controls and safety devices are fully operational, securely fastened to their intended point of anchorage and labeled in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (f) All electrical outlets and receptacles shall be operational with no broken, missing or loose parts;
  - (g) The emergency lighting system is operational and functioning in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements.
- (4) The components of “Electrical – Other” shall be regularly inspected and tested in accordance with the Maintenance Plan. All repairs and renewals of the components of “Electrical – Other” shall meet these IFM Specifications and otherwise in accordance with the Technical Requirements, all applicable Laws and Standards.

### **C.7.14.3. Communications Systems**

- (1) Communication systems include the security system, clock system, parking controls as well as all ICT conduit and raceways required to be provided by PPC pursuant to these IFM Specifications and otherwise in accordance with the Technical Requirements.

- (2) PPC shall properly maintain the communication systems to ensure that the communication systems:
  - (a) Function and operate safely and perform in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meet all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.
- (3) PPC shall maintain the communication systems to ensure that:
  - (a) All systems operate and perform in accordance with the manufacturers' specifications, recommendations, and these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) The security system is fully operational and initiates alarms in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements; and
  - (c) ICT conduit and raceways shall be intact, functional and securely fastened at all times.
- (4) PPC shall regularly inspect and test the systems in accordance with the Maintenance Plan. PPC shall perform all repairs and renewals of any communication system to meet these IFM Specifications and otherwise in accordance with the Technical Requirements, all Applicable Laws and Standards.

### **C.7.15. Fire Prevention Equipment and Fire Alarm System**

- (1) Fire prevention equipment includes all fire safety systems and equipment, such as fire sprinklers, standpipe and hose networks, and fire extinguishers (including carbon dioxide, wet chemical, dry chemical, clean agent and foam extinguishers).
- (2) The fire alarm system includes the fire alarm system control panel, heat and smoke detectors, pull stations, alarms, annunciators and all associated wiring and equipment.
- (3) PPC shall properly maintain the fire prevention equipment and fire alarm system to ensure that the fire prevention equipment and fire alarm system:
  - (a) Function and operate safely and perform in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meet all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meet the Handback Requirements at the end of the Term.
- (4) PPC shall maintain the fire prevention equipment and fire alarm system to ensure that:
  - (a) The fire prevention equipment and fire alarm system are fully functional and operating as designed;

- (b) Fire prevention equipment and fire alarm system are maintained, repaired and updated, as required, to ensure it is in compliance with these IFM Specifications and otherwise in accordance with the Technical Requirements and all Applicable Laws and Standards;
  - (c) Sprinkler systems and components shall be free of leaks and damage, with all parts functioning and operational in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements; and
  - (d) Fire extinguishers and other firefighting equipment are maintained in accordance with all Applicable Law and Standards.
- (5) Suitable systems and procedures shall be established and maintained by PPC to ensure that all fire prevention equipment is examined and tested, with the records of all such tests and the dates thereof prepared in an accurate and sufficiently detailed manner. PPC shall ensure that the fire protection equipment and fire alarm system is regularly monitored in accordance with the Maintenance Plan and tested in accordance with all Applicable Laws and Standards and Regulatory Approvals.

## **C.7.16. Elevators**

- (1) Elevators include the elevator cab, cabling, telephone, indicator lights, call buttons, door openers, controllers, pit drains, and all parts and components thereof.
- (2) PPC shall properly maintain the elevators to ensure that the elevator:
  - (a) Functions and operates safely and performs in accordance with these IFM Specifications and otherwise in accordance with the Technical Requirements;
  - (b) Meets all Applicable Laws and Standards and Regulatory Approvals; and
  - (c) Meets the Handback Requirements at the end of the Term.
- (3) PPC shall maintain the elevator to ensure that:
  - (a) The elevator is operational and available for use;
  - (b) The elevator car moves smoothly;
  - (c) The elevator car levels properly at each floor, without tripping hazards;
  - (d) The doors opening smoothly without binding;
  - (e) All elevator safety devices function properly;
  - (f) All parts and components, including indicator lights, call buttons, emergency telephone, door openers and controllers and performance such as speed operate in accordance with these Technical Requirements; and
  - (g) The elevator door and passenger compartment finishes must be free from peeling or discoloration and, where applicable, paneling must be securely fastened.

- (4) PPC shall ensure that the elevator is regularly maintained by qualified personnel. PPC shall ensure that the elevator shall be inspected annually in accordance with applicable Laws and Regulatory Approvals.
- (5) PPC shall immediately respond to all elevator alarms or telephone calls from an elevator and immediately initiate the required action to release trapped individuals.
- (6) In the event of failure in the operation of the elevator, trapped individuals must be released from the elevator as soon as practicable but in any event no later than one hour from notification.

## Section D - Ad Hoc Services

- (1) PPC shall provide Ad-Hoc Services on an as-requested and non-exclusive, fee for services basis. City has the right to procure services from alternate suppliers. Where City procures and manages the services, PPC may be responsible for coordination, reviewing plans, etc.
- (2) Fees for services provided shall be provided at market rates with only an agreed mark-up for Ad-Hoc services.
- (3) All Ad-Hoc Services must be pre-authorized in accordance with agreed procedures and policy. PPC shall not be compensated for costs incurred where work is performed without pre- authorization.
- (4) Ad Hoc Services will be initiated through the Help Desk by authorized City Representatives. Where requests are received from non-authorized individuals, PPC will advise the individuals to follow the established procedures.
- (5) PPC shall work with City to ensure the scope, definition of requirements, schedule and budgets, where applicable, are established prior to proceeding with the work.
- (6) If the request has an impact on the Infrastructure Facility or the IFM Project Site, PPC shall advise City of the impact and where necessary, Article 12 (City Change Process, Unilateral Change Orders, Deviation) of the Agreement will apply.
- (7) The fees for work performed as Ad-Hoc Services shall be included in the monthly invoice to City with a separate itemization and back-up documentation as agreed with City.
- (8) The Ad-Hoc Services includes the following services.
  - (a) Installation, relocation or removal of pictures, white boards or other similar items attached to the walls.
  - (b) Set-up, reconfiguration and arrangement of furniture and modular units as necessary.
  - (c) Minor moves, including reconfiguration or setup of furniture, moving and related infrastructure such as cabling and power provision.
  - (d) Minor furniture repairs.
  - (e) Support for and/or installation of audio visual or telecommunications or equipment.
  - (f) Key cutting and removing broken keys from locks.
- (9) Additional services may be requested by City and provided at the option of PPC.

## Section E - Renewal Work

### E.1 General Requirements

- (1) The objective of the Renewal Work is to ensure the long-term integrity and ongoing operational serviceability of the Infrastructure Facility through the delivery of the Renewal Work Plan which defines design life, specific replacement/refurbishment strategies.
- (2) PPC shall deliver Renewal Work to maintain the standards of the Infrastructure Facility in accordance with the approved Renewal Work Plan and result in an asset condition and Residual Life in accordance with Handback Requirements.
- (1) All standards for replacement or refurbishment as a result of the Renewal shall be in accordance with the Technical Requirements. Where replacements are not available to the required standards, they may be substituted with similar equivalent or higher standard materials or equipment. Substitutions must be fully documented, and equivalence demonstrated to the satisfaction of City.

### E.2 Renewal Work Plans and Reports

- (1) PPC shall:
  - (a) Provide an initial 30-year Renewal Work Plan prior to Substantial Completion identifying the renewal projects planned in each Contract Year. The Renewal Work Plan shall be provided in spreadsheet format with assets identified to the Uniformat II level 3 or equivalent detail by row. For each row, the columns shall indicate the estimated design life with additional columns for each year of the Operating period and the estimated cost for the Renewal Work for each asset in the respective year it is planned. The source may be a software solution however the information must also be provided to the City in spreadsheet format. City and PPC shall agree upon acceptable format of Renewal Work Plan at least 6 months prior to Substantial Completion.
  - (b) Provide a revised Renewal Work Plan to the end of the IFM Period annually as part of the Annual Service Plan, reflecting any changes to the planned projects
  - (c) Provide a Renewal Work schedule for each subsequent Contract Year at least 3 months prior to the commencement of the Contract Year. The s should identify the projects scheduled for that Contract Year, the planned start and completion dates and potential impacts on SFMTA O&M Services. Where schedules have a potential impact on SFMTA O&M Services, City may require PPC to change their schedule and/or provide a plan to demonstrate mitigation of impact or risk to SFMTA O&M Services.
  - (d) Provide a summary of Renewal Work completed or in progress as part of the Annual Service Plan.
  - (e) Provide a summary and status of completed, in progress, and upcoming work in the monthly management reports and meetings.

## **E.3 Commissioning**

- (1) PPC shall commission or re-commission components or systems as required following any Renewal Work activity which may impact operational efficiency or effectiveness of the system or component.

## **E.4 Facility & System Condition Index**

- (1) PPC shall prepare and submit to City every five (5) years a Facility Condition Index (“FCI”) and System Condition Index (“SCI”). The FCI and SCI will be no more than 0.15, unless approved by City and only based on appropriate justification provided by PPC for the deviation and confirmation that the Handback Requirements will be met. The FCI and SCI will be measured and calculated by a third party and be included in the report prepared for the Joint Technical Review.
- (2) The FCI shall be calculated in accordance with accepted industry practice by dividing the maintenance, repair, and replacement of the Infrastructure Facility by the current replacement value of the Infrastructure Facility.

## Section F - Handback Requirements

### F.1 Handback Services

#### F.1.1. General Requirements

- (1) Not earlier than 365 days and not later than 90 days prior to the end of the Term, PPC shall perform and deliver all of the requirements as detailed in this section.
- (2) PPC shall assign a Move-In Manager and attend Move-In meetings as needed by City to ensure transfer of knowledge and information from PPC to City or City's designated entity.
- (3) PPC shall provide training to personnel who may replace PPC personnel. This will include job shadowing and an overlap period of at least two weeks.
- (4) All data and information used in the administration and management of the Infrastructure Facility shall be turned over to City in non-proprietary formats and where systems are currently in use, provide City with an opportunity to licence, or take over the licence, of those systems.

#### F.1.2. Handback Requirements

- (1) At the end of the Term, the PPC shall, at no cost to the City, surrender the Infrastructure Facility to the City in a condition that is as follows:
  - (a) The Infrastructure Facility will be in a condition so that each Maintained Element has a Residual Life of not less than indicated in Appendix C of this Exhibit 18 (Technical Requirements).
  - (b) The performance of the asset shall be at a level commensurate with the performance to be expected from a Well-Maintained Asset and in accordance with the findings and recommendations following the last Joint Technical Review performed. For the purposes of this article a Well-Maintained Asset is defined as an asset that has received regular and demonstrable routine service and Scheduled Maintenance as prescribed by the supplier, manufacturer and/or installer of the asset and whose age-driven performance degradation is no greater than that identified in open-source data published by the supplier, manufacturer and/or installer.
  - (c) Designed and constructed in accordance with the applicable requirements in the Project's Technical Requirements.
  - (d) Managed and maintained in accordance with the applicable requirements set forth in this IFM Specification and the Technical Requirements.
  - (e) Required to achieve an FCI score of 0.10 or less at the end of the IFM Period and as determined by the Handback Requirements defined in this Section.

- (2) At the end of the Term, the PPC shall provide and leave on site the following supplies of spare parts and consumables:
  - (a) A 12 month supply of spare parts based on an analysis of emergency /critical spare part requirements that includes long lead time or specialty items as necessary to ensure reliability and continuous function as well as other spare parts based on the historical consumption of all spare parts.
  - (b) A 12 month supply of consumables for maintenance and repair requirements based on historical consumption.
  - (c) A one month supply of consumables for cleaning, landscaping, pest control and any other non-maintenance and repair services.
  - (d) PPC shall provide an electronic inventory of spare parts and an electronic inventory of consumables with the supply/part description, manufacturer, part number, quantity, location and the supplier.

## F.2 Handback

- (1) PPC shall comply with Section 8.6 of the Agreement with respect to Handback. The Handback Survey may be combined with a Joint Technical Review (JTR) as appropriate depending on timing and in the sole discretion of the City.
- (2) If either the PPC or the City determines from the Handback Inspection that any element of the Infrastructure Facility will not meet the Handback Requirements through the PPC implementing the established Maintenance Plan over the remainder of the IFM Period, within 60 days of completion of the Handback Inspection the PPC will submit to the City the PPC's plan (i.e., a "Handback Requirements Recovery Plan") to perform additional work needed to meet the Handback Requirements at the end of the IFM Period (the "Handback Requirement Recovery Work"). Such a plan will include a schedule and cost estimates for the Handback Requirements Recovery Work, which will be the sole responsibility of the PPC under the terms of the Project Agreement.
- (3) The City may review and comment on the Handback Requirements Recovery Plan. Such review includes the adequacy of the Handback Requirements Recovery Work and reasonableness of the PPC's schedule and cost for the proposed Handback Requirements Recovery Plan implementation.

## Section G - Performance Measurements

REF.	Service	Measure	LEVEL	Response	Rectification	FREQ.	Points	Penalty
Sect.B	General Management Services Management and Administration	PPC to provide administrative and management services in accordance with these IFM Specifications	MED	N/A	N/A	Per Failure Event	5	\$300
B.8.1.2	General Management Services Management and Administration	IFM Manager (or designate) provided by PPC for the Infrastructure Facility available and contactable 24 hours, 365(6) days/year	MAJOR	N/A	N/A	Per Calendar Day	10	\$650
B.17	General Management Services Management and Administration	PPC shall at all times have in place the Performance Monitoring Program for all of the IFM Services in accordance with these IFM Specifications	MAJOR	N/A	N/A	Per Calendar Day	10	\$650
B.8.1.6	General Management Services Management and Administration	All PPC employees and Contractor employees have received orientation training prior to starting work.	MED	N/A	N/A	Per Calendar Day	5	\$300

REF.	Service	Measure	LEVEL	Response	Rectification	FREQ.	Points	Penalty
Sect.B	General Management Services Management and Administration	All PPC employees are appropriately trained, and records maintained in accordance with these IFM Specifications	MED	N/A	N/A	Per Contract Month	5	\$300
B.8.1.2	General Management Services Management and Administration	Proof of licenses, qualifications and registrations provided to City Representative for all PPC Staff annually.	MAJOR	N/A	N/A	Per Failure Event	10	\$650
B.18	General Management Services Management and Administration	Compliance with all Applicable Law and Standards.	MAJOR	N/A	N/A	Per Failure Event	10	\$650
B.8.1.6	General Management Services Reporting	Prepare, submit and update Service Reports in accordance with these IFM Specifications.	MED	N/A	N/A	Per Failure Event	5	\$300
B.8.1.5	General Management Services Reporting	Prepare, submit and update Performance Monitoring Report in accordance with these IFM Specifications.	MAJOR	N/A	N/A	Per Contract Month	10	\$650
B.14 (4)	General Management Services Reporting	The status on all statutory testing is reported to City on a monthly basis or as per applicable Law.	MAJOR	N/A	N/A	Per Contract Month	10	\$650

REF.	Service	Measure	LEVEL	Response	Rectification	FREQ.	Points	Penalty
B.3	General Management Services IFM Services Procedures & Documentation	Prepare, submit and update all IFM Services Procedures in accordance with these IFM Specifications	MED	N/A	N/A	Per Failure Event	5	\$300
B.10	General Management Services IFM Services Procedures & Documentation	Prepare, submit and update the IFM Services Procedures.	MAJOR	N/A	N/A	Per Failure Event	10	\$650
B.18	General Management Services IFM Services Procedures & Documentation	Prepare, submit and update 5-Year and detailed 1 Year Scheduled Maintenance Plans in accordance with these IFM Specifications	MAJOR	N/A	N/A	Per Non	10	\$650
B.3	General Management Services IFM Services Procedures & Documentation	Prepare, submit and update Renewal Work Plans in accordance with these IFM Specifications.	MAJORx2	N/A	N/A	Per Non	20	\$1300
B.6	General Management Services IFM Services Procedures & Documentation	Maintain appropriate records in relation to all PPC permits, licenses and approvals.	MAJORx2	N/A	N/A	Per Failure Event	20	\$1300

REF.	Service	Measure	LEVEL	Response	Rectification	FREQ.	Points	Penalty
B.6.1(4)	General Management Services IFM Services Procedures & Documentation	Update all As-Built drawings in accordance with these IFM Specifications	MAJORx2	N/A	N/A	Per Failure Event	20	\$1300
C.6.7.1 C.6.7.2	Move-In Services	Provision of Move-In In Services in accordance with these IFM Specifications	MED	N/A	N/A	Per Failure Event	5	\$300
E.2	Move-In Services	Prepare, submit and update Move-In Plan in accordance with these IFM Specifications	MAJORx2	N/A	N/A	Once	20	\$1300
B.3	Move-In Services	Staff involved in Move-In in accordance with these IFM Specifications	MEDx2	N/A	N/A	Per Failure Event	10	\$600
C.6.1	Help Desk Services	Help Desk Services provided in accordance with these IFM Specifications.	MEDx2	N/A	N/A	Per Calendar Day	10	\$600
B.25	Help Desk Services	Service Requests and transactions are categorized and recorded in accordance with these IFM Specifications	MAJORx2	N/A	N/A	Per Failure Event	20	\$1300
B.25.1(3)	Help Desk Services	The Help Desk Service (by phone and web) is available 24 hours per day, 365(6) days per year.	MAJORx2	N/A	N/A	Per Calendar Day	20	\$1300

REF.	Service	Measure	LEVEL	Response	Rectification	FREQ.	Points	Penalty
B.25.1(1)	Utilities Management Services	Utilities Management Services are delivered in accordance with these IFM Specifications	MED	N/A	N/A	Per Failure Event	5	\$300
B.19	Utilities Management Services	Monthly Utility Analysis conducted in accordance with these specifications.	MAJORx2	N/A	N/A	Per Contract Month	20	\$1300
B.19.2(2)	Environmental Management Services	Environmental Management Services are delivered in accordance with these IFM Specifications	MED	N/A	N/A	Per Failure Event	5	\$300
B.19.20	Environmental Management Services	PPC shall put programs in place to ensure monitoring, inspection, testing, handling, storage and clean up as required for all elements of the EMS.	MEDx2	N/A	N/A	Per Calendar Day	10	\$600
B.21	Environmental Management Services	No environmental releases, spills or noncompliance.	MAJOR	N/A	N/A	Per Event	10	\$650
B.21	Environmental Management Services	Prepare, submit and update an annual environmental compliance statement	MAJORx2	N/A	N/A	Per Non	20	\$1300
B.22	Environmental Management Services	Achieve LEED EBOM certification as per these IFM Specifications	MAJORx2	N/A	N/A	Per Calendar Week	20	\$1300
B.22.2	Emergency Management Services	Emergency Management Services are delivered in accordance with these IFM Specifications	MEDx2	N/A	N/A	Per Failure Event	10	\$600

REF.	Service	Measure	LEVEL	Response	Rectification	FREQ.	Points	Penalty
B.22	Emergency Management Services	PPC has at all times its own contingency plan in place.	MAJORx2	N/A	N/A	Per Failure Event	20	\$1300
B.22.2(2)	Emergency Management Services	PPC has response and mitigation plans for emergency situations in accordance with these IFM Specifications.	MAJORx2	N/A	N/A	Per Failure Event	20	\$1300
B.22.4(2)	Emergency Management Services	PPC has comprehensive fire management plan in place at all times.	MAJORx2	N/A	N/A	Per Failure Event	20	\$1300
B.23	Quality & Performance Management Services	Maintain and use an IFM Management Plan to manage quality in accordance with these IFM Specifications	MEDx2	N/A	N/A	Per Calendar Day	10	\$600
B.23.3.2	Quality & Performance Management Services	Conduct quality inspections in compliance with the IFM Quality Management Plan.	MAJORx2	N/A	N/A	Per Contract Quarter	20	\$1300
B.23.2	Quality & Performance Management Services	Conduct occupant satisfaction surveys in accordance with these IFM Specifications	MAJORx2	N/A	N/A	Per Contract Year	20	\$1300
B.23	Quality & Performance Management Services	Conduct transaction satisfaction surveys in accordance with these IFM Specifications	MAJORx2	N/A	N/A	Per Contract Quarter	20	\$1300

REF.	Service	Measure	LEVEL	Response	Rectification	FREQ.	Points	Penalty
B.16	Quality & Performance Management Services	Provide action plan(s) as required by these IFM Specifications	MEDx2	N/A	N/A	Per Failure Event	10	\$600
B.16(2)(f)	Quality & Performance Management Services	Implement action plan(s) as agreed between the City and PPC.	MEDx2	N/A	N/A	Per Failure Event	10	\$600
B.16	Quality & Performance Management Services	% satisfaction score for each service category on the occupant satisfaction survey no more than 5% lower than the baseline.	MAJORx2	N/A	N/A	Per Contract Quarter	20	\$1300
B.16	Quality & Performance Management Services	% satisfaction score for the Transaction Satisfaction Survey no more than 5% lower than the baseline.	MAJORx2	N/A	N/A	Per Contract Quarter	20	\$1300
B.16.3(b)	Maintenance Services	Landscaping Services are delivered in accordance with these IFM Specifications	MED	N/A	N/A	Per Failure Event	5	\$300
B.16.3(c)	Cleaning Services	Cleaning Services are delivered in accordance with these IFM Specifications.	MED	N/A	N/A	Per Failure Event	5	\$300
B.16.1	Solid Waste Collection, Recycling and removal Services.	Solid Waste Collection, Recycling and Removal Services are delivered in accordance with these Specifications	MED	N/A	N/A	Per Failure Event	5	\$300

REF.	Service	Measure	LEVEL	Response	Rectification	FREQ.	Points	Penalty
B.16.2	Maintenance Services	Maintenance Services are delivered in accordance with these IFM Specifications	MAJOR	N/A	N/A	Per Failure Event	10	\$650
C.4	Maintenance Services	100% of regulatory requirements completed within the planned period.	MAJOR	N/A	N/A	Per Contract Month	10	\$650
C.5	Maintenance Services	90% of non-regulatory Scheduled Maintenance completed within the planned period.	MAJOR	N/A	N/A	Per Contract Month	10	\$650
C.2	Maintenance Services	Provision and maintenance of a CAFM System in accordance with these IFM Specifications	MAJOR	N/A	N/A	Per Calendar Day	10	\$650
C.6	Maintenance Services	Commissioning of all new systems and equipment based on approved commissioning procedures.	MAJORx2	N/A	N/A	Per Failure Event	20	\$1300
C.6.3	Renewal Work	Renewal Work delivered in accordance with these IFM Specifications.	MAJORx2	N/A	N/A	Per Contract Month	20	\$1300
C.6.3	Response & Rectification	Priority 1 requests are Responded to within the Response Time	MAJOR	See B.18.1.2		Per Failure Event	10	\$650
C.6.6	Response & Rectification	Priority 2 requests are Responded to within the Response Time	MED	See B.18.1.2		Per Failure Event	5	\$300
C.6.2	Response & Rectification	Priority 3 requests are Responded to within the Response Time	MINOR	See B.18.1.2		Per Failure Event	1	\$75

REF.	Service	Measure	LEVEL	Response	Rectification	FREQ.	Points	Penalty
E.1	Response & Rectification	Priority 1 requests are Rectified within the Rectification Time	MAJOR	See B.18.1.2		Per Failure Event	10	\$650
B.18.1.2	Response & Rectification	Priority 2 requests are Rectified within the Rectification Time	MED	See B.18.1.2		Per Failure Event	5	\$300
B.18.1.2	Response & Rectification	Priority 3 requests are Rectified within the Rectification Time	MINOR	See B.18.1.2		Per Failure Event	1	\$75
B.18.1.2	Availability Failures	Availability Failures are Responded to within the Response Time	N/A	See B.18.1.3		See Exhibit 4 Payment Mechanism		
B.18.1.2	Availability Failures	Availability Failures are Rectified within the Rectification Time	N/A	See B.18.1.3		See Exhibit 4 Payment Mechanism		
[Placeholder for DBE requirements]								

## Appendix A – Space Tolerances

The below document established tolerance levels whereby deviations from the Performance Requirements ('Design') established in Division 3 (Design Criteria) of Exhibit 18 (Technical Requirements), constitute Service Failures or Availability Failures, as required.

### Temperature Tolerances:

For the purposes of interpreting the Table 1 – Performance Parameters for Space Temperatures below:

- A Service Failure will occur if the temperature is outside of the Performance Tolerance range. For greater clarity, a Service Failure will not occur if the temperature is within the provided range ('+/-')
- An Availability Failure will occur if the temperature is below the Availability Threshold in Winter, or exceeds the Availability Threshold in Summer
- Note that these tolerances are required during core hours only – City to agree with PPC on appropriate setback times during Commissioning.

Table 1 – Performance Parameters for Space Temperatures

Area/Item	Winter Parameters			Summer Parameters		
	Design	Performance Tolerance	Availability Threshold	Design	Performance Tolerance	Availability Threshold
<b>1. Office Areas</b>						
Office Areas	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
<b>2. Parking Areas</b>						
Parking L3 & L4	65°F			Ambient		
<b>3. Bays &amp; Shops</b>						
60' Bus Repair Bay	65°F	+/-4°F	59°F	Ambient		
60" Bus Prev Maint Bay	65°F	+/-4°F	59°F			
60" Bus Tire Bay	65°F	+/-4°F	59°F			
60' Bus Minor Body Repair	65°F	+/-4°F	59°F			
60' Bus Chassis Wash	55°F	+/-4°F	49°F			
Common Work Area	65°F	+/-4°F	59°F			
Portable Equip Storage	65°F	+/-4°F	59°F			
Tool Box Storage	65°F	+/-4°F	59°F			
AC Shop Storage	65°F	+/-4°F	59°F			
Battery Rebuild Shop	65°F	+/-4°F	59°F			
Tire Shop Storage	65°F	+/-4°F	59°F			

Area/Item	Winter Parameters			Summer Parameters		
	Design	Performance Tolerance	Availability Threshold	Design	Performance Tolerance	Availability Threshold
3.13 Lube Compressor Room	55°F	+/-4°F	49°F	Ambient		
Minor Body Shop	65°F	+/-4°F	59°F	Ambient		
Electronic Bench Shop	65°F	+/-4°F	59°F	74°F	+/-4°F	80°F
<b>4. Fare Box &amp; Clipper Card Reader Repair</b>						
Gen Module Offices	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
Storage & Shops	65°F	+/-4°F	59°F	Ambient		
<b>5. Service &amp; Clean</b>						
Supervisor Office	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
Service Position	65°F	+/-4°F	59°F	Ambient		
Bus Wash Bay/Water Reclamation	55°F	+/-4°F	49°F	Ambient		
Cleaning Equip Storage	Per Code	+/-4°F		Per Code	+/-4°F	
<b>6. Parts</b>						
Parts Areas	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
Parts Lockers	Per Code	+/-4°F		Per Code	+/-4°F	
Break Room	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
Parts Window/Shopkeeper/Parts Storage/Ship & Rec	65°F	+/-4°F	59°F	74°F	+/-4°F	80°F
Rec Office	65°F	+/-4°F	59°F	Ambient		
Battery Storage	65°F	+/-4°F	59°F	Ambient		
<b>7. Maintenance - Administration</b>						
All Areas	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
<b>8. Operations - Administration</b>						
All Areas	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
<b>9. Transit Service (MRO)</b>						
All Areas	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
<b>10. Shared</b>						
Conf/Fit Rooms	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
Fitness Room	65°F	+/-4°F	59°F	74°F	+/-4°F	80°F
Building Engineer/Storage	65°F	+/-4°F	59°F	Ambient		
Revenue Office	65°F	+/-4°F	59°F	Ambient		

Area/Item	Winter Parameters			Summer Parameters		
	Design	Performance Tolerance	Availability Threshold	Design	Performance Tolerance	Availability Threshold
Meet & greet	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
Security Office	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
Lactation Room	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F
<b>11. Training</b>						
All Areas	68°F	+/-4°F	62°F	74°F	+/-4°F	80°F

## Bus Wash Floor Area Heating

For the purposes of the Bus Wash Floor Area Heating Area:

- An Availability Failure will occur when the temperature drops below the minim design tolerance of 49°F

## Ventilation Tolerances:

For the purposes of ventilation, performance will be monitored through space temperature.

## Lighting Levels:

For the purposes of Space Lighting:

- A Service Failure will occur when the lighting is below the Minimum Design as identified in Table 1 – Performance Parameters for Space Temperatures below, during core hours only
- An Availability Failure will occur when lighting level is below the Minimum Design and deemed to be unsafe for work, as determined by the City, at all times.

Table 2 – Performance Parameters for Space Lighting

Area/Item	Lighting Parameters		
	Minimum Design (fc)		Comment
<b>10.Shared</b>			
Building Eng/Building Storage	20		
Security Office	35		
Lobby	35		

## Plumbing Systems:

For the purposes of Domestic Hot Water:

- A Service Failure will occur if the temperature is outside of the Performance Tolerance range as identified in Table 3 – Performance Parameters for Domestic Hot Water, but below the Availability Threshold. For greater clarity, a Service Failure will not occur if the temperature is within the provided Performance Tolerance range ('+/-')
- An Availability Failure will occur if the temperature is outside of the Availability Threshold range

**Table 3 – Performance Parameters for Domestic Hot Water**

Item	Design	Performance Tolerance	Availability Threshold
Domestic Hot Water	140°F	+/-5°F	+/-15°F

For the purposes of Shower Water Temperatures:

- A Service Failure will occur if the temperature is below the minimum Performance Threshold but equal to or greater than the minimum Availability Threshold as identified in Table 4 – Performance Parameters for Shower Temperature below. Alternatively, a Service Failure will also occur if the temperature is above the maximum Performance Threshold but equal to or below the maximum Availability Threshold.
- An Availability Failure will occur if the temperature is below the minimum Availability Threshold or above the maximum Availability Threshold
- Note the above Performance Requirements are to apply within the limits of the final system capacity

**Table 4 – Performance Parameters for Shower Temperature**

	Performance Thresholds		Availability Thresholds	
	Min	Max	Min.	Max.
Shower Water Temperature	100°F	105°F	95°F	110°F

For the purposes of Compressed Air

- An Availability Failure will occur if the provided compressed air pressure is below the minimum Availability Threshold or above the maximum Availability Threshold as identified in Table 5- Performance Parameters for Compressed Air System

**Table 5- Performance Parameters for Compressed Air System**

	<b>Availability Thresholds</b>	
	<b>Minimum</b>	<b>Maximum</b>
Compressed Air System	166.25 psi (175 psi - 5%)	183.75 psi (175 psi+5%)

## Appendix B - Summary of Reports

The following summarizes the reports and plans required by these IFM Specifications.

Note that other specific reporting requirements may exist however generally are included in a formal report as part of the list below.

This list is for convenience only and is not to be relied upon. The reporting requirements in the Technical Specifications should be consulted and shall be adhered to.

*Note that the term Service Report in the performance measurements includes all reporting requirements.*

### **Reports Submitted Monthly**

<b>Report Name</b>	<b>Description</b>
Maintenance Status Report	<p>PPC shall provide a report detailing the following:</p> <ul style="list-style-type: none"> <li>• Past month's performance on Demand Maintenance</li> <li>• Past month's performance on Scheduled Maintenance</li> <li>• Monthly Scheduled Maintenance activities for the upcoming month</li> </ul>
Operational Report	<p>PPC shall prepare on operations report with the following:</p> <ul style="list-style-type: none"> <li>• An executive summary</li> <li>• A summary of major activities and issues during the past month for each PPC service category as well as general responsibilities such as quality, risk management, OH&amp;S, Contractor procurement and management, etc.</li> <li>• A summary of all demand requests with statistics, graphs and analysis of trends and action to be taken based on the results</li> <li>• Human resources reporting including training, orientation, certificates, personnel and organizational changes, etc.</li> <li>• Statutory compliance</li> </ul>
Performance Monitoring Report	<p>The Performance Monitoring Report shall document all results and related failures along with the related deductions in accordance with Exhibit 4 (Payment Mechanism). A quarterly roll-up report shall be prepared to support invoicing and payment of the Quarterly Availability Payment.</p> <p>The Performance Monitoring Report shall also include a space trending report showing space temperatures during the period and identifying any rooms which have missed the required performance standards.</p>
Renewal Work Report	<p>PPC shall provide a report detailing the following:</p> <ul style="list-style-type: none"> <li>• Completed Renewal Work projects year-to-date</li> <li>• Renewal Work activities for the upcoming month</li> </ul>
System Availability Report	<p>PPC shall prepare a monthly report of the Performance Monitoring Program, comprised of a summary of all Service Failures and Availability Failures and the related performance details and applicable financial adjustment to the invoice in accordance with Exhibit 4 (Payment Schedule).</p>
Monthly Energy Report	<p>PPC shall prepare energy reports as required in Exhibit 12 (Energy Management)</p>

**Reports Submitted Annually**

<b>Report Name</b>	<b>Description</b>
Annual IFM Services Report	The Annual Summary report shall be provided by PPC to City no more than 20 Business Days following the completion of each Contract Year. This report shall be in a similar format to the monthly report however with an annual summary of results and information.
Annual Scheduled Maintenance and Renewal Work Schedule	PPC shall provide the Annual Scheduled Maintenance Schedule outlining major Scheduled Maintenance planned for the next Contract Year that may impact SFMTA O&M Services. PPC shall provide a planned Renewal Work schedule to the City annually on a date to be agreed with the City. This schedule shall include the proposed start and completion dates of each project.
Annual Service Plan	<p>PPC will develop the Annual Service Plan in accordance with the items listed below at a minimum. PPC may include additional information as appropriate.</p> <ul style="list-style-type: none"> <li>• A brief narrative overview or executive summary of PPC’s approach to delivery of IFM Services</li> <li>• The plan for delivery and provision of each of the IFM Services, including upcoming procurement activities, changes, audits, etc. along with potential impacts to City.</li> <li>• A detailed organizational and staffing plan for the upcoming Contract Year.</li> <li>• Activities or initiatives that may cause disruption to City or other users of the Facilities and the methods and/or accommodations PPC will implement to minimize such disruptions.</li> <li>• An analysis of past performance and upcoming changes to improve delivery of the IFM Services.</li> <li>• Recommendations for changes to any joint service protocols and procedures between PPC and City.</li> <li>• Any proposals for changes to IFM Services or the procedures that may impact SFMTA O&amp;M Services.</li> <li>• Subsequently the Annual Services Plan shall be reviewed and revised by PPC annually and re-submitted to City.</li> </ul>
IFM Services Procedures (revisions as necessary)	PPC shall develop IFM Services Procedures for the service areas to provide services in accordance with the relevant sections in Exhibit 18(Technical Requirements). These may be incorporated in PPC’s overall procedure documentation and may be standard procedures, however all unique City requirements are to be addressed.
Renewal Work Plan	<p>PPC shall:</p> <ul style="list-style-type: none"> <li>• Provide an initial 30-year Renewal Work Plan prior to Substantial Completion identifying the renewal projects planned in each Contract Year.</li> <li>• Provide a revised Renewal Work Plan to the end of the IFM Period annually as part of the Annual Service Plan, reflecting any changes to the planned projects.</li> </ul>

<b>Report Name</b>	<b>Description</b>
	<ul style="list-style-type: none"> <li>• Provide a summary of Renewal Work completed or in progress as part of the Annual Service Plan.</li> <li>• Provide a summary and status of completed, in progress, and upcoming work in the monthly management reports and meetings.</li> </ul>
Renewal Work Schedule	PPC shall: <ul style="list-style-type: none"> <li>• Provide Renewal Work schedule for each subsequent Contract Year at least 3 months prior to the commencement of the Contract Year.</li> <li>• The plans should identify the projects schedule for that Contract Year, the planned start and completion dates and potential impacts on SFMTA O&amp;M Services.</li> <li>• Where schedules have a potential impact on SFMTA O&amp;M Services, City may require PPC to change their schedule and/or provide a plan to demonstrate mitigation of impact of risk to SFMTA O&amp;M Services.</li> </ul>
Satisfaction Survey Report	PPC shall report results to City: <ul style="list-style-type: none"> <li>• Provide survey results and analysis within 30 days of the close of the survey for each occupant satisfaction survey or 30 days after each Quarter for the Transaction Survey</li> <li>• Provide an action plan within 45 days of the close of the survey</li> </ul>
Energy Analysis Report	PPC shall prepare energy reports as required in Exhibit 12 (Energy Management)

**Reports Submitted on an Ad-Hoc Basis**

<b>Report Name</b>	<b>Description</b>
Emergency Action Report	PPC shall provide an emergency action report following an Emergency that outlines the emergency, action taken and recommended mitigation to prevent future occurrences.
Performance Action Plans	Where the City (directly or through the PPC) observes a significant or consistent non-performance on any IFM Services, the PPC shall prepare a Performance Action Plan (“PAP”) upon request by the City. The PAP will be due five Business Days from the request of an alternate later date as identified by the City. The PAP submitted to City will, at a minimum, contain a summary of the issues raised by City, an analysis of the root causes of the issues, the steps that will be undertaken by PPC to address the issues and specific timeframes for such steps.
Report on permits, licenses and approvals associated with PPC work	The PPC shall provide an annual report on permits, licenses, and approvals associated with work conducted by PPC.

## Appendix C – Handback Residual Life Schedule

<b>Project Component</b>	<b>Residual Life</b>
Exterior Walls and Foundations	10 years
Roof membrane	5 years
Exterior Windows	10 years
Ceilings	10 years
Interior Walls and Partitions	10 years
Interior Windows	10 years
Domestic hot and cold water service	5 years
Chillers	10 years
Boilers	5 years
Cooling Towers	5 years
Air Handling Units	5 years
Low and medium voltage switchgear	10 years
Elevator cabs and panel boards	5 years
Vehicle Ramps	10 years
Flooring and parking surfaces	5 years
Compressed Air System	5 years
Fire Protection (fire pump, control panel, major sprinkler system components)	5 years
Heat Pumps, Chilled Beams, Large Fans > 1,000 CMF	5 years
Building Automation System	5 years
Standby Power System	10 years
Main Electrical Gear	10 years

## Appendix D – PPC Spaces

The following areas outlined from the Contract Drawings capture spaces that the PPC will have O&M and Lifecycle responsibility in accordance with these Technical Requirements:

Room Tag	Name	Floor	Department	O&M Responsibility	Lifecycle Responsibility
Unlabelled	LOBBY	Ground	09 - Shared	X	X
MEP020	MAIN ELECTRICAL ROOM	Ground	09 - Shared	X	X
MEP021	MECHANICAL ROOM	Ground	09 - Shared	X	X
MEP022	ELECTRICAL ROOM FOR CHARGERS	Ground	09 - Shared	X	X
01.1.02-65	FM SPARE PARTS STORAGE	Ground	FMO	X	X
09.1.08A	MAIN POINT OF ENTRY	Basement	09 - Shared	X	X
09.1.09	BICYCLE PARKING	Basement	09 - Shared	X	X
05.1.09	STAGING	Basement	05 - Parts	X	X
05.1.11	DOCK	Basement	05 - Parts	X	X
05.1.12	SHIPPING & RECEIVING	Basement	05 - Parts	X	X
09.1.14	TRASH/ RECYCLING/ COMPOST COMPACTOR	Basement	05 - Parts	X	X
09.1.18	ELECTRICAL ROOM ALLOWANCE	Basement	09 - Shared	X	X
09.1.19-01	MECHANICAL ROOM ALLOWANCE	Basement	09 - Shared	X	X
TBD	ELEV. CONTROL RM.	Basement	09 - Shared	X	X
MEP007	DCW BOOSTER ROOM	Basement	09 - Shared	X	X
MEP008	GREY WATER TANK	Basement	09 - Shared	X	X
MEP009	RAIN WATER TANK	Basement	09 - Shared	X	X
MEP010	PROCESSING PLANT	Basement	09 - Shared	X	X
MEP012	500,000 GALLON FIRE WATER TANK	Basement	09 - Shared	X	X
MEP013	INSTRUMENT ROOM	Basement	09 - Shared	X	X
UN0902	BYC FIRE PUMP	Basement	09 - Shared	X	X
UN0903	DIESEL STORAGE ROOM	Basement	09 - Shared	X	X
CSP01	CAR SHARE PARKING	Basement	Car Share Park	X	X
CSP02	CAR SHARE PARKING	Basement	Car Share Park	X	X
CSP03	CAR SHARE PARKING	Basement	Car Share Park	X	X
CSP04	CAR SHARE PARKING	Basement	Car Share Park	X	X

Room Tag	Name	Floor	Department	O&M Responsibility	Lifecycle Responsibility
CSP05	CAR SHARE PARKING	Basement	Car Share Park	X	X
UN001	STORAGE	Basement	FMO	X	X
UN002	STORAGE	Basement	FMO	X	X
UN003	STORAGE	Basement	FMO	X	X
FMOP01	FMO PARKING	Basement	FMO	X	X
FMOP02	FMO PARKING	Basement	FMO	X	X
FMOP03	FMO PARKING	Basement	FMO	X	X
09.1.01	LOBBY	Level 2	09 - Shared	X	X
09.1.08	TELECOMMUNICATION ROOM	Level 2	09 - Shared	X	X
09.1.12	SECURITY OFFICE	Level 2	09 - Shared	X	X
09.1.13-01	GENDER NEUTRAL ACCESSIBLE RESTROOM	Level 2	09 - Shared	X	X
09.1.19-02	MECHANICAL ROOM ALLOWANCE	Level 2	09 - Shared	X	X
09.1.19-03	MECHANICAL ROOM ALLOWANCE	Level 2	09 - Shared	X	X
09.1.19-04	CHILLER ROOM	Level 2	09 - Shared	X	X
09.1.19-05	MECHANICAL ROOM ALLOWANCE	Level 2	09 - Shared	X	X
09.1.19-07	BOILER ROOM	Level 2	09 - Shared	X	X
09.1.19-08	HVAC ROOM	Level 2	09 - Shared	X	X
09.1.19-09	MECHANICAL ROOM ALLOWANCE	Level 2	09 - Shared	X	X
MEP023	ELECTRICAL ROOM FOR CHARGERS	Level 2	09 - Shared	X	X
MEP024	ELECTRICAL ROOM FOR CHARGERS	Level 2	09 - Shared	X	X
MEP025	ELECTRICAL ROOM FOR CHARGERS	Level 2	09 - Shared	X	X
MEP026	ELECTRICAL ROOM FOR CHARGERS	Level 2	09 - Shared	X	X
UN103	STORAGE	Level 2	09 - Shared	X	X
UN203	SFMTA OPEN SPACE	Level 2	09 - Shared	X	X
01.1.02-65	FM SPARE PARTS STORAGE	Level 4	FMO	X	X
01.1.02-65	FM SPARE PARTS STORAGE	Level 3	FMO	X	X

---

## Division 8: Public Benefit Principles

[This document will be incorporated at a later stage as a reference document within the IF Project Agreement]

Page left blank intentionally

---

Division 9: SFMTA's  
Communications Division's Public  
Outreach and Engagement  
Requirements (POER) v.1.0

# Public Outreach and Engagement Requirements

v.1.0

## POETS

Public Outreach  
& Engagement  
Team Strategy



SFMTA

# Table of Contents

Introduction.....	3
Public Outreach and Engagement Requirements.....	4
Develop the Plan .....	4
Implement the Plan.....	7
Document the Plan.....	9
Accountability .....	10
Conclusion.....	10

Note to PPC:  
The following hyperlinks have been eliminated because they are only for internal use of SFMTA staff.

- Appendix
- Intranet
- Calendar

# Introduction

The San Francisco Municipal Transportation Agency (SFMTA) is committed to involving the people of San Francisco in the decisions that shape the city’s transportation system. This commitment is expressed in the agency’s [Strategic Plan](#) and through our ongoing investment in the Public Outreach Engagement Team Strategy (POETS). It is based on an understanding that:

- Those who are affected by government decisions should be informed and have an opportunity to participate in the decision-making process;
- The community’s trust in the public process directly affects our ability to deliver projects; and
- Most projects must meet legal requirements related to public notification and participation.

The agency’s approach to working with the communities we serve is reflected in our core values:

## RESPECT

We are courteous and constructive in our treatment of others. We recognize that our colleagues and their contributions are vital to the agency. We listen and directly engage our colleagues and the public to understand their needs and deliver effective services.

## INCLUSIVITY

We seek a variety of identities, abilities, and interaction styles to promote a diverse and fair workplace. We operate from the context of teamwork and positive intent. We serve the public and address historic inequities in transportation by including all communities in the agency’s decision-making processes.

## INTEGRITY

We are accountable for and take ownership of our actions. We are responsive and honor our commitments to our colleagues and stakeholders. We are transparent and honest in everything we do, from internal operations to external delivery.

To ensure consistent public communications and outreach across projects, the SFMTA established our Public Outreach and Engagement Team Strategy (POETS). The main components of POETS are:

**Requirements** for every project, **Resources** to support staff, **Relationships** with the community, and **Recognition** of outstanding work.

**This document presents the requirements for public outreach and engagement that every SFMTA project is expected to meet.** More information about the other components of the Public Outreach and Engagement Team Strategy, including supportive resources and recognition opportunities for staff, can be found on the POETS page located on the SFMTA intranet. The process of developing the SFMTA’s requirements and guidance involved extensive feedback from the community. It is strongly recommended that you review the summary of this valuable input in the [Appendix](#).

# Public Outreach and Engagement Requirements

To ensure a consistent approach throughout the agency, all managers and leads responsible for SFMTA projects that impact the public must ensure that their project teams do the following:

- **PLAN** for public outreach and engagement for the project
- **IMPLEMENT** the public outreach and engagement plan
- **DOCUMENT** the implementation of the plan and the feedback received

## Develop the Plan

Every SFMTA project must develop a Public Outreach and Engagement Plan at the outset of the project, and the project team must evaluate and revise the plan at each subsequent project phase. The plan should be reviewed within the division by the direct report manager and/or the POETS Division Lead. Each division is responsible for establishing a process to determine when a Public Outreach and Engagement Plan is considered complete and ready for submission to the POETS webpage. Whatever the protocol for deciding who submits the plan, the project manager/lead is ultimately accountable for ensuring that it occurs. **When the Public Outreach and Engagement Plan is considered complete according to the division's process, it must be uploaded to the POETS page on the SFMTA [intranet](#), where all Public Outreach and Engagement Plans are tracked. Keep in mind that every plan is a public document and may be reviewed at any time by SFMTA leadership and staff, city partners and members of the public.**

To help empower staff to meet these requirements, the agency provides a [Guide](#) and [Template](#) for creating a Public Outreach and Engagement Plan. These companion documents include guidance on doing a project needs assessment to identify stakeholders and impacts, writing a project brief, crafting key messages for target audiences, identifying the opportunities for public participation, selecting outreach and engagement techniques, establishing goals and measurable objectives, scheduling activities and tasks, evaluating the plan, and reporting back to the public.

At a minimum, every Public Outreach and Engagement Plan MUST include:

- Identification of who should be involved in developing the plan (staff, consultants, partners)
- Identification of project stakeholders, impacts, and decision space
- Early engagement of key stakeholders
- Use of multiple communication channels to reach audiences
- Compliance with language & accessibility requirements
- Consideration of the Racial Equity Action Plan and Toolkit
- Goals and measurable objectives for each phase of the project
- A method to document plan implementation and to collect data related to goals and objectives
- A strategy for outreach during all project phases, including detailed design and construction
- Sufficient budget to carry out the activities specified in the plan
- Coordination with other SFMTA projects that affect the project
- Coordination with other city partners who will be involved with the project

- A report submitted to the POETS webpage after each project phase

It is important to emphasize that the development of the Public Outreach and Engagement Plan should be a team effort. Those staff members who will be directly involved in the implementation of the plan should have input in the creation of the plan. Several aspects of the plan require careful consideration and judgement without hard and fast rules (e.g., stakeholder identification, impact analysis, budget). Involvement of key team members (including any consultants and partners) allows for a thoughtful and collaborative process and lays the groundwork for better understanding and successful implementation of the plan. In the case of projects with significant impacts on the community, it is also advisable to consult key stakeholders for their input as the plan is being developed (e.g., for advice on the most effective ways to keep particular communities informed).

Note that it is not mandatory to use the specific planning [Template](#) offered by POETS, but any Public Outreach and Engagement Plan must include comparable content regardless of the format, and any document used to satisfy these requirements must be uploaded to the POETS page on the SFMTA [intranet](#). The [Guide](#) and [Template](#) provide detailed instructions for the content of any Public Outreach and Engagement Plan.

## Programmatic Public Outreach and Engagement Plans

Every SFMTA project that impacts the public must implement its Public Outreach and Engagement Plan. Larger, more complex projects require their own detailed plans. In addition to large projects, the SFMTA routinely implements many smaller, similar projects (e.g., stop signs, signal changes) that can rely on a single, programmatic Public Outreach and Engagement Plan. Divisions that deliver such projects should develop programmatic outreach and engagement strategies that apply to typical projects in each category. Every small project must still consider community impacts, but the programmatic plan can be used as a template by each project. Only the programmatic plan that will serve as the template for projects in a given category must be uploaded to the POETS page on the SFMTA [intranet](#), not the plans for each project. However, every project that falls within a program category must have a plan based on the programmatic template. While project teams are not required to upload each plan to the POETS webpage, they are responsible for implementing the plan and can be held accountable. Project teams should also report to POETS Division Leads any lessons learned from individual projects that suggest changes needed to the programmatic plan template going forward.

### What is a “Project”?

For the purpose of these requirements, the SFMTA defines a project as, “A one-time effort to construct, acquire, replace, improve, expand, or rehabilitate the transportation system in the City and County of San Francisco.” The Public Outreach and Engagement Requirements apply to all capital projects, as well as one-time policy initiatives that are not capital in nature (including those that occur in multiple phases). Smaller, routine “projects” are sometimes classified as “operations.” Regardless of terminology, any action that impacts the public is subject to compliance with the Public Outreach and Engagement Requirements. As discussed below, there are specific guidelines for smaller, routine projects.

## Review the Public Outreach and Engagement Plan between Phases

The initial Public Outreach and Engagement Plan should describe the plan for public outreach and engagement for each phase of the project, with the assumption that the strategy for later phases will be adapted based on what is learned during implementation of earlier phases. The Public Outreach and Engagement Plan should be reviewed and updated at the end of each phase of the project. In cases where projects transition from SFMTA to another agency between phases, it is essential to coordinate with those city partners to maintain a consistent standard of outreach and engagement, even if the SFMTA is not the lead agency during a particular phase of the project. In order to achieve a successful transition for larger projects, POETS recommends funding for a Public Information Officer to work with the city partner(s) throughout the transition and until project completion.

There are good reasons to review the Public Outreach and Engagement Plan between phases. First, it gives the project team an opportunity to think about lessons learned at the completion of each phase and to incorporate those lessons into the next phase. Second, there is understandable uncertainty at the beginning of a project about the kind of public outreach and engagement that will be necessary during later phases (especially if the project will take years to complete).

## Internal Coordination

In planning for public outreach and engagement for a single project, it is important to know which other teams and projects within the SFMTA (including those in different divisions) might connect with, intersect or impact your project. Brief related staff and teams on your Public Outreach and Engagement Plan as early in the process as possible.

## Challenging Phases: Detailed Design and Construction

For projects that take years to complete, it is impossible to anticipate all aspects of outreach and engagement that will be needed to complete the project. The most challenging phases to include in the initial plan are detailed design and construction. While decision space is typically less during these phases (plans have been made, the project is legislated), it is essential to keep stakeholders informed and to continue to engage the community beyond the planning phase.

During the detailed design phase, it can feel to the community like the project is inactive. It is not uncommon for this phase to continue for several years, during which the community itself changes (there are new residents and merchants who never heard of the project and were not part of the planning phase). During the construction phase, project impacts are felt most acutely by the community and there may be new stakeholders affected who were not involved during project planning. Because these phases present unique challenges, the project team should closely review the original Public Outreach and Engagement Plan before detailed design and construction to create a more detailed and updated strategy. The [Appendix](#) provides examples of plans for the detailed design phase.

The City and County of San Francisco Construction Mitigation Program defines the measures that are required for construction mitigation for various kinds of projects (low, moderate and major impact). Construction Mitigation Plans should be created in advance of construction, developed in collaboration

with merchants and residents, and budgeted separately from the initial Public Outreach and Engagement Plan. The [Appendix](#) includes a summary of the program, along with a presentation and example plans.

## Submit the Plan

Every Plan must be uploaded to the POETS webpage upon completion and prior to implementation. The process of approving and submitting the plan is left to the discretion of each Division. Each division must determine its own protocol for deciding when a Plan is complete and ready to be submitted. Regardless of the division's process, project managers/leads are accountable for compliance at the project level.

## Implement the Plan

Once your Public Outreach and Engagement Plan is submitted to the POETS webpage, the project team is responsible for carrying it out. As noted above, the project manager/lead is ultimately accountable for implementation of the plan. The Public Outreach and Engagement [Guide](#) and [Template](#) provide advice and tools designed to help schedule and track activities. In addition, the SFMTA Public Outreach and Engagement Manager, the [POETS web page](#), Division Leads and [District Liaisons](#) can offer information and contacts to project teams as they implement their plans. The role of the POETS Division Leads is to ensure compliance with these requirements within each division and to provide support to project managers/leads and their teams, including referrals to appropriate resources. District Liaisons are designated staff members within the SFMTA who can provide geographically specific information and contacts to project teams.

## Compliance with Language Assistance Requirements

As a city department that receives federal funding, the SFMTA must follow both local rules (San Francisco's Language Access Ordinance) and federal rules (Title VI of the Civil Rights Act of 1964 and supporting guidance) regarding accessibility to our programs and services to ensure that all customers, regardless of their ability to read, speak, write and understand English ("limited-English proficient" or "LEP"), are informed and able to participate in our agency's decision-making processes. The SFMTA's 2016 Language Assistance Plan (LAP) details the agency's policies about providing both written (translations) and verbal (via interpreters or bilingual employees) language assistance for our limited-English proficient customers and other stakeholders.

The Language Assistance Plan includes maps detailing concentrations of limited-English proficient communities by language, which can be used as a resource when determining the language needs of those who are affected by the project. In general, and at a minimum, most public information pieces should be translated into Chinese, Spanish and Filipino (Tagalog), and all public communications and meeting notices must include the 311 "Free Language Assistance" tagline (included in the Public Outreach and Engagement Plan Guide). Public meeting and hearing notices and agendas, including those posted at SFMTA.com, must include the four-language 48 hours' notice and a staff person's phone number for requesting language assistance; LanguageLine telephonic interpretation services can be used to process requests from limited-English proficient customers via phone. The [Appendix](#) provides a LanguageLine

reference sheet and includes all language assistance taglines. Depending on content, transit related public information pieces might require additional translation support.

When considering language accessibility, the agency provides resources and training to assist with implementation. Guidelines and tips to providing language assistance can be found in the [Appendix](#). Specific language assistance questions and requests for individual consultation or staff training should be directed to SFMTA Regulatory Affairs Manager Kathleen Sakelaris at [Kathleen.Sakelaris@sfmta.com](mailto:Kathleen.Sakelaris@sfmta.com) or 415.701.4339.

## Planning for Equity

Regardless of the specific activities outlined in your Public Outreach and Engagement Plan, its implementation must be inclusive and equitable. The plan should include methods for soliciting feedback that engage and are accessible to those who have historically been underrepresented in the public process, including low-income households, people of color, youth, seniors, and people with disabilities.

The core principle that informs the practice of public outreach and engagement is that those who are affected or have been historically disenfranchised by government decisions have a right to be included in the decision-making process.

The SFMTA has worked with the Local and Regional Government Alliance on Race and Equity (GARE) to develop a Racial Equity Action Plan and Toolkit that promotes diversity and inclusion internally and with the communities we serve. This signals the agency's intention both to apply a racial equity lens to project-level planning and implementation, and to build the organization's capacity and skills to achieve greater equity as an overall outcome of our work.

While it may be more difficult and require more resources to reach and engage members of underrepresented communities, it is essential to make a deliberate effort to do so. Equity should be a primary consideration in establishing goals and objectives for the plan, and project teams should measure success with appropriate data. Teams should also seek to partner with stakeholders in developing and implementing the plan in order to achieve results that are meaningful to the community.

## Required Notification

When implementing any plan, the legal minimum distance for notification about the project should be treated as a starting point. In some cases, those neighborhoods and stakeholders who are affected by the project will extend beyond the minimum required distance, warranting broader notification. All Public Outreach and Engagement Plans — including programmatic plans for smaller projects — require an assessment of the project's impacts. The expectation is that every project team will plan for notification based on a thoughtful consideration of the anticipated impacts of the project and those community members who will actually be affected.

## Online Presence

Every SFMTA project is required to have an online presence, either a page on the agency website or an equally accessible and comparable alternative. At a minimum, the information posted online should include a project description, project history and current phase, opportunities for public input, and contact information for the project manager/lead and anyone else who is responsible for answering

questions about the project. If the website is designed to receive written questions or comments, it must be monitored regularly so that staff can reply in a timely manner if a response is appropriate.

## SFMTA Calendar

Every public meeting associated with the project must be posted on the SFMTA master [calendar](#) at least as early as the meeting is announced through other channels.

## Document the Plan

Project teams must track key indicators related to outreach and engagement by documenting:

- How the Public Outreach and Engagement Plan was implemented (and any changes in implementation from the original plan)
- Any input received from the public
- How public input influenced the project (and the reasons why or why not)
- How public input was presented to decision makers
- The indicators established for the plan's goals and objectives

At the end of each project phase the team must complete a brief summary of lessons learned and recommendations for the next project phase. When you complete this brief report ("Plan Evaluation" on page 11 of the [Template](#)), submit an updated version of your plan (including answers to the evaluation questions and any revisions to the plan itself) to the [POETS web page](#). Add a date to the file name to distinguish it from previous versions.

## Close the Feedback Loop

From the community standpoint, documentation of public input is essential to closing the "feedback loop." If the plan calls for public consultation, the stakeholders who participate should know how their input was conveyed to decision makers and whether it had any influence on the outcome. This can only happen if the project team documents public input and the process by which they took it into account. For this reason, the Public Outreach and Engagement Plan should always include a plan to report back to stakeholders at the end of each project phase.

From an internal perspective, planning for public outreach and engagement is an ongoing process, and each project team is expected to review and revise previous plans as the project moves through each phase. To make informed decisions, the team needs to know what was learned from public participation in earlier phases. Documentation at the project level also supports an accumulation of lessons throughout the agency that can inform future practice on other projects. It also provides elected and appointed officials with essential information to inform their decision-making.

# Accountability

All SFMTA projects that impact the public are subject to the Public Outreach and Engagement Requirements. Project managers are accountable for meeting the requirements, and failure to adequately plan for and implement public outreach and engagement can jeopardize project funding and delivery at any phase.

A [General Notice](#) from the Project Management Office specifies procedures to ensure compliance with these requirements. It states that the needs assessment should be conducted at project inception, and the expected cost of outreach and engagement should be included in the original project budget. The Public Outreach and Engagement Plan must be integrated into the project's pre-development report, ensuring that it will be completed no later than the end of the planning phase.

Throughout all phases of the project, there are multiple opportunities for review of the Public Outreach and Engagement Plan. These include:

- Review of funding requests for planning and preliminary engineering through the Project Integration Committee and the Transportation Capital Committee;
- Review of phase milestones by the Project Management Office before approval of funding for subsequent project phases;
- Review of project implementation by the Project Delivery Technical Advisory Committee;
- Interdepartmental reviews of proposed street changes by the Transportation Advisory Staff Committee (TASC) and related internal reviews by the Pre-TASC Engineering public hearings;
- Development of a Construction Mitigation Plan, which is explicitly required to comply with the Public Outreach and Engagement Requirements.

In addition to these structured opportunities for review, every plan is subject to random audit by agency leadership. The POETS team is available to provide support in developing strategies and budgets for outreach and engagement to ensure that projects comply with the requirements.

# Conclusion

These requirements are meant to hold the SFMTA to a high standard of practice for public outreach and engagement. At the same time, the POETS program is designed to give staff members the support they need to meet the requirements. The Public Outreach and Engagement Plan [Guide](#) and Public Outreach and Engagement Plan [Template](#), companion documents to these requirements, provide a blueprint for how to develop, implement and document an appropriate strategy for each project. In addition, the POETS team and Division Leads are available to offer guidance on an ongoing basis as project teams create and revise their plans. As part of that support, the POETS webpage includes a wealth of resources and training opportunities available to staff members who work with the public.

The purpose of the Public Outreach and Engagement Requirements is to ensure that those who are affected by the SFMTA's decisions and actions are included in the decision-making process, and that the



interests of the community are carefully considered as the agency carries out its mission of maintaining and improving San Francisco's transportation system. A related goal of these requirements is to give every SFMTA project the best possible chance to be delivered smoothly, anticipating challenges and avoiding extreme course corrections. Thoughtful planning is the key, and the needs and concerns of the community must be an integral part of that process. In the end, the POETS approach of establishing high standards and providing the necessary support to meet them is intended to strengthen the position of staff who are responsible for working with the public. By taking the time up front to plan for meaningful public outreach and engagement, project teams are more likely to have a positive experience in the community and will be more confident and better prepared to deliver their projects with outstanding results.

---

Division 9 – Exhibit A

## Public Outreach and Engagement Plan Guide

# Public Outreach and Engagement Plan Guide

v.1.0

## **POETS**

Public Outreach  
& Engagement  
Team Strategy



**SFMTA**

# Table of Contents

Introduction.....	3
Guide to the Public Outreach and Engagement Plan.....	4
Project Overview.....	4
Project Needs Assessment.....	4
Goals and Objectives.....	5
Key Messages.....	7
Outreach and Engagement Techniques.....	7
Schedule and Responsibilities.....	8
Budget.....	8
Plan Review.....	9
Plan Evaluation.....	9
Report Back to Stakeholders.....	10
Tips for Developing a Public Outreach and Engagement Plan.....	10
Tip 1: Determine the Kind of Plan the Project Requires.....	10
Tip 2: Scale the Plan to Fit the Project.....	11
Tip 3: Begin Outreach and Engagement as Early as Necessary.....	11
Tip 4: Coordinate with Other SFMTA Projects and City Partners.....	12
Tip 5: Comply with Language Access Requirements.....	12
Tip 6: Make Outreach and Engagement Accessible and Equitable....	13
Tip 7: Be Thoughtful about Stakeholder Notification.....	13
Tip 8: Plan for Outreach during Detailed Design and Construction...	14
Tip 9: Consider Opportunities to Expand Engagement.....	14
Tip 10: Update the Plan between Project Phases.....	14
The Spectrum of Public Participation.....	15

# Introduction

The San Francisco Municipal Transportation Agency (SFMTA) moves nearly a quarter million people daily within the city of San Francisco. To fulfill the agency's mission to "connect San Francisco through a safe, equitable, and sustainable transportation system" the agency undertakes more than 200 projects at any given time, including major transit corridor investments, safer designs for local streets, and improvements to all modes of transportation throughout the city.

As the transportation agency for the City and County of San Francisco, the SFMTA has a responsibility to keep the public informed as part of our work. The agency is committed to fulfilling these responsibilities and going above and beyond to engage the public in our work. We are committed to strengthening and sustaining our relationships with the community and to ensuring that the agency delivers quality transportation projects to those who need them. This commitment is expressed in the SFMTA's [Strategic Plan](#) and through our ongoing investment in the Public Outreach and Engagement Team Strategy (POETS).

The purpose of this document is to guide those staff members who conduct public outreach and engagement and clarify the agency's expectations for what must be included as part of the public outreach and engagement planning process. This guide is a companion to the [Public Outreach and Engagement Plan Template](#), which project teams can use to develop a plan that meets our agency's requirements for conducting public outreach and engagement. The [Public Outreach and Engagement Requirements](#) outline what is expected to occur as part of agency outreach to the public on any given project.

The first section of this document provides instructions for using the fillable Template to create a Public Outreach and Engagement Plan. The second section presents general principles, practices and tips to consider when developing a plan. The final section summarizes the "Spectrum of Public Participation," a helpful framework for thinking about your plan's purpose and goals.

The process of developing the SFMTA's requirements and guidance involved extensive feedback from the community. The agency heard from a range of diverse voices – those who both benefit from our work and are impacted by our projects. A summary of this valuable community input is included in the [Appendix](#).

# Guide to Public Outreach and Engagement Planning

This section provides a step-by-step guide to develop a project-level Public Outreach and Engagement Plan in accordance with the agency's [Public Outreach and Engagement Requirements](#). Each heading below corresponds to the [Public Outreach and Engagement Plan Template](#), which provides a format for writing a project-level plan. This section supplements the instructions in the Template.

**When a project's Public Outreach and Engagement Plan is complete, it is mandatory to submit it to the POETS webpage on the SFMTA intranet [here](#). Note that each division determines its own process for deciding when a plan is ready to be uploaded and who is responsible for doing so. Keep in mind that the Public Outreach and Engagement Plan is a public document and may be reviewed by SFMTA leadership and staff, city partners and members of the public.**

## Project Overview

The purpose of the Project Overview is to summarize the project scope, purpose, benefits and timeline. It also includes some early considerations about decision space – constraints and decisions that have already been made, and decisions that are yet to be made. When preparing this information, take into consideration that the overview may be used for the project webpage, fliers, etc. Note that the next step (Project Needs Assessment) adds valuable information – project impacts, stakeholders, opportunities for public input – that can be added later to the basic information in the Project Overview.

## Project Needs Assessment

A Project Needs Assessment is critical to the planning process. It is your chance to think carefully about those who will be affected by the project, the purpose of your outreach and engagement strategy, and the relationships that will matter most for the success of the project.

The Project Needs Assessment should help to identify three things: stakeholders, impacts and decision space. Note that while the Template presents the identification of these as sequential steps, they are in

Public participation is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process.

- IAP2 Core Value

fact interdependent, and the assessment should be more iterative than linear. As you complete the following steps, consider how each of the components informs the others. For example, understanding what decisions the public can influence might affect the potential impacts and identification of stakeholders.

Within the Project Needs Assessment, the **stakeholder analysis** identifies those audiences that need to be informed and/or engaged. It also suggests a method of gauging the level of outreach that is required. Research on stakeholders should clarify their roles, the degree to which they are organized, their capacity to participate, and specific considerations for ensuring an inclusive and culturally appropriate public process (language, accessibility, barriers to participation, etc.). The Template helps to

identify which key stakeholders should be contacted early on, to make them aware that the project team will be reaching out to the community. Valuable internal resources to help gather the information for the stakeholder analysis include the Public Outreach and Engagement Team, District Liaisons, POETS Division Leads, and the Regulatory Affairs Manager (for help with language access).

The **impact and interest analysis** in the Project Needs Assessment suggests how extensive the outreach and engagement effort should be, and the level of resources that will be needed to carry it out. The table in the Template is designed to be a starting point for discussion among members of the project team. Once you answer the ten questions about anticipated impacts and the level of public interest in your project, you will end up with an average score on a scale of very low to very high. While there is no hard and fast rule about how to interpret this number, a higher score generally suggests that more effort and resources will be needed for community outreach. Answering the diagnostic questions as a team (including the project manager, communications lead, relevant consultants and any staff members who will be doing outreach and engagement) will give you the best chance possible to accurately gauge the public's response to your project.

The **decision space analysis** in the Project Needs Assessment identifies the opportunities for stakeholders to provide input and potentially influence the project. Decision space is normally limited by a variety of constraints: agency goals, direction from policymakers, previous decisions, legal requirements, technical feasibility, available budget, etc. Within these constraints, it is always important to consider whether the decision space can be expanded beyond simply telling the public what is going to happen. Even during construction, when decision space is typically most limited, there might be room to consider input on timing, sequencing or mitigation to address community concerns. One reason for seeking to expand the decision space is to demonstrate the agency's commitment to listen to the public. Another is that community members often have good ideas that can strengthen the project and help you deliver it successfully.

The analysis of impacts and interests is closely connected to decision space. In general, greater impacts and higher levels of concern will raise expectations and put pressure on the project team to give the public a say in shaping the project. It is much easier to suggest that the purpose of outreach is only to inform the public when there are few negative impacts and minimal interest in the project. Therefore, given the constraints that limit decision space, there is a tendency for a higher score on the impact and interest analysis to be associated with a higher level of engagement on the spectrum of public participation described below. In other words, the project impacts and level of public concern are not the only factors that determine decision space, but they are critical to consider in the analysis.

## Goals and Objectives

The Project Needs Assessment provides the information needed to establish goals and objectives for the Public Outreach and Engagement Plan. This can be the most difficult task in developing the Public Outreach and Engagement Plan, for at least two reasons. First, it only makes sense to establish goals and objectives if they can be measured. This means that metrics need to be realistic, so that information and data can be gathered to evaluate the success of the plan. Second, it is important to have goals and objectives that are meaningful. The key metrics should measure not only the activities of outreach and engagement (How many people did we reach? How many people attended our meetings?) but also measure the results that matter (How did public input affect the final project? Did our outreach and engagement provide helpful input to decision makers?).

This section provides a brief guide to setting goals and objectives for a Public Outreach and Engagement Plan. The approach is to (1) Keep in mind the agency's goals for working with the public, (2) Establish project goals that correspond to the "levels of participation" on the IAP2 Spectrum, and (3) Establish project objectives that can be realistically measured and related to the project goals.

Every Public Outreach and Engagement Plan should consider the broader agency goals for communication and public participation as expressed in the SFMTA's [Strategic Plan](#) and [Public Participation Plan](#). Keep this agency-wide context in mind as you develop project-level goals and objectives.

Strategic Plan Goal 4.0, Objective 4.3 commits the agency to enhance customer service, public outreach, and engagement: "Effective communications and consistent messaging can create meaningful opportunities for community input, give policymakers the information they need to support their communities, and improve the agency's projects and service delivery. Not only is community engagement critical in developing near-term projects that serve the community, it can also benefit long-term, comprehensive efforts related to safety, transit service, and mode choice. Placing this objective in Goal 4 underscores the agency's commitment to not only improve agency communications and engagement processes, but to also overhaul the agency's internal communications processes to better serve the public and agency staff."

The SFMTA [Public Participation Plan](#) emphasizes the agency's commitment to inclusion, equity and accessibility. Planning for every SFMTA project should meet these expectations. In practice, this means that project teams should consciously address barriers to participation and should make deliberate efforts to reach out to communities that have been historically underrepresented in the public process.

The **goals** of public outreach and engagement for a specific project should correspond to the four levels of public participation on the IAP2 Spectrum: Inform, Consult, Involve or Collaborate. The identification of goals comes directly from the Decision Space analysis in the Project Needs Assessment. Every Public Outreach and Engagement Plan should have the goal to **inform** the public about the project. In addition to informing, most projects will also have an opportunity for the public to provide input that might influence the project. Therefore, most projects will also **consult** to some extent as a goal of the project, with the parameters for potential public influence (the Decision Space) clearly defined. Some projects will also present further opportunities for public partnership and influence, meaning that the goals for public participation might be to **involve** the community or to **collaborate** with stakeholders.

"Reach out and listen to people, don't just 'educate' them."

- Stakeholder Feedback

The **objectives** of public outreach and engagement for a specific project should be meaningful and measurable. Objectives should have a meaningful relationship to the goals of the Public Outreach and Engagement Plan (How do we know that the public was informed or consulted? What did we hear that would be helpful to decision makers?). Objectives should also be measurable. Measures can be quantitative (How many people did we reach through various communications channels?) or qualitative (How did the project change as a result of public input?). The key is to create objectives that are linked to the goals for the plan, and that can be documented and communicated to decision makers and the public.

Some examples of Objectives that could correspond to Goals:

- Number of those reached through communications channels and attending meetings
- Number of users accessing the project webpage; number providing online feedback
- Percentage of stakeholders surveyed at meetings who feel informed about the project
- Specific ways that public input influenced the project (a “We Listened” category)

## Key Messages

Design your key messages about the project for both general and specific audiences, building on the Project Overview. Keep in mind that the most important consideration is the desired impact of the communication effort within the overall Public Outreach and Engagement Plan. For every project, the goal of communication is to inform the community about the project, its benefits, its impacts, and opportunities for formal public comment. Plans that also call for consulting or involving the community during project planning will require additional information and communication to support an engagement strategy. Successful messaging is not just about content, but also the impact of communication. In all cases, it is important to be consistent and transparent in messaging – providing the community with a clear path to information and staff contacts – in order to build trust throughout the life of the project.

For almost any project, key messages include:

- Purpose and benefits of the project
- Anticipated impacts of the project
- Project timeline and current phase
- Opportunities for public participation
- Project contacts (who and how to reach them)
- Project webpage (how to access further information online)
- Specific messages for specific audiences

In general, key messages should be concise (a few short statements that are easily understood), relevant (limit information to what is essential), compelling (lead with benefits and highlight opportunities for public input) and tailored to the audience (with special consideration of language needs). Use plain language and avoid jargon and acronyms. It is always advisable to check your messages with representatives of the audiences you are trying to reach.

## Outreach and Engagement Techniques

The selection of outreach and engagement techniques should be based on the Project Needs Assessment and the project goals and objectives. When the goal is to inform, the techniques used should be tailored to specific audiences. When the goal is to invite feedback from stakeholders, the plan should include techniques and tools designed to gather and compile public input, and it should be specific about the kind of feedback that could affect the project.

The field of practice offers a wide variety of techniques and tools to choose from. The key is to think carefully about the intended purpose of public participation at each phase of the project, and to select

techniques, tools and meeting designs that fit the project goals while getting information to stakeholders in the way they prefer to receive it. Regardless of other considerations, our stakeholders report that all flyers and posters should use large print and plain language, and they should be placed in multiple locations and at various heights. In addition, all electronic communication should be reviewed for accessibility.

The [Appendix](#) provides several resources to help you think about techniques: (a) a summary of communication techniques that are commonly used for SFMTA projects, (b) a description of various outreach techniques, engagement strategies and meeting formats that correspond to different goals on the public participation spectrum, and (c) guidance for making meetings accessible.

## Schedule and Responsibilities

Once the goals for public outreach and engagement have been determined and the methods have been selected, the next step in developing the Public Outreach and Engagement Plan is to create a schedule of activities and assign responsibility for implementation tasks.

The schedule should be detailed enough to be useful to the project team, but also appropriate as a tool to report to stakeholders, agency partners and decision makers. It should include the timing of specific communications efforts, outreach to key stakeholders, and key meetings or events. It should also note those activities that are ongoing throughout the duration of the plan, as distinct from communications for a specific meeting or event.

Project teams may use their own formats (or those provided by consultants) to track detailed tasks, individuals responsible, and due dates. The format for your project's outreach and engagement strategy can be a single spreadsheet, or a combination of tables for different tasks. The format is less important than the content: When do activities need to happen and who is responsible for carrying them out? When planning public meetings, the action plan should highlight dates for inviting participants, arranging meeting logistics, producing meeting materials, recruiting facilitators, etc. One approach is to create a summary timeline and a separate, more detailed production schedule for individual tasks.

## Budget

The budget for Public Outreach and Engagement can be estimated based on the size and scope of the project, as well as the extent of activities in the Public Outreach and Engagement Plan. Costs can vary widely based on staff time, communications collateral, language support, online engagement, and the number of public meetings held.

As noted above, it might be necessary to estimate the budget for public outreach and engagement before the plan is fully developed. To ensure adequate resources are devoted to outreach and engagement (including for language translation and interpretation), it is critical to conduct a Project Needs Assessment as early as possible. If your project requires a budget estimate before the Public Outreach and Engagement Plan is complete, the POETS team or your POETS Division Lead can provide guidance.

## Plan Review

Once the Public Outreach and Engagement Plan has been drafted, it is important to review it within the SFMTA before moving to implementation. As a practical matter, the plan should be developed in concert with all of the team members responsible for carrying it out (including staff and consultants), and ideally in consultation with key stakeholders. As noted at the outset of this Guide, one of the first steps in developing the Public Outreach and Engagement Plan should be to identify all of those individuals and groups who should be part of the conversation before the plan is developed and approved.

Any project that will transition from the SFMTA to another city agency (e.g., between legislative approval and construction) must address this transition in its Public Outreach and Engagement Plan. As early as possible, the project lead should meet with city partners to establish roles and budget responsibilities.

The project lead should meet with the District Liaison for the project area to be aware of any other SFMTA projects that might affect your project. If there are intersecting projects, the outreach and engagement activities for both should be coordinated to the extent feasible.

It is always a good idea to review the draft plan with an experienced colleague. Consider reaching out to your POETS Division Lead, a public information officer, or the POETS team if you have questions or challenges while completing your plan.

Once the Public Outreach and Engagement Plan is reviewed internally and with city partners, it must be approved by the project manager and then uploaded to the POETS webpage. At the end of each project phase, the evaluation section of the plan should be filled out and submitted to the same link.

Prior to implementation, the project lead should provide a summary of the project and the Public Outreach and Engagement Plan to the SFMTA's Media Relations Manager and should consider whether to reach out to elected officials (District Supervisors' Aides, State delegation offices).

## Plan Evaluation

The Public Outreach and Engagement Plan should be viewed as a living document. Adaptation to changing or unforeseen circumstances is a basic principle of good public engagement. The implementation of the Public Outreach and Engagement Plan should be carefully documented, with records kept on who was contacted and who participated in any meetings held. Ideally, any meeting other than a public hearing should include a feedback form from participants. The [Appendix](#) has an example of a meeting evaluation survey. At a minimum, the project outreach and engagement lead should submit a brief report at the end of each phase of the project. The plan should be reviewed and updated every six months if the project phase lasts longer than this.

Review of the Public Outreach and Engagement Plan should include answers to the following questions outlined in the [Public Outreach and Engagement Plan Template](#):

- Was the Public Outreach and Engagement Plan implemented as planned?
- If there were changes in practice from the original plan, please explain.
- How did the plan perform on its identified goals and objectives?
- What were the key lessons learned during implementation?

- What changes would you recommend to the plan going forward?
- How did you document public input and take it into account?

## Report Back to Stakeholders

After evaluating the Public Outreach and Engagement Plan, the project team should also report back to stakeholders (including partners and decision makers) at the end of each project phase. What was the purpose of outreach and engagement at this phase of the project? Who was contacted and/or engaged in the public process? What feedback did the public provide? If applicable, how did the project team take public input into account? How was it conveyed to decision makers and how did it affect the project?

The project brief created at the beginning of the Public Outreach and Engagement Plan, along with the evaluation conducted at the end of the plan, provides the information needed to complete this report back to the community at the end of each project phase. All stakeholders engaged in the process should receive this summary report, which completes the “feedback loop” described in the Public Outreach and Engagement Requirements.

# Tips for Developing a Public Outreach and Engagement Plan

The SFMTA established our Public Outreach and Engagement Requirements to ensure that project teams are thoughtful in their approach to working with the communities we serve. This section offers general guidance to help you think about your Public Outreach and Engagement Plan. These tips do not correspond directly to the planning steps outlined in the Template. Instead, they emphasize that the development of your plan is not a mechanical process, but is instead an iterative and reflective effort.

## Tip 1: Determine the Kind of Plan the Project Requires

The SFMTA’s Public Outreach and Engagement Requirements mandate that every SFMTA project must have a Public Outreach and Engagement Plan. For the purpose of this requirement, a “project” is defined as, “A one-time effort to construct, acquire, replace, improve, expand, or rehabilitate the transportation system in the City and County of San Francisco.” The assumption is that “one-time” includes projects that occur in multiple phases. In cases where the distinction between a “project” and “operations” is not clear, the key question is whether the agency’s action impacts the public. If there are community impacts from an action, then the agency should plan for some level of public outreach and/or engagement.

If a project needs a plan, the first question to address is whether the project team needs to create a new, customized Public Outreach and Engagement Plan, or whether this is a smaller, routine project that can use a template developed within each Division. POETS refers to the latter as a **Programmatic Public Outreach and Engagement Plan**. The kinds of projects that are appropriate for Programmatic Plans are determined by each Division, and each Division is responsible for developing a Programmatic Plan for each category of projects. Examples might include stop signs or signal adjustments. Every small project must still consider community impacts, but the Programmatic Plan can be used as a template for each project that falls within the program category. The Programmatic Plan should be on file with POETS, and if so,

individual projects in the program category do not need to file separate plans (e.g., there's one Programmatic Plan on file for stop sign changes, so it's not necessary to file a separate plan for every stop sign change).

In addition to determining the kind of plan your project requires, it is essential to determine WHO needs to be involved in the development of the plan. Planning for outreach and engagement is not a solitary exercise in the office, but instead should involve collaboration among a team of staff members (and any consulting members of the team), informed by conversations with SFMTA colleagues, key community stakeholders, partner agencies, and decision makers. Given all the information and judgements that are necessary to create a Public Outreach and Engagement Plan, one of the first steps in planning is to identify who should be part of the process.

### Tip 2: Scale the Plan to Fit the Project

The Public Outreach and Engagement Plan should be appropriate to the scale of the project. Plans for large projects will be detailed and complex, while those for smaller, simpler projects can be more standardized, as described above. The templates are designed to be helpful for all projects regardless of their size, and they are intended to be flexible. If the Project Needs Assessment determines that project impacts are minimal or that there is no opportunity for public influence, then the purpose of the plan might only be to inform stakeholders. On the other hand, even the simplest project might offer some opportunity for public influence.

### Tip 3: Begin Outreach and Engagement as Early as Necessary

Planning for outreach and engagement should always begin as early as possible, ideally at the conceptual or pre-planning phase of a project. This does not necessarily mean that public outreach should be the first step in project implementation, only that an early Project Needs Assessment should identify WHEN is the best time to begin outreach and engagement with the public. In general, opportunities for the public to provide input on a project are greater during the early stages of a project (versus during post-legislation or construction). However, it can be counterproductive to reach out to the public too early, before relevant questions are addressed in the Project Needs Assessment (scope of the project, decision space, etc.). You get one chance to make a first impression, so it is critical to be prepared before going to the community. The point is to begin planning for public outreach and engagement at the outset of the project, and to include early outreach to key stakeholders in the plan whenever appropriate.

From the stakeholder's standpoint, "early" generally means before key decisions have been made, and in time for the public to have meaningful input on the project to the extent possible.

Realistic planning for outreach and engagement also includes early consideration of funding. As a practical matter, the Project Needs Assessment must be done soon enough to estimate the budget for outreach and engagement before the plan is fully developed. The POETS team can help with budget estimates.

## Tip 4: Coordinate with Other SFMTA Projects and City Partners

The Project Needs Assessment identifies stakeholders, including those who will work on the project within the SFMTA and the city of San Francisco. When planning for public outreach and engagement for your project, it is important to know which other teams within the SFMTA might be working in the same geographic area. Project teams working in the same community should connect with one another as early as possible to share information, formulate communications strategies, and coordinate activities in a way that facilitates community understanding and input opportunities for intersecting projects.

“Nobody cares if it’s MTA or PUC or DPW. To us, it’s the city.”

- Stakeholder Feedback

It is also essential to think forward about all phases of the project during initial planning. It is common for a project to be handled by different SFMTA divisions at different phases, or for a project to be handed off by the SFMTA to another agency (e.g., Public Works, Public Utilities Commission) at some phase. In either case, it is essential to coordinate with those agency and city partners to maintain a consistent standard of outreach and engagement, even if the SFMTA is not the lead during a particular phase of the project. From the community point of view, it doesn’t matter which agency is working on a particular phase of a project. If it was seen as an SFMTA project from the beginning, then the SFMTA will be held responsible for how the project is carried out.

## Tip 5: Comply with Language Access Requirements

As a city department that receives federal funding, the SFMTA must follow both local rules (San Francisco’s Language Access Ordinance) and federal rules (Title VI of the Civil Rights Act of 1964 and supporting guidance) regarding accessibility to our programs and services to ensure that all customers, regardless of their ability to read, speak, write and understand English (“limited-English proficient” or “LEP”), are informed and able to participate in our agency’s decision-making processes. The SFMTA’s 2016 Language Assistance Plan (LAP) details the agency’s policies about providing both written (translations) and verbal (via interpreters or bilingual employees) language assistance for our limited-English proficient customers and other stakeholders.

The Language Assistance Plan includes maps detailing concentrations of limited-English proficient communities by language, which can be used as a resource when determining the language needs of those who are affected by the project. In general, and at a minimum, most public information pieces should be translated into Chinese, Spanish and Filipino (Tagalog), and all public communications and meeting notices must include the 311 “Free Language Assistance” tagline (included in the Public Outreach and Engagement Plan Guide). Public meeting and hearing notices and agendas, including those posted at SFMTA.com, must include the four-language 48 hours’ notice and a staff member’s phone number to request language assistance; LanguageLine telephonic interpretation services can be used to process requests from limited-English proficient customers via phone. The [Appendix](#) includes a LanguageLine reference sheet, all language assistance taglines, and tips for providing language assistance. Depending on content, transit related public information pieces might require additional translation support.

The agency provides resources and training to assist with language assistance. Specific questions and requests for individual consultation or staff training should be directed to SFMTA Regulatory Affairs Manager Kathleen Sakelaris at [Kathleen.Sakelaris@sfmta.com](mailto:Kathleen.Sakelaris@sfmta.com) or 415.701.4339.

## Tip 6: Make Outreach and Engagement Accessible and Equitable

All activities outlined in the Public Outreach and Engagement Plan must be implemented in a way that is inclusive and equitable. Activities should include methods for soliciting feedback that meet communities on their own terms, and that are accessible to youth, seniors, people with disabilities, and underrepresented community members, regardless of ability. The goal of the SFMTA is to inform anyone affected by our projects about their benefits and impacts, and to include anyone in the public process who has an interest in participating. The purpose of making communications and meetings accessible is not to “check a box,” but to ensure that opportunities for public participation are open to all.

All communication materials should be provided in accessible formats. As noted above, the [Appendix](#) provides guidance on making meetings accessible. For assistance on making your materials and meetings accessible, contact [Annette.Williams@sfmta.com](mailto:Annette.Williams@sfmta.com) or 415.701.4444.

The [Muni Service Equity Strategy](#) takes a neighborhood-based approach to address disparities on transit routes that are most critical to people from low-income households and people of color. As of 2018, there are eight neighborhoods covered by the Equity Strategy: Bayview, Chinatown, Mission, Tenderloin/SOMA, Oceanview, Outer Mission/Excelsior, Visitacion Valley, and Western Addition. Project teams working in any of the neighborhoods named in the Equity Strategy should review the documents at the link above and think carefully about how to apply the strategy to their own projects.

Regardless of whether your project falls within these eight neighborhoods, your Public Outreach and Engagement Plan should have a strategy to include those community members who have historically been underrepresented in the planning and decision-making process. While it may be more difficult and require more resources to reach and engage members of these communities, it is essential to make a deliberate effort to do so. The agency offers resources and support to help you plan for inclusive, equitable and accessible outreach and engagement.

**“Public Participation”** refers to the role of community members in planning and decision-making processes. It involves a two-way relationship in which the agency consults the public.

**“Outreach”** refers to agency efforts to inform stakeholders about the project and opportunities to participate in the public process.

**“Engagement”** refers to the agency’s strategy to encourage public participation and consider public input.

## Tip 7: Be Thoughtful about Stakeholder Notification

The goal of outreach and engagement is to be inclusive and equitable. Consider the full range of stakeholders who might be impacted by, or interested in, the project. As a general rule, it is advisable to expand rather than limit the geographic scope of project notification and updates, and to consider non-geographically defined communities that might also have an interest in the project. In cases where notification is legally required within a specified distance, consider doing outreach beyond the minimum legal requirement if indicated by the Project Needs Assessment.

One of the most consistent messages we have heard from community members is that notification should not be limited to the immediate neighborhood in which a project is taking place. Residents and other stakeholders in surrounding neighborhoods can be affected in sometimes unanticipated ways, so it is always advisable to err on the side of doing wider notification and outreach.

### Tip 8: Plan for Outreach during Detailed Design and Construction

It is critical to maintain ongoing communication across all phases of the project, including those periods when there are no public meetings or legally required notices. Most large projects face a period between legislation and construction when the project has been approved but construction has not yet begun. Often, this phase can take years and can result in the community not knowing or understanding that the project has been even been approved, let alone that it is going to be implemented after a period of inactivity. In such cases, when construction begins, community members can be caught unaware. The approval process may be a distant memory for those who were involved, and newer residents may feel alarmed that they did not have an opportunity to participate during the early project phases.

For this reason, the Public Outreach and Engagement Plan must include a strategy to keep the public informed during these “quiet” or “inactive” periods. Examples of plans specifically tailored to the detailed design phase of a project can be found in the [Appendix](#).

### Tip 9: Consider Opportunities to Expand Engagement

There is always an obligation to inform the public about a given project. But despite the temptation to think our work ends here, it is rare that our only obligation is to inform through one-way communication. In almost every case, there is also an opportunity to engage stakeholders more deeply on some aspect of the project and to consider how public input might affect the project. Even during construction, there might be choices about sequencing, scheduling or mitigation that stakeholders can influence. While the minimum goal is always to inform the public about a project, good practice requires thinking carefully about how the “decision space” for public influence can be defined and potentially expanded at each phase of the project’s delivery. The next section on the “Spectrum of Public Participation” provides a framework for thinking about decision space.

### Tip 10: Update the Plan between Project Phases

The Public Outreach and Engagement Plan should lay out a strategy for the life of the project, with the understanding that the plan will be reviewed and updated at the end of each phase based on lessons learned and changing conditions. As a general rule, it is advisable to update the Public Outreach and Engagement Plan approximately every six months, even if a project phase lasts longer.

The Public Outreach and Engagement Requirements call for documentation of the how the Public Outreach and Engagement Plan was implemented. The templates for creating the Public Outreach and Engagement Plan provide space to record whether the plan was implemented as expected during a particular phase, the lessons learned, and the recommended revisions to the plan going forward.

## The Spectrum of Public Participation

A key step in developing the Public Outreach and Engagement Plan is identifying the purpose of public participation at each phase of the project. Is the purpose simply to inform stakeholders, or is it also to ask for public feedback that might shape the project? Public participation practitioners refer to this as the project's **Decision Space**. To what extent can the public influence the project? What has already been decided, and what is on the table for consideration? The SFMTA makes a commitment about how public participation can influence each of our projects. Defining the "decision space" gives the community clear expectations about the purpose of public participation and helps planners understand how public input that can potentially influence the project.

The SFMTA has worked closely with the International Association of Public Participation (IAP2), whose **Spectrum of Public Participation** is a useful framework for helping to think about the decision space for a project. The Spectrum defines the project sponsor's commitment to public participation during each phase of project delivery. Once the goal of public participation has been defined, the Spectrum helps the project team choose the outreach and engagement methods that are appropriate for the project. The agency can reach out to stakeholders just to inform them about a project, or also to engage them in higher levels of participation along the Spectrum. Any level of public participation beyond "inform" requires some level of "engagement" by the agency in addition to communications "outreach."

The figure below defines four levels of public participation on the IAP2 Spectrum and suggests methods that correspond to each level. It is important to note that the correspondence between the level of participation and the methods used is suggestive rather than definitive. Different methods can be used for different purposes. For example, while we have heard from our stakeholders that "open houses" are forums for staff to speak, and "town halls" are opportunities for the public to speak, it is certainly true that staff can listen and take valuable feedback at open houses. Similarly, a walking tour or an ambassador can be methods to inform and/or involve the community in planning for a project.

## THE SPECTRUM OF PUBLIC PARTICIPATION

The following levels of participation describe different roles of the public in the planning and decision-making process, and the commitment made by the agency at each level. The agency’s outreach and engagement strategy should correspond to the goal of public participation at each project phase.

LEVEL →	INFORM	CONSULT	INVOLVE	COLLABORATE
<b>Goal of Outreach and Engagement</b>	We will keep you informed about the project and the decision-making process.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the project and decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the project and decision.	We will look to you for advice and innovation in formulating solutions, and we will incorporate your advice and recommendations into the project and decision to the maximum extent possible.
<b>Example Tactics</b>	<ul style="list-style-type: none"> <li>• Open house</li> <li>• Newsletter</li> <li>• Webpage</li> <li>• Factsheet</li> <li>• Email</li> <li>• Social media</li> <li>• Mailer</li> <li>• Poster</li> <li>• Phone hotline</li> <li>• Ambassador</li> </ul>	<ul style="list-style-type: none"> <li>• Town hall</li> <li>• Public meeting</li> <li>• Comment form</li> <li>• Survey</li> <li>• Focus group</li> <li>• Interview</li> <li>• Tour</li> <li>• Pop-up booth</li> </ul>	<ul style="list-style-type: none"> <li>• Workshop</li> <li>• Charrette</li> <li>• Deliberative poll</li> <li>• Recurrent conversations</li> </ul>	<ul style="list-style-type: none"> <li>• Advisory committee</li> <li>• Participatory budgeting</li> <li>• Collaborative problem-solving</li> <li>• Small group dialogue</li> </ul>

*Adapted from the International Association for Public Participation (IAP2)*

The spectrum is helpful in thinking about the purpose of public outreach and engagement at different phases of a project. Typically, there is more decision space – more opportunity for meaningful public input – at earlier stages of a project (although, as noted above, even the construction phase generally allows some room for public input, even if it is more limited than at earlier phases).

At the same time, if outreach occurs too early, the project might not be well defined, and it might not be clear to the public how to provide input. The key is to think carefully about the goals of public outreach and engagement, and to time the work appropriately. It is critical for the Public Outreach and Engagement Plan to allow enough time to inform and/or engage the public before legal milestones for public comment are reached and decisions are made.

---

Division 9 – Exhibit B

Public Outreach and Engagement Plan  
Template

# Public Outreach and Engagement Plan Template

Follow the steps below to create the Public Outreach and Engagement Plan for your project. See the [Public Outreach and Engagement Plan Requirements](#) for the standards that every plan must meet, and the [Public Outreach and Engagement Plan Guide](#) for more detailed support on completing each step of the plan. When you complete the plan, submit it to the POETS page on the SFMTA intranet [here](#). **THIS STEP IS MANDATORY.** Keep in mind that your plan is a public document and may be reviewed by SFMTA leadership and staff, city partners and members of the public.

## Project Overview

**INSTRUCTIONS:** Create an initial summary of the project scope, purpose, benefits and timeline. Based on an initial understanding of the project, state the anticipated decision space – the aspects of the project that the public might be able to influence and those that cannot be changed. Note that this is a very early step in project planning and should be revised based on the subsequent Project Needs Assessment. As a general rule, the Project Overview should fit on one page. Maps or other graphics can be included on the reverse side, but the Project Overview should be a single sheet when printed.

### Project Description

Click here to enter text.

### Project Purpose

Click here to enter text.

### Project Benefits

Click here to enter text.

### Project Start and End Dates

Click here to enter text.

### Decision Constraints (What has already been determined or decided?)

Click here to enter text.

## Project Needs Assessment

### STAKEHOLDER ANALYSIS



**INSTRUCTIONS:** Use this table to identify stakeholders – those who will be affected by, or interested in, the project. Check the categories of stakeholders who will be affected by the project, list specific individuals and groups, and classify each as either primary, secondary or partner audiences. Note that where boxes are already selected there is a presumption that these categories of stakeholders will be included in most plans. To the extent possible, classify each group as “primary,” “secondary,” or “partner.” Primary stakeholders are *directly* impacted by the project and must be informed regularly (e.g., residents, merchants). Secondary stakeholders are *indirectly* or *temporarily* impacted by the project (e.g., delivery drivers, commuters, tourists). Partner stakeholders are *influential and interested* within the project area and/or community-at-large (e.g., transit riders, bicycle advocates). Partners can affect awareness and support and may be enlisted to assist with outreach to the primary and secondary audiences and/or to champion the project.

### Stakeholders Who Reside, Work or Travel through the Project Area

**Category:** Type of Stakeholder     
 **Names:** Specific Individuals or Groups     
 **Classification:** Primary, Secondary, Partner

<input checked="" type="checkbox"/>	Residential Area	Click here to enter text.	Choose an item.
<input checked="" type="checkbox"/>	Business District	Click here to enter text.	Choose an item.
<input checked="" type="checkbox"/>	People who drive	Click here to enter text.	Choose an item.
<input checked="" type="checkbox"/>	People who walk	Click here to enter text.	Choose an item.
<input checked="" type="checkbox"/>	People who ride bicycles	Click here to enter text.	Choose an item.
<input checked="" type="checkbox"/>	People who ride transit	Click here to enter text.	Choose an item.
<input type="checkbox"/>	Other	Click here to enter text.	Choose an item.

### Community Organizations Located in the Project Area

**Category:** Type of Stakeholder     
 **Names:** Specific Individuals or Groups     
 **Classification:** Primary, Secondary, Partner





<input checked="" type="checkbox"/>	Neighborhood Organizations	Click here to enter text.	Choose an item.
<input checked="" type="checkbox"/>	Merchant Groups	Click here to enter text.	Choose an item.
<input checked="" type="checkbox"/>	Community Groups	Click here to enter text.	Choose an item.
<input type="checkbox"/>	Interest/Advocacy Groups	Click here to enter text.	Choose an item.
<input type="checkbox"/>	Faith-Based Groups	Click here to enter text.	Choose an item.
<input type="checkbox"/>	Schools	Click here to enter text.	Choose an item.
<input type="checkbox"/>	Senior Centers, Disabled Services	Click here to enter text.	Choose an item.
<input type="checkbox"/>	Media (local and citywide)	Click here to enter text.	Choose an item.
<input type="checkbox"/>	Other	Click here to enter text.	Choose an item.

### Internal Stakeholders and Influencers

✓ **Category:** Type of Stakeholder      **Names:** Specific Individuals or Groups      **Classification:** Primary, Secondary, Partner

<input checked="" type="checkbox"/>	SFMTA Internal Stakeholders (other projects that intersect with yours)	Click here to enter text.	Choose an item.
<input type="checkbox"/>	SFMTA Board of Directors	Click here to enter text.	Choose an item.
<input type="checkbox"/>	San Francisco Board of Supervisors	Click here to enter text.	Choose an item.



<input type="checkbox"/>	Local Elected Officials (Supervisory District)	Click here to enter text.	Choose an item.
<input type="checkbox"/>	City Agencies (Public Works, Public Utilities Commission, Planning, Police, etc.)	Click here to enter text.	Choose an item.
<input checked="" type="checkbox"/>	SFMTA Committees (Citizens' Advisory Council, Multimodal Accessibility Advisory Council, Paratransit Coordinating Council)	Click here to enter text.	Choose an item.
<input checked="" type="checkbox"/>	Planning/Funding Organizations (County Transportation Authority, Metropolitan Transportation Commission, etc.)	Click here to enter text.	Choose an item.
<input type="checkbox"/>	State and Federal Elected Officials (Delegation offices)	Click here to enter text.	Choose an item.
<input type="checkbox"/>	Local schools and district	Click here to enter text.	Choose an item.

## IMPACT AND INTEREST ANALYSIS

**INSTRUCTIONS:** Think about the ways that the project will affect residents, merchants, those who ride transit, and those who walk and ride bicycles on city streets. List the main impacts anticipated throughout all phases of the project. Note that the impacts identified in your plan are distinct from those detailed in an Environmental Impact Report or Environmental Impact Statement. While those documents might inform your analysis, the focus here is impacts on the local community.

After listing the project impacts, use the following table



### Impact and Interest Analysis Calculation

to calculate a score that represents the overall level of impact and interest. There is no hard and fast rule for translating the score into a particular plan, but it is an indicator of the public's likely expectations around outreach and engagement. It is intended to serve as a starting point for discussion among the project team in developing the Public Outreach and Engagement Plan.

To find your project score, answer each question by putting a number 1 in the appropriate box in each row. The table will add the numbers in each column and then multiply the total in each column by the column weight (very low = 1, low = 2, moderate = 3, high = 4, very high = 5). The table will then calculate an average score across all questions. Write the impact and interest analysis average score below.

**Impact and Interest Analysis Average Score:** [Click here to enter text.](#)

## Project Impacts

List the main impacts anticipated from the project (service changes, traffic changes, parking changes, construction, etc.)

[Click here to enter text.](#)

## DECISION SPACE ANALYSIS

**INSTRUCTIONS:** Describe the decision space of the project (the scope of potential public influence on the project or decision and the opportunities for public participation). Public participation requires the SFMTA to make a commitment to stakeholders about their involvement in the project. Defining the decision space gives the public clear expectations about their role in the planning and decision-making process. Complete the section below to identify the aspects of the project that the public can potentially influence, and the kind of public input that the project team will seek. See the Guide for a discussion of how the score on the impact and interest analysis can inform the decision space analysis.

**What aspects of the project can potentially be influenced by public input?**

[Click here to enter text.](#)

**What aspects of the project are NOT open to change based on public input, and what are the constraints that limit public influence (financial, legal, legislative, etc.)?**

[Click here to enter text.](#)

## Goals and Objectives

**INSTRUCTIONS:** List the goals and objectives of the Public Outreach and Engagement Plan for each phase of the project that the plan covers. Goals should correspond to the levels of public participation on the Spectrum of Public Participation (Inform, Consult, Involve, Collaborate). Objectives should be measurable indicators of the extent to which the goals are met. Indicate the data sources that will be used to measure progress on the objectives.

**PROJECT PHASE:** [Click here to enter text.](#)

GOAL / OBJECTIVE	DATA SOURCES
<b>Goal #1</b> Click here to enter text.	Click here to enter text.
<b>Objective 1.1</b> Click here to enter text.	Click here to enter text.
<b>Objective 1.2</b> Click here to enter text.	Click here to enter text.
<b>Goal #2</b> Click here to enter text.	Click here to enter text.
<b>Objective 2.1</b> Click here to enter text.	Click here to enter text.
<b>Objective 2.2</b> Click here to enter text.	Click here to enter text.

## Key Messages

**INSTRUCTIONS:** List the key messages about the project for general and specific audiences. Be sure to include the purpose and benefits of the project, potential impacts, project timeline, opportunities for



public input, and key contacts. Where relevant, indicate the intended purpose of communication in relation to the goals of the Public Outreach and Engagement Plan (to inform, to recruit participants, etc.).

**Messages for General Audience:**

Click here to enter text.

**Specific Audience Messages (Stakeholder: Click here to enter text.)**

Click here to enter text.

**Specific Audience Messages (Stakeholder: Click here to enter text.)**

Click here to enter text.

**Specific Audience Messages (Stakeholder: Click here to enter text.)**

Click here to enter text.

**Specific Audience Messages (Stakeholder: Click here to enter text.)**

Click here to enter text.

## Outreach and Engagement Techniques

**INSTRUCTIONS:** List the outreach and engagement techniques and tools you will use to achieve the goals and objectives you established for the project. Include multi-channel communications tactics, community meetings, and other ways you will reach out to stakeholders given your goals for each project phase. This step is about how to inform and engage the public, including details about implementation. This is also the appropriate step for planning language access needs.

**Project Phase:** Click here to enter text.

**ONGOING** (For communication and relationship-building throughout the phase)

Click here to enter text.

**DISCRETE** (At specific points to inform, compile feedback or convene people)

Click here to enter text.

**Project Phase:** Click here to enter text.



**ONGOING** (For communication and relationship-building throughout the phase)

Click here to enter text.

**DISCRETE** (At specific points to inform, compile feedback or convene people)

Click here to enter text.

**Project Phase:** Click here to enter text.

**ONGOING** (For communication and relationship-building throughout the phase)

Click here to enter text.

**DISCRETE** (At specific points to inform, compile feedback or convene people)

Click here to enter text.

## Schedule and Responsibilities

**INSTRUCTIONS:** Create an action plan – a summary of the schedule and responsibilities for public outreach and engagement activities and tasks.

### PUBLIC OUTREACH & ENGAGEMENT ACTION PLAN

Date	Activities/Tasks	Person(s) Responsible
Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click & choose "Remove Content Control".	Click here to enter text.	Click here to enter text.
Click down arrow to enter	Click here to enter text.	Click here to enter text.



<p>a date; to enter approx. date or range, click inside cell, right click &amp; choose "Remove Content Control".</p>		
<p>Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click &amp; choose "Remove Content Control".</p>	<p>Click here to enter text.</p>	<p>Click here to enter text.</p>
<p>Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click &amp; choose "Remove Content Control".</p>	<p>Click here to enter text.</p>	<p>Click here to enter text.</p>
<p>Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click &amp; choose "Remove Content Control".</p>	<p>Click here to enter text.</p>	<p>Click here to enter text.</p>



<p>Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click &amp; choose "Remove Content Control".</p>	<p>Click here to enter text.</p>	<p>Click here to enter text.</p>
--	----------------------------------	----------------------------------

## Budget

**INSTRUCTIONS:** Enter the estimated budget for public outreach and engagement for each project phase that the Public Outreach and Engagement Plan covers. Note: depending on the project, it might be necessary to complete this estimate before other steps in the planning process. If possible, however, the budget will be based on the Project Needs Assessment and a thorough understanding of the strategy for outreach and engagement. Note that the table below represents a budget summary which should be based on a more detailed estimate of budget line items for each phase. Note that budgeting for public outreach and engagement is more art than science and must be conducted on a project-by-project basis. Division Leads can provide support in developing your budget. The [Appendix](#) provides examples of line item budgets for other SFMTA projects.

### PUBLIC OUTREACH & ENGAGEMENT PLAN BUDGET

<p><b>Project Phase:</b> Click here to enter text.</p>	
<p><b>Project Phase:</b> Click here to enter text.</p>	
<p><b>Project Phase:</b> Click here to enter text.</p>	
<p><b>Project Phase:</b></p>	



Click here to enter text.	
<b>TOTAL</b>	<b>\$ 0.00</b>
Enter cost for each phase; to total, click the \$ sign and press F9. If you make changes to any of the costs, click the \$ sign and press F9 to calculate the new total.	

## Plan Review

**INSTRUCTIONS:** Check which of the following people and agencies need to be contacted and informed about your plan. Which SFMTA projects intersect with yours? What other agencies will you need to work with? Who needs to be kept informed within the City? Indicate in the Notes the nature of the relationship.

✓ **Target:**                      **Notes:**

<input checked="" type="checkbox"/>	SFMTA Public Relations Officer	Click here to enter text.
<input checked="" type="checkbox"/>	Other SFMTA Projects in your Project Area	Click here to enter text.
<input checked="" type="checkbox"/>	District Liaison for your Project Area	Click here to enter text.
<input checked="" type="checkbox"/>	POETS Division Lead	Click here to enter text.
<input type="checkbox"/>	Project Management Office	Click here to enter text.
<input type="checkbox"/>	Other City Departments	Click here to enter text.
<input type="checkbox"/>	Other non-City Agencies	Click here to enter text.

## Plan Evaluation



**INSTRUCTIONS:** At the end of each phase of the project (or every six months, whichever comes first), answer the following questions and submit an updated version of your plan (one that includes the completed section below and any revisions to other parts of the plan for future phases of the project) to the POETS page on the SFMTA intranet [here](#). If the Plan Evaluation along with any revisions to the Public Outreach and Engagement Plan.

**Project Phase:** [Click here to enter text.](#)

**Was the plan implemented as intended? How did it change?**

[Click here to enter text.](#)

**To what extent did the plan achieve its goals and objectives?**

[Click here to enter text.](#)

**What were the main lessons learned during implementation?**

[Click here to enter text.](#)

**How would you modify the plan as the project moves to the next phase?**

[Click here to enter text.](#)

**How did you document public input and how it was considered (if applicable)?**

[Click here to enter text.](#)

## Report Back to Stakeholders

**INSTRUCTIONS:** At the end of each phase of the project, complete the “feedback loop” with stakeholders who were contacted or engaged. Use the Template to provide the key information that will be provided to stakeholders, and to document when, how and to whom it was provided.

**Project Phase:** [Click here to enter text.](#)

**What aspects of the project were open to public input?**

[Click here to enter text.](#)



**What were the techniques used to receive public input?** (meetings, website, surveys, etc.)

Click here to enter text.

**What input did the project team receive from the public?**

Click here to enter text.

**How was public input conveyed to decision-makers (if applicable)?**

Click here to enter text.

**How did public input influence the project?**

Click here to enter text.

**What are next steps for the project and any opportunities for further public input?**

Click here to enter text.

**List the stakeholders who received a follow-up report (written or verbal):**

Stakeholder	Method	Date
Click here to enter text.	Click here to enter text.	Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click & choose "Remove Content Control".
Click here to enter text.	Click here to enter text.	Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click & choose "Remove Content Control".



Click here to enter text.	Click here to enter text.	Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click & choose "Remove Content Control".
Click here to enter text.	Click here to enter text.	Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click & choose "Remove Content Control".
Click here to enter text.	Click here to enter text.	Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click & choose "Remove Content Control".
Click here to enter text.	Click here to enter text.	Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click & choose "Remove Content Control".



Click here to enter text.	Click here to enter text.	Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click & choose "Remove Content Control".
Click here to enter text.	Click here to enter text.	Click down arrow to enter a date; to enter approx. date or range, click inside cell, right click & choose "Remove Content Control".

---

## Division 10: SFPW Div 01 General Requirements for Construction

# Table of Contents

SECTION 00 73 20 - EXISTING UTILITIES.....	1
SECTION 00 73 21 - UTILITY CROSSINGS .....	3
SECTION 01 12 00 - SPECIAL INSTRUCTIONS .....	14
SECTION 01 13 00 - OVERHEAD CONTACT SYSTEM (OCS) ISOLATION and Replacement .....	16
SECTION 01 14 00 - ARTWORK COORDINATION .....	17
SECTION 01 31 33 - PARTNERING PROCEDURES.....	26
SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION.....	30
SECTION 01 35 43 - ENVIRONMENTAL PROCEDURES .....	32
SECTION 01 35 44 - HAZARDOUS BUILDING MATERIALS SCOPE OF WORK .....	83
SECTION 01 35 45 - HEALTH AND SAFETY CRITERIA .....	103
SECTION 01 35 50 - ADDITIONAL ENVIRONMENTAL PROCEDURES .....	125
SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS .....	134
SECTION 01 57 26 - TEMPORARY PROTECTION OF CATCH BASINS AND STORM DRAIN INLETS .....	142
SECTION 01 71 33 - PROTECTION OF EXISTING FACILITIES AND ADJACENT CONSTRUCTION .....	143
SECTION 01 74 50 - MATERIAL REDUCTION AND RECOVERY PLAN .....	146
SECTION 02 41 16 - STRUCTURE DEMOLITION .....	156
SECTION 02 80 13 - HAZARDOUS BUILDING MATERIALS – REMEDIATION .....	163
SECTION 02 81 10 - ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS .....	204

## SECTION 00 73 20 - EXISTING UTILITIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes special requirements for existing utilities and underground facilities owned or controlled by any person or entity, private or governmental, referred to herein as "Utility Owners," which may be encountered by PPC while performing the Work.
- B. Utilities in public streets that are within the jurisdiction of the Department of Public Works shall be governed by the applicable provisions of the San Francisco Public Works Code, Sections 906, 907, 908, 909, and 910. The Utility Crossings Specifications (see Section 00 73 21) are based on agreements with non-governmental agencies for removal, support and relocation of privately-owned utility facilities.

#### 1.2 GOVERNMENTAL UTILITIES IN THE CITY OF SAN FRANCISCO

- A. PPC shall satisfactorily support, work around, and protect, as approved by the City as Regulator, all Utilities, whether shown on drawings or not, which exist within any excavation and which are owned or controlled, and maintained, by a City department or Governmental Entity, including, but not limited to, traffic control, lighting, police communication and fire alarm systems, and all conduits, wiring and related appurtenances for such systems; sewers and sewer structures; water enterprise Utilities; pipes and Utilities of the Auxiliary Water Supply System for Fire Protection; the Municipal Railway and Hetch Hetchy Water and Power overhead lines and power feeder systems serving the Municipal Railway; and other Hetch Hetchy Water and Power Utilities (together, "**Governmental Utility(ies)**").
  - 1. If Municipal Railway facilities, Hetch Hetchy Water and Power facilities serving the Municipal Railway, and other Hetch Hetchy Water and Power facilities are encountered, PPC shall support such Utilities in a manner satisfactory to the City as Regulator.
  - 2. If Auxiliary Water Supply for Fire Protection Utilities are encountered, PPC shall support such Utilities by a minimum of one cable with turnbuckle, a strongback, and a beam spanning the trench; however, where a joint falls within the trench area, a cable with turnbuckle shall be placed on each side of the joint. All such support work shall be subject to the approval of the City as Regulator before commencement thereof. After supports are removed and the pipe is sufficiently supported by partial backfill, but with the joints exposed, the pipe shall be subjected to a hydrostatic field test of 350 psi pressure in accordance with section 908.22 of the DPW Standard Specifications (refer to Division 1 for reference standards) before final backfill is placed. If a joint is visibly wet, PPC shall repair the joint in accordance with section 910 of the DPW Standard Specifications.
  - 3. If vitrified clay pipe side sewers or culverts are encountered, PPC may elect, in lieu of supporting such side sewers and culverts, to cut and restore those portions of the side sewers and culverts which obstruct the prosecution of the Work, provided that PPC complies with the provision of section 301 of the DPW Standard Specifications regarding the handling and disposal of seepage, storm water and sewage.
  - 4. Water enterprise Utilities, if encountered, shall be supported by PCC as follows:
    - a. Push-on joint pipes: Pipes shall be supported by a minimum of one cable with turnbuckle, a pipe clamp and a beam spanning the trench; however, where a joint falls within a trench area, a cable with turnbuckle and pipe clamp shall be placed on each side of the joint.

- b. Copper tubing and plastic pipes (service pipes 2 inches or smaller in diameter): If the trench is less than 8-foot wide, no support is required. For trenches wider than 8 feet, one support is required for every additional 8 feet or part thereof.
  - c. Steel welded pipes: Pipes shall be supported in a manner satisfactory to the General Manager of the Public Utilities Commission of the City and County of San Francisco.
  - d. PPC shall submit support designs for approval and start work only with approved support designs.
5. PCC shall perform the adjustment of manhole castings and other castings of Government Utilities, and the paving adjacent thereto, in accordance with the requirements of Section 217 of the DPW Standard Specifications.
- B. Supporting, working around, and protecting existing Governmental Utilities shall be considered part of the Work.

### **1.3 NON-GOVERNMENTAL UTILITIES IN THE CITY OF SAN FRANCISCO**

- A. The procedure to be followed with respect to non-governmental Utilities owned or controlled by any person, company, firm or corporation, is covered by sections 906, 907, 908, 909, and 910 of the San Francisco Public Works Code (part II, chapter X, of the Municipal Code).
- B. Principal Project Company shall be aware that agreements have been executed between various Utility Owners, and the City, enabling such Utility Owners to have included in City contracts the work of supporting, working around, and protecting their Utilities. Such work will be paid for by the various Utility Owners directly to PPC in conformance with the provisions of the Utility Crossing Specifications (Section 00 73 21). Requirements for performance of this work are also contained in the Utility Crossing Specifications.

### **1.4 ABANDONED UTILITIES**

- A. These provisions do not apply to abandoned Utilities. Any increase in the cost of PPC operations occasioned by the presence and/or removal of abandoned Utilities shall be at the sole expense of PPC and no additional payment will be made by the former Utility Operators or by the City.

### **1.5 USE OF PAVEMENT BREAKER ADJACENT TO UTILITY FACILITIES LIMITED**

- A. In accordance with the requirements of section 373 of the Public Works Code, PPC may use pavement breakers or other labor-saving devices; however, the use of any machine or device that breaks pavement by blows struck by a falling or driven hammer or weight is prohibited within a horizontal distance of 6 feet from any gas, sewer, water or Auxiliary Water Supply System pipe, communications duct or any other utility facility.
  - 1. Such prohibition, however, shall not be construed as barring the use of hand tools or manually operated air tools such as jackhammers.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 00 73 21 - UTILITY CROSSINGS

(Effective January 1, 2023)

### SECTION U1. SUPPORT, WORK AROUND, AND PROTECT EXISTING UTILITY COMPANY FACILITIES- GENERAL SPECIFICATIONS

#### I. General

PPC shall support, work around, and protect all existing Utilities, including the Utilities of the following Utility Owners, as applicable, where Utilities exist within excavations and interfere with the prosecution of the Work because of their presence:

Pacific Gas and Electric Company (PG&E), Pacific Bell Telephone Company D/B/A AT&T California (AT&T), Comcast Corp. (Comcast), Astound Broadband, LLC dba Wave (Astound), Webpass Telecommunications LLC (Webpass), Zayo Group, LLC (Zayo), Century Link Communications LLC f/k/a Qwest Communications Company LLC (Century), Sonic Telecom, LLC (Sonic), GTE Mobilnet d/b/a Verizon Wireless (Verizon), Mobilitie, LLC (Mobilitie), Crown Castle NG West LLC (Crown Castle), ExteNet Systems (California) LLC (Extenet), MCImetro Access Transmission Services Corp., PAXIO, INC., Electric Lightwave Holdings, Inc. fka Integra Telecom Holdings, Inc. (Electric Lightwave), Mpower Communications Corporation, T-Mobile West LLC (T-Mobile), Level 3 Communications LLC (Level 3), TW Telecom of California I.p, formerly known as Time Warner Telecom of California, L.P (TW Telecom).

This Section covers supporting documentation required from PPC and direct payment by the Utility Owner to PPC, based upon existing agreements between the Utility Owners and the City, for all costs incurred as a result of the work performed by the PPC to support, work around and/or protect the existing Utility Crossings within the Project Site.

Principal Project Company shall identify in the relevant Design Documents all known Utilities and where Utility Crossing work is anticipated. Utilities which the Utility Owner intends to adjust or abandon thus eliminating the need for PPC to support, work around, or protect will also be identified.

Within 45 calendar days of NTP 1, the Utility Owners listed above, as applicable, will execute a payment agreement with the PPC and will pay said PPC directly for the work of supporting, working around, and protecting such Utilities, according to the Fixed Price Schedule, set forth in this Section 00 73 21. The Utility Owner is not required to accept or pay invoices submitted to the Utility Owner by a Subcontractor. PPC will not be allowed to mark up the invoices for the support and work around costs from any Subcontractor.

PPC shall perform the Work at Utility Crossings of other non-governmental Utilities not owned by the Utility Owners identified in this Section 00 73 21.

Any Utilities owned by Utility Owner that require relocation to avoid physical conflict with the facilities to be constructed under this Agreement will be relocated by the appropriate Utility Owner.

Utility Crossing work that is subject to the Fixed Price Schedule is not a Utility Adjustment.

#### Definitions

**Utility Crossing:** means any Utility, including a Utility main, duct structure, or service, located within an excavation area of the Work, where the Utility will remain in place and will not be relocated, abandoned in place, or removed.

**Duct Structure:** means one or more ducts, conduits or pipes, of any size, or a combination of such ducts, conduits or pipes, which are grouped together but which may or may not be banded, encased in concrete, or otherwise incorporated into a solid unit.

Nested Utilities: means facilities six- inches (6") or less in outside diameter or width and are less than 3 feet clear distance from each other regardless of ownership. In the case of nested facilities, each crossing shall be paid for according to the Fixed Price Schedule reduced by 33-1/3%.

Abandoned Utilities: means those Utilities identified by the Utility Owner as Utilities that the Utility Owner has stopped using with the intent of never using again.

Inactive/Deactivated Utilities: means those Utilities that Utility Owner identifies as Utilities that Utility Owner has temporarily stopped using with the possible intent of future use.

### **Fixed Price Schedule**

Utility Crossings where the length of the Utility is not more than 3 times the width of the excavation for excavation widths less than 18 feet, shall be priced pursuant to the "Fixed Price Schedules" set forth in this Section 00 73 21, and submitted to the Utility Owner for payment.

Excavation width will be the outside diameter or width of the City-owned structure plus 3 feet. The length of a Utility Crossing is the centerline distance, in feet, of the portion of the Utility within the excavation area.

### **Utility Co. Facility Support, Etc., Work Located in Contract but Utility Contract Drawings Omitted from Contract**

In the event that information from the Utility Owners listed in this Section 00 73 21, as applicable, are not included in the Agreement but the cost estimate and general location of the support, work around and protect work are known and included in the Contract Documents, all such work performed will be paid for by the Utility Owner according to the Fixed Price Schedule hereinafter set forth.

### **Utility Co. Facility Support, Etc., Work Overlooked, Unexpected, and Not Shown on Utility Contract Drawings, but Ownership Known**

Support, work around and protect work for those Utility Crossings overlooked, unexpected, and not shown on information provided by Utility Owners will be paid for by the Utility Owner according to the Fixed Price Schedule set forth in this Section 00 73 21 plus an additional fifteen (15) percent surcharge for Principal Project Company's profit and overhead.

### **Negotiated Payment**

Notwithstanding the Fixed Price Schedules hereninafter set forth, the Utility Company and the PPC shall directly negotiate the costs for:

- "Parallel" Utility Crossings,
- Utility Crossings with lengths more than three times the width of the excavation, and/or
- Where the computed cost of any crossing exceeds **\$12,748**.

If a public or private Utility is located longitudinally and directly on top of the Project trench or multiple Utilities crossing the Project trench are located too close to each other leaving no space in between for the PPC to excavate and shore the trench, and there is a need to change the construction method to install Project facilities, then the increased cost shall be shared by Utility Owners and Principal Project Company based on the number, size, and ownership of each Utility.

### **Abandoned or Inactive/Deactivated Facilities**

#### Abandoned Utilities

Abandoned Utilities are those Utilities identified by the Utility Company Owner identifies abandoned facilities as facilities Utilities that they have Utility Owner has stopped using with the intent of never using again. Utility Owner may, but is not required to, specify abandoned Utilities materials it furnishes to support Utility work, including Utility Crossings. If PPC encounters unidentified Utilities during construction, PPC shall notify the Utility Owner in

accordance with paragraph "Unexpected or Unidentified Utilities". The Utility Owner inspector shall visit the site within 24 hours or the time required in Utility contracts with the City to confirm that the Utility is abandoned. If the Utility Owner fails to confirm that the Utility is abandoned, the PPC will receive full payment per Fixed Price Schedule for support, work around and protect work performed.

#### Inactive/Deactivated Utilities

Utility Owner will specify materials it furnishes to PPC to support Work related to Utilities and Utility Crossing any inactive Utilities. The PPC will perform support, work around, and protect around inactive Utilities unless otherwise instructed by the Utility Owner.

#### Removal of Abandoned Utilities or Inactive Utilities

If necessary to construct the Project, the removal of abandoned or inactive Utilities that the Utility Owner determines it intends to abandon will be at the PPC's sole expense, except for removal of duct banks, and conduits or pipes larger than twelve-inch (12") in outside diameter owned by the Utility Owners. Utility Owner and the PPC will negotiate the cost for removal of such Utility Owner duct banks, and conduits or pipes larger than twelve-inch (12") in diameter.

#### **Payment Only for Work Performed by the PPC**

The Utility Owner will not pay the PPC unless actual work to support, work around and/or protect the Utility Owner's Utilities was performed. No payment shall be due to the PPC if the Utility Owner crews respond and are supporting, working around, and/or protecting their Utilities, such as in an emergency, or if the PPC does not actually perform any work or undertake any action to support, work around or protect the Utility Owner's Utilities.

## **II. Contract Activities**

### **Utility Crossing Measurement**

The PPC shall measure the outside diameter or width of Utility Crossings to the nearest inch (outside diameter **excluding** any fittings, bells, or gate valves) and length of the Utility Crossings to the nearest foot to determine the cost of each Utility Crossing according to the Fixed Price Schedule hereinafter set forth.

### **Utility Company's Right of Confirmation**

The Utility Owner shall have the right to confirm measurements with the PPC but all disagreements shall be resolved without delay to the Project Schedule.

### **Variations and Cost Adjustments**

The PPC shall notify the Utility Owner immediately of any variation of Utility Crossings from the materials furnished by the Utility to support Work related to Utility Crossings and estimate the required cost adjustment for such variations. Cost adjustments shall be settled within no more than two Days.

### **Verification and the PPC Itemization**

PPC shall keep an itemized record of the Utility Crossing work done, noting any variations from the materials furnished by Utility Owners to support Work related to Utility Crossings and estimates. The itemized record shall be maintained and copies submitted monthly to the Utility Owner and the City for information.

### **Supporting Documentation for City Projects other than Spot Sewer Repair Contracts**

The PPC shall, at a minimum, submit the following supporting documentation with each invoice submitted to the Utility Owner for payment:

- Utility Crossing support and work around summary and Design Documents for support and work around invoice for utilities" identifying the Utility Owner reimbursed work by type of Utility, and shall include following:

- Identification of all Utility Crossings by alpha-numerical numbering system (e.g., E1, E2, G1, G2);
- Location and size of all Utility Crossings
- Length of all Utility Crossings
- Photos of following Utility Crossings:
  - Utility Crossings where the size of the Utility varies from that shown on Design Documents or estimates; any change of measurement requires one photo per block per size variation.
  - Utility Crossings not shown on Utility Owner's Utility Contract Drawings or estimates.
  - Parallel Utility Crossings showing measurements and potential facilities support
  - Utility Crossings six-feet (6') or longer unless:
    - Shown on Utility-furnished materials and/or estimates and no variance.
    - Utility is a lateral that is crossing the excavations having 6 feet or greater trench width and crossing length does not exceed the trench width.

### **Supporting Documentation for Spot Sewer Repair Contracts**

The PPC shall, submit the following documentation with each invoice submitted to the Utility Owner for payment for spot sewer repair contracts:

- A summary of Utility Crossing support and work around.
- Support and work around invoice for Utility Crossings identifying company reimbursed work by block, type of Utility and shall include following:
  - Identification of all Utility Crossings by alpha-numerical numbering system (e.g., E1, E2, G1, G2);
  - Location and size of all Utility Crossings
  - Length of all Utility Crossings.
  - Invoice and as-built templates shall be utilized and all information filled out in its entirety (e.g. PPC representative's name and signature, date, etc.)
- Photos of following Utility Crossings:
  - All Duct Bank Structures and related measurements
  - All Utility Crossings six-feet (6') or greater in length
  - All unmarked active Utility Crossings that are supported
  - Each utility that varies in size and/or location from USA street marking(s).
- Underground service alert ticket number

### **Photos**

All photos must include:

- Label with Utility Crossing reference number
- Name of street or intersection
- Above-ground picture that includes a landmark (street sign, or house) that helps identify location of the crossing.

**Unexpected or Unidentified Utilities**

If, during the course of the work, an unexpected or unidentified interference is discovered, the PPC shall immediately call this fact to the attention of all Utility Owners, including appropriate City Departments. The City Departments and Utility Owner shall have 48 hours from receipt of such notification including at least 8 working hours to determine ownership and provide direction to the PPC for disposition of the Utility which are not in direct conflict with the Work and can be supported, worked around and protected in the trench. However, if the unidentified facility is in direct physical conflict with the City Project work and the PPC cannot proceed further without resolution, the Utility Owner and City Departments will visit the site as soon as possible within the 24 hours from receipt of such notification to determine ownership and provide direction to the PPC. The time allowance shall include at least 8 working hours. If the ownership of the unidentified Utility is unknown, the PPC shall call Underground Service Alert (USA) requesting Utility Companies to visit the site to identify the ownership. If no determination can be made after the aforementioned procedure is followed, the PPC will follow the direction of the City or authorized designee to either remove the facility as abandoned or support and work around the Utility. Disposition shall be in accordance with the applicable requirements of Section 00 73 20, Article 1.3, if such Utilities are owned by Utility Owners other than the Utility Owners listed above. If ownership is by one or more of the Utility Owners listed above, disposition shall be as hereinbefore set forth under the heading, "Utility Owner Utility Support, Etc., Work Overlooked, Unexpected, and Not Shown on Utility Contract Drawings, But Ownership Known." If the City directs the PPC to support and work around a Utility whose ownership is unknown and cannot be confirmed that it is abandoned, support and work around work of such Utility will be paid for by the City according to the Fixed Price Schedule hereinafter set forth plus an additional fifteen (15) percent surcharge for PPC's profit and overhead.

**Progress Payments**

Progress payment for completed Utility Crossing work shall be made by the Utility Owner within ninety (90) days of receipt of an invoice from the PPC submitted along with the supporting documentation listed above.

**III. METHOD OF DETERMINING UTILITY CROSSING COSTS**

**Fixed Price Schedule**

The cost of support, work around and protection of Utility mains, duct structures and services shall be based on the outside diameter or width of said Utilities and the length of the Utility Crossing.

In the following schedules the maximum outside diameter shall mean outside diameter of pipe, conduit, service, duct or main **excluding** any fittings, bells, or gate valves, and width shall mean the distance measured horizontally across the duct structure.

**Cost of Utility Crossing = Fixed Cost + Support Cost Group I: Length of Crossing less than Six (6) Feet**

<b>Maximum Outside Diameter Of Main And Service Or Width Of Duct Structure</b>	<b>Fixed Cost</b>	<b>Support Cost Per Foot of Length of Crossing</b>
4 inches or less	<b>\$717</b>	0
Over 4 inches to 20 inches	<b>\$717 + \$119</b> per inch over 4 inches	0
Over 20 inches	<b>\$2,628 + \$199</b> per inch over 20 inches	0

**Group II: Length of Crossing Six (6) Feet to Twelve (12) Feet**

<b>Maximum Outside Diameter Of Main And Service Or Width Of Duct Structure</b>	<b>Fixed Cost</b>	<b>Support Cost Per Foot of Length of Crossing Over Six Feet</b>
4 inches or less	<b>\$916</b>	<b>\$119</b>
Over 4 inches to 20 inches	<b>\$916 + \$127 per inch over 4 inches</b>	<b>\$119</b>
Over 20 inches	<b>\$2,955 + \$215 per inch over 20 inches</b>	<b>\$119</b>

**Group III: Length of Crossing Greater than Twelve (12) Feet**

<b>Maximum Outside Diameter Of Main And Service Or Width Of Duct Structure</b>	<b>Fixed Cost</b>	<b>Support Cost Per Foot of Length of Crossing Over Twelve Feet</b>
4 inches or less	<b>\$1,633</b>	<b>\$159</b>
Over 4 inches to 20 inches	<b>\$1,633 + \$143 per inch over 4 inches</b>	<b>\$159</b>
Over 20 inches	<b>\$3,926 + \$239 per inch over 20 inches</b>	<b>\$199</b>

## **SECTION U2. SUPPORT, WORK AROUND, AND PROTECT EXISTING PACIFIC GAS AND ELECTRIC COMPANY (PG&E) UNDERGROUND FACILITIES - STANDARD TECHNICAL SPECIFICATIONS**

The requirements for supporting, working around, and protecting existing Pacific Gas and Electric Company (PG&E) underground electric, gas and steam Utilities are as follows:

For pipe and conduit in sizes up to and including 6 inches inside diameter, spans of less than 6 feet shall be considered self-supporting unless otherwise directed by the City or by the PG&E inspector through the City. Spans of 6 feet and more, but not to exceed 12 feet, shall be supported by a beam with at least one cable and turnbuckle. For spans over 12 feet, an additional cable and turnbuckle shall be installed for each additional 6 feet or fraction thereof of span. Cables and turnbuckles shall be located to support joints, valves and other fittings. Cast iron joints and valves, where encountered, shall be supported on both sides.

For pipe and conduit in sizes larger than 6 inches inside diameter, spans shall be supported by beams with cables and turnbuckles located at intervals not to exceed ten times the diameter of the pipe measured in inches, unless otherwise directed by the City or the PG&E inspector through the City. Cable and turnbuckles shall be located to support joints, valves, and other fittings. Cast iron joints and valves, where encountered, shall be supported on both sides.

Concrete-encased duct lines and/or concrete-encased steam lines shall not be considered as

self-supporting, but may be so designated by the City or PG&E inspector through the City, upon a visual examination of the concrete envelope.

Beams, cables and turnbuckles for supporting steel pipe and/or conduit shall be adequately sized to limit the deflection so as not to exceed length of span in feet divided by 360.

### **Length of Span in Feet**

Beams, cables and turnbuckles used for supporting cast iron pipe shall be adequately sized to ensure that no deflection will occur.

Beams, cables and turnbuckles used for supporting concrete encased duct lines and/or concrete encased steam lines shall be adequately sized and spaced to ensure that no deflection will occur.

For multi-way conduits, spacers shall be placed to maintain conduit separation at point of support. 2-inch x 4-inch wood softeners shall be used with all cable slings to prevent damage to pipe, coating, wrapping or concrete encasement. However, slings supporting unreinforced concrete encased pipe must also incorporate strongbacks to prevent cracking of concrete.

PPC shall exercise due care to avoid damage to pipe and pipe coatings, wrapping or concrete encasement. To help prevent damage to gas pipelines and other PG&E underground utilities, call 811 at least two (2) working days before and up to fourteen (14) days in advance of an excavation so that all crossings can be verified. Should PPC damage or displace any PG&E facility: move to a safe location, call 911, and then contact PG&E at 1-800-743-5000 (gas and electric facilities). Repairs or replacements will be made by the PG&E.

### **SECTION U3. SUPPORT, WORK AROUND, AND PROTECT EXISTING PACIFIC BELL TELEPHONE COMPANY D/B/A AT&T CALIFORNIA (AT&T) UNDERGROUND UTILITIES - STANDARD TECHNICAL SPECIFICATIONS**

#### **General**

The requirements for supporting, working around, and protecting existing AT&T underground Utilities are as follows:

#### **Requirements for Supporting AT&T Ducts**

A single duct spanning less than 6 feet shall be considered self-supporting unless otherwise directed by the City or by the AT&T inspector through the City.

A single duct spanning more than 6 feet shall be supported by a beam with at least one cable and turnbuckle. For spans over 12 feet, an additional cable and turnbuckle shall be installed for each additional 6 feet or fraction thereof of span. Cables and turnbuckles shall be located to support duct joints.

Duct structures consisting of 2 or more single ducts not encased in concrete and spanning more than 4 feet, shall be banded with at least 2 bands and supported by a beam with at least one cable and turnbuckle. For spans over 8 feet, an additional set of bands, cable and turnbuckle shall be installed for each additional 4 feet or fraction thereof of span. Banding of ducts shall be done in such a manner as to not distort the normal configuration of the structure.

Duct structures consisting of 2 or more single ducts, encased in concrete and spanning more than 4 feet, shall be supported by a beam with at least one cable and turnbuckle. For spans over 8 feet, an additional cable and turnbuckle shall be installed for each additional 4 feet or fraction thereof of span.

Multiple-duct structures of vitrified clay and/or concrete shall be supported for the complete width of the trench. The support shall consist of planking or beams equal in width to the width of the structure and banded to it. This structure in turn shall be supported by a beam with at least one cable and turnbuckle placed every 4 feet or fraction thereof so as to maintain the existing position and alignment of the duct structure.

Duct structures consisting of dissimilar conduit materials shall be supported in the manner applicable to the most fragile portion of the structure.

#### **Requirements for Protecting AT&T Ducts**

Single ducts shall be protected if required. This determination will be made by the City or by the AT&T inspector through the City.

Duct structures having top and bottom wood planking or encased in concrete will not require additional protection unless otherwise directed by the City or by the AT&T inspector through the City.

All other multiple duct structures, with the exception of steel pipe in good condition, shall be protected by the placement of wood planking or sheeting no less than 1/2-inch in thickness and equal in width to the width of the structure.

#### **Damage or Displacement of AT&T Utilities**

Should PPC damage or displace any AT&T owned facility, the Cable Maintenance Department of AT&T shall be notified immediately by calling 611, press Option 1, and then Option 5. Repairs or replacements will be made by AT&T.

## **SECTION U4. SUPPORT, WORK AROUND, AND PROTECT EXISTING COMCAST CORP. (COMCAST) UNDERGROUND UTILITIES - STANDARD TECHNICAL SPECIFICATIONS**

### **General**

The requirements for supporting, working around, and protecting existing Comcast underground Utilities are as follows:

#### **Requirements for Supporting Comcast Corp. Ducts**

A single duct spanning less than six (6) feet shall be considered self-supporting, unless otherwise directed by the Comcast engineering coordinator or the Comcast inspector, through the City.

A single duct spanning more than six (6) feet shall be supported by a beam with at least one cable and turnbuckle. For spans over twelve (12) feet, an additional cable and turnbuckle shall be installed for each additional six (6) feet or fraction thereof of span. Cables and turnbuckles shall be located to support duct joints.

Duct Structures consisting of two (2) or more single ducts spanning more than four (4) feet shall be banded with at least two (2) bands and supported by a beam with at least one (1) cable and turnbuckle. For spans over eight (8) feet an additional set of bands, cable, and turnbuckle shall be installed for each additional four (4) feet or fraction thereof of span. Banding of ducts shall be done in such a manner as to not distort the normal configuration of the structure.

Duct structures consisting of dissimilar conduit materials shall be supported in the manner applicable to the most fragile portion of the structure.

#### **Requirements for Protecting Comcast Ducts**

Single ducts shall be protected if required. This determination will be made by the Comcast engineering coordinator or by the Comcast Corp. inspector, through the City.

Duct Structure having top and bottom wood planking will not require additional protection unless otherwise directed by the Comcast engineering coordinator or the Comcast Corp. inspector through the City.

All other multiple duct structures shall be protected by the placement of wood planking or sheeting no less than 1/2-inch in thickness and equal in width to the width of the structure.

#### **Damage or Displacement of Comcast Facilities**

Should PPC damage or displace any Comcast owned facility the proper authorities shall be notified immediately by calling 1-888-824-8399. Repairs or replacements will be made by Comcast

## **SECTION U5. SUPPORT, WORK AROUND, AND PROTECT EXISTING MUNI TRANSIT POWER (MTP) UNDERGROUND FACILITIES - STANDARD TECHNICAL SPECIFICATIONS**

### **General**

The requirements for supporting, working around, and protecting existing Muni Transit Power (MTP) underground conduit and ducts are as follows:

#### **Requirements for Supporting MTP Conduits and Ducts**

Steel conduit spanning less than six feet shall be considered self-supporting unless otherwise directed by the City or by the MTP inspector through the City.

Steel conduit spanning six feet and more shall be supported by a beam with at least one cable and turnbuckle. For spans over 12 feet, an additional cable and turnbuckle shall be installed for each additional six feet or fraction thereof of span. Cables and turnbuckles shall be located to support duct joints.

Beams, cables and turnbuckles for supporting steel conduit shall be adequately sized to limit the deflection so as not to exceed length of span in feet divided by 360.

Spacers shall be placed between multiple conduits in a manner to maintain conduit separation at points of support.

Concrete-encased ducts spanning more than four feet shall be supported by a beam with at least one cable and turnbuckle. For spans over eight feet, an additional cable and turnbuckle shall be installed for each additional four feet or fraction thereof of span for the complete width of the excavation.

Beams, cables and turnbuckles for supporting concrete-encased duct lines shall be adequately sized and spaced to insure that no deflection will occur.

PPC shall provide adequate support and protection to prevent differential movement at the juncture of manholes and duct banks.

Duct structures consisting of dissimilar conduit materials shall be supported in the manner applicable to the most fragile portion of the structure.

#### **Requirements for Protecting MTP Conduits and Ducts**

Steel conduit shall be protected if required. This determination will be made by the City or by the MTP inspector through the City.

Duct structures having top and/or bottom wood planking or encased in concrete will not require additional protection unless otherwise directed by the City or by the MTP inspector through the City.

All other duct structures, such as unprotected tile and the like, shall be adequately protected by the placement of wood planking or sheeting no less than 1/2-inch in thickness and equal in width to the width of the structure. The top, bottom and sides shall be covered as necessary, depending on PPC's operations and the conditions of the work.

#### **Damage or Displacement of MTP Facilities**

Should PPC damage or displace any MTP-owned facility, John Orkes, Overhead Lines Superintendent of the Traction Power Group (TPG), shall be notified immediately by calling 1-415-554-9221. Repairs or replacements will be made by MTP.

**Conduits to Pole Risers to be Considered as Services**

For the purpose of payment, conduits that run directly from a manhole or pull box to a pole riser shall be considered to be a service and will be paid for according to the Cost of Utility Crossing Schedule above (III. METHOD OF DETERMINING UTILITY CROSSING COSTS).

**END OF SECTION**

## SECTION 01 12 00 - SPECIAL INSTRUCTIONS

### PART 1 - GENERAL

The following conditions apply to the Work / Project.

- A. Principal Project Company shall comply with Article 37 of General Order 95 of the Public Utilities Commission State of California. CAL OSHA regulations require that any equipment that moves vertically must maintain a 10 feet radial clearance, and any other equipment must maintain a 6 feet clearance from SFMTA overhead electric wires. The Principal Project Company shall observe these regulations during the entire duration of the construction work. The Principal Project Company shall choose the appropriate construction means and methods to meet all CAL-OSHA rules and regulations while accommodating MUNI's operational and facility's requirements.
- B. Relocating or isolating/re-energizing MUNI overhead wires will not be allowed for roadway related work, which includes, but is not limited to curb ramps, curbs, gutters, sidewalk, parking strips, paving, and adjustment of castings.
- C. Initial Curb Ramps: The Principal Project Company shall complete the construction of the initial curb ramps at two curb returns and have them inspected and approved by the City as Regulator prior to proceeding with construction of the other curb ramps. No additional curb ramps shall be constructed until the City as Regulator has approved the initial curb ramps. Inspection will include workmanship, color, finishes, and to verify that the curb ramps conform to the plans and specifications. The approved initial curb ramps shall be a standard of comparison for all curb ramps work.
- D. The Principal Project Company shall ensure that the existing fire hydrants on site are not removed or relocated prior to curb ramp layout. The existing fire hydrant and flange shall be removed prior to final curb ramp or concrete finishing.
- E. The Principal Project Company shall ensure there is proper coordination of new fire hydrant and water meter box locations with new curb ramp construction locations, so that new fire hydrants and water meter boxes do not negatively impact the curb ramp design requirements in accordance with SFDPW Standard Plans 102,854 thru 102,864.
- F. The Principal Project Company shall use proper equipment to prevent unnecessary damage to public and private property not otherwise part of the Project or identified as part of the Work such as no heavy equipment on the top of sidewalks.
- G. The Principal Project Company shall use temporary hot mix asphalt concrete to provide longitudinal and/or transverse transitions with a slope of 1:18 between the newly constructed concrete base, manhole, etc. and existing pavement (whenever the difference in the grade of the pavement and the concrete base, manhole, etc. exceeds 3/4 inch) by the end of the work shift or before opening the lanes to traffic. Temporary hot mix asphalt paving shall conform to Section 211.01 of DPW Standard Specifications. Installing and removing temporary paving shall be considered incidental work.
- H. Five (5) working days prior to the commencement of Construction Work, Contractor shall notify Mark Middleton of the San Francisco Public Utilities Commission at (415) 262-2144 or (415) 254-3538 to schedule removal of flow meters installed in sewer manholes, if encountered within the work scope.
  1. Three days (3) after completion of sewer work, Principal Project Company shall contact Mark Middleton for PUC to reinstall flow meters at affected locations.

**THIS APPLIES TO THE REMOVAL OF EXISTING BUS SHELTERS AND INSTALLATION OF NEW BUS SHELTERS AND CORRESPONDING ELECTRICAL CONDUITS WITH CLEAR CHANNEL.**

- I. The Principal Project Company shall coordinate all bus shelter work with SFMTA and Clear Channel. Clear Channel will coordinate the removal of existing bus shelter with Principal Project Company in order to minimize bus shelter down time. Principal Project Company shall verify the new bus shelter locations with Clear Channel on site. After demolition and removal of the existing concrete pavement, Principal Project Company shall allow a maximum of five (5) working days for Clear Channel to install the underground electrical conduits and pull boxes at each bus shelter location. Principal Project Company is to contact Clear Channel and SFMTA for the new bus shelter installation after sidewalk construction has been completed.
- J. If completion of the Work will require temporary closure of the roadway, such closure shall be coordinated so that neighbors are as minimally impacted as possible in multiple phases of construction.
- K. Principal Project Company shall coordinate with Recology for neighborhood garbage collection at the Project Site.
- L. Principal Project Company shall coordinate with neighbors and the City's Authorized Representative to allow for ingress and egress to properties during construction.
- M. Contractor shall not have more than 0.5 acres open with active construction at any one time in the public right-of-way.
- N. Contractor shall notify the SFMTA Meter Shop ten (10) business days prior to demolition work in areas with parking meters and once parking areas are reopened to the public.
- O. Contractor shall notify the MTA Meter Shop ten (10) business days in advance of new concrete sidewalk pours to coordinate the installation of parking meter sleeves in new concrete sidewalk areas.
- P. Tree trimming, replanting and removal shall be coordinated with BUF (Bureau of Urban Forestry). Provide ninety (90) calendar day notice. Tree removal or relocation shall require a permit application and fee to BUF.
- Q. Contractor shall notify owners of sub-sidewalk basements in writing at least 30 days prior to performing any work within sub-sidewalk basements to coordinate access to the basements.
- R. Only temporary overlay pavement markers shall be placed on top of the micro-surfacing finished work areas. Temporary tape traffic striping may be placed in areas after the permanent striping has been removed. Temporary tape traffic striping shall be removed before the area has micro-surfacing work performed.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## **SECTION 01 13 00 - OVERHEAD CONTACT SYSTEM (OCS) ISOLATION AND REPLACEMENT**

### **PART 1 - GENERAL**

#### **1.1 OVERHEAD CONTACT SYSTEM (OCS) ISOLATION**

- A. Principal Project Company shall perform, but not be limited to, the following tasks to complete OCS isolation work:
  - 1. Traffic control work for de-energization and re-energization related to OCS isolation work;
  - 2. Preparing A site specific work plan (SSWP);
  - 3. Attend all necessary safety training and be certified by SFMTA as required before starting said work;
  - 4. Principal Project Company shall sign a SFMTA Safety Training Waiver for OCS de-energization with respect to the safety training;
  - 5. Obtain approval of submittals and clearance permit from SFMTA Operations Control Center (OCC) before beginning said work. SFMTA OCC permit application procedure will be discussed as part of the SFMTA safety training;
  - 6. support during de-energization and re-energization of OCS (isolation of OCS) including support regarding installation and removal of sectional insulators; and
  - 7. Perform all related and incidental work required for the isolation of wires in accordance with Technical Requirements and General Order 95 Cal-OSHA requirements.

### **PART 2 - PRODUCTS (NOT USED)**

### **PART 3 - EXECUTION**

#### **3.1 OVERHEAD CONTACT SYSTEM (OCS) REMOVAL**

- A. Principal Project Company shall complete all scope of work as shown in the SFMTA approved OCS disconnection, cut, salvage-in-place, and removal plan.
- B. Principal Project Company shall complete all scope of work as shown in the SFMTA approved new OCS replacement, installation, and re-energization plan.

**END OF SECTION**

## SECTION 01 14 00 - ARTWORK COORDINATION

### PART 1 - GENERAL

#### 1.1 DEFINITIONS

- A. San Francisco Arts Commission (Arts Commission) shall mean the Charter-established City agency that has jurisdiction over all art belonging to the City and charged with the preservation and care of this Artwork.
- B. San Francisco Arts Commission Public Art Program shall mean the department responsible for the commissioning of permanent public Artworks to be accessioned into the Civic Art Collection as required by the City's Art Enrichment Ordinance.
- C. Artist shall mean a person that designs the Artwork and consults on its fabrication and installation through a separate contract with the City, under the supervision of the San Francisco Arts Commission.
- D. Artwork shall mean:
  - 1. Artist-designed graphics integrated into the architectural glazing of the bus ramp on 17th Street measuring approximately 11,000ft<sup>2</sup>, facing Franklin Square.
  - 2. Artist-designed graphics integrated into the architectural glazing of a multi-story stairwell measuring approximately 3,800ft<sup>2</sup>, located on Mariposa Street at York Street.
  - 3. Large-scale tile Artwork on building façade measuring approximately 3,000ft<sup>2</sup>, located on 17th Street at Bryant Street.
- E. Public Art Project Manager shall mean the person that represents the San Francisco Arts Commission Public Art Program.

#### 1.2 SUMMARY

- A. Section includes:
  - 1. Requirements for installation of Artwork that has been designed for this Project under the direction of the San Francisco Arts Commission (SFAC) Public Art Program.
    - a. SFAC Public Art Project Manager for this Project, shall be the contact person for all aspects related to the Artwork; coordinate the work of the various artists, and shall receive copies of all communications concerning aspects of the Project Schedule that are pertinent to the Artwork, site preparation, coordination, delivery, installation, and protection of the Artwork.
    - b. For Tile Artwork:
      - 1) Artwork will be produced by Artist under a separate agreement with the City/San Francisco Arts Commission.
      - 2) Principal Project Company shall coordinate any and all work related to the installation of Artwork with the Public Art Project Manager.
    - c. For Glass Artworks:
      - 1) Artwork digital files will be furnished by the SFAC Public Art Manager.

- 2) Principal Project Company shall coordinate all aspects of fabricating the Artwork in consultation with the SFAC Public Art Project Manager.
  - 3) Principal Project Company shall coordinate all aspects of transportation, acceptance and handling of Artwork (e.g., Artwork crates), installation schedule and protection of Artwork, as applicable.
  - 4) Principal Project Company shall coordinate any and all work related to installation of Artwork with the SFAC Public Art Project Manager.
- d. Principal Project Company shall coordinate all aspects of acceptance, storage, transportation, and installation of Artwork including, but not limited to the following:
- 1) Provide the Arts Commission with shop drawings showing the field verified and hold dimensions, materials of walls where Artwork will be installed.
  - 2) Provide Project Schedule updates to include transportation, unpacking, installation, protection, and cleaning of Artwork.
- e. Principal Project Company shall coordinate all work related to installation of Artwork with the Public Art Project Manager.

B. San Francisco Arts Commission Contact Person:

1. Public Art Project Manager:

Jackie von Treskow  
 Senior Program Manager, Public Art  
 San Francisco Arts Commission  
 401 Van Ness Avenue, Suite 325  
 San Francisco, CA 94102  
 Telephone: (415) 252-2225  
 Email: jackie.vontreskow@sfgov.org

2. Artists' Contact Information:

a. TBD

C. Artwork:

1. Artworks include but are not limited to:

- a. **Artwork graphics** for incorporation into of 17th Street Bus Ramp and Mariposa and York Stairwell glazing.
- b. **Graphic ceramic tiles** to be installed on the building exterior.

2. For Glass Artwork:

- a. Artwork shall consist of decorative glass units for installation into the building's curtain wall system.
- b. Final selection of glass type to be determined through the further development of the specification via the sample review process with the artist and selected vendor.
- c. All treatments must have a warranty of 10 years, without degrading or fading.

3. For Tile Artwork:
  - a. Artwork shall consist of ceramic tiles for installation on the building façade.
  - b. The Arts Commission shall provide and arrange for delivery of Artwork to the Principal Project Company-provided secure, weatherproof, conditioned storage site within a thirty-mile radius of San Francisco for temporary storage prior to installation by the Principal Project Company into the Infrastructure Facility as indicated on the Final Design Documents.
  - c. Principal Project Company shall coordinate the receipt of Artwork, inspection, storage, field verification of site conditions, transportation from storage to project site and installation of the Artwork and related contract activity, provide services as specified in this Section, and protect Artwork during and after installation until Final Acceptance.
4. Artwork must be integrated with construction of the Infrastructure Facility and installation coordinated and scheduled to align with the work and schedule of other trades.
5. Principal Project Company shall include Artwork installation and protection as an activity in the Principal Project Company's Project Schedule based on coordination discussions during the pre-installation conference(s). Principal Project Company shall notify the Public Art Project Manager in writing of all changes in the Project Schedule related to the Artwork(s), and is responsible for contacting the Public Art Project Manager with specific installation dates for the Artwork no less than 90 days in advance of installation.

### **1.3 SCHEDULING**

- A. Principal Project Company's Project Schedule shall include the following milestones:
  1. Date of delivery of Artwork to the Project Site;
  2. Date(s) of pre-installation Conference(s)
  3. Dates of Artwork installation
  4. Date of Artwork acceptance.
- B. Additional activities shall include, but not be limited to the following: pre-production, submittals, shop drawings, samples, and field inspections.
- C. Upon completion of installation, inspection will be scheduled with Artist, Public Art Project Manager, Principal Project Company, and the City's Authorized Representative for final acceptance of the Artwork. If repairs to the Artwork are required, the Principal Project Company shall complete these and other punch list items before approval by Artist, Public Art Project Manager, and the City's Authorized Representative.

### **1.4 SUBMITTALS**

Principal Project Company shall prepare and submit the following to the Public Art Project Manager, Artist(s), and City's Authorize Representative. No work shall proceed until shop drawings of the Artwork are approved by the Arts Commission and Artists:

- A. Shop Drawings:
  1. Base drawings for layout of Artwork: shall include areas receiving Artwork, incorporate field-verified finish dimensions of the overall area, locations and dimensions of openings, construction, joint layouts, descriptions of finish and structural support details. The

submitted base drawings shall be the basis for the artists to provide rough layout guidelines for the Principal Project Company to prepare final installation shop drawings indicated below.

2. Protection Plan: location and information regarding storage location for the Artwork, protection materials and necessary equipment, attachment details, and work plan to protect installed Artwork in-place until project completion.

B. Product Data:

1. Manufactured Products, including Sealants.
2. Manufacturer's specifications, recommendations, and installation instructions - including cleaning and preparation of substrates for each product to be used.
3. Protection materials and equipment.

C. Samples:

1. For Glass Artwork:

a. Minimum 12" x 12" samples to be provided.

- 1) Submit up to 6 initial 12"x 12" square samples to show full range of colors, details of graphics, and visual transparency. Adjustments by Artist to Artwork digital graphics files may be made by Artist in response.
- 2) Submit up to 6 additional 12"x12" samples based on adjusted graphics.

b. Minimum 24" x 24" samples to be submitted following approval of 12"x12" samples.

- 1) Submit up to 2 initial 24"x24" square samples to show full range of colors, details of graphics, and visual transparency. Adjustments by Artist to Artwork digital graphics files may be made by Artist in response.
- 2) Submit up to 2 additional 24"x24" square samples based on adjusted graphics.

c. For Tile Artwork: Color samples of sealants, grouts and any other Principal Project Company-provided materials exposed to view.

d. Protection materials.

2. Quality Control: Statement of qualifications for each installer related to Artwork. The Principal Project Company shall provide supporting documentation indicating past experience for each installer upon request of the Arts Commission.

## 1.5 PRE-ARTWORK INSTALLATION CONFERENCES

- A. Principal Project Company to provide no less than 14 days advance notice and confirm attendance by Public Art Project Manager, Artist, and City's Authorized Representative.

## 1.6 IDENTIFICATION AND RESPONSIBILITY

- A. Unless otherwise indicated, all items of work associated with the receipt of Artwork, initial inspection, storage, transportation, installation and protection of the Artwork indicated are the Principal Project Company's responsibility.

- B. Principal Project Company shall jointly inspect the condition of each piece of Artwork with the Arts Commission upon receipt of Artwork delivery at the Principal Project Company's storage site and shall re-package the Artwork to the satisfaction of the Arts Commission after the inspection for storage and for subsequent transportation to the Project Site.
- C. Installation requirements shall be as specified and as shown on the Principal Project Company's approved installation shop drawings. Artist and the Arts Commission shall be responsible for reviewing and approving the Principal Project Company-prepared installation shop drawings. Principal Project Company shall be responsible for preparation of substrates, wall recesses and openings, surfaces, and finishes in accordance with the approved shop drawings.
- D. Principal Project Company Responsibilities. Principal Project Company shall:
  - 1. Submit all Submittals as specified in this Section 01 14 00.
  - 2. For Glass Artwork:
    - a. Coordinate sampling process with the SFAC Public Art Project Manager.
    - b. Coordinate the fabrication of Artwork in accordance with the requirements of SFAC.
  - 3. For Tile Artwork: Prepare substrates, surfaces, and finishes receiving and/ or surrounding Artwork.
  - 4. Receive, inspect, handle, repackage, protect, and store Artwork at an approved storage location not at the project construction site, and transport Artwork from the storage location to the Project Site for installation.
  - 5. Install Artwork as shown on reviewed and approved shop drawings, under the supervision of the Arts Commission, Public Art Project Manager, Artist, and the City's Authorized Representative.
  - 6. Develop installation schedule in consultation with Arts Commission for each Artwork element. Notify the Arts Commission of installation schedule for each Artwork.
  - 7. Provide all anchorage, mounting, and installation devices and materials, hardware, and trim for Artwork as specified below, or as otherwise necessary to complete installation of the Artwork.
  - 8. Replace and reinstall any and all defective installations by Principal Project Company of Artworks, to be determined by the Arts Commission.
  - 9. Be responsible for cost of repair and replacement solely by the original Artist of any Artwork elements that are broken or damaged by Principal Project Company from the moment the Principal Project Company takes possession of the Artwork, during handling, unpacking, storage, transporting and installation, and until acceptance by the Arts Commission or Final Acceptance, whichever comes first.
- E. Arts Commission Responsibilities. The Arts Commission will:
  - 1. For Glass Artwork:
    - a. Deliver digital production files of Artwork for glass fabrication.
    - b. Communicate sampling process with Artist.

2. For Tile Artwork:
  - a. Fabricate and deliver Artwork in a timely manner to a predetermined storage location for Principal Project Company acceptance, storage and installation with related construction.
3. Coordinate shop drawing review comments from the Artist to the City's Authorized Representative and Principal Project Company.
4. Conduct joint inspection of Artwork with Principal Project Company upon delivery of Artwork to storage location.
5. Coordinate with Principal Project Company for the time of delivery and method of transporting Artwork, storage, and supervision for installation of each Artwork item.
6. Review and approve installation of each Artwork as installation is completed by Principal Project Company.
7. Coordinate communication between Principal Project Company and Artist, and between Principal Project Company and other fabricators of Artwork.

## **1.7 PROJECT CONDITIONS**

- A. *[Left intentionally blank]*

## **1.8 QUALITY ASSURANCE**

- A. Pre-Installation Conferences(s): Principal Project Company shall schedule pre-installation meeting(s) with the City's Authorized Representative, Public Art Project Manager, Artist (if necessary), and appropriate members from the DB Contractor to coordinate and review details, schedules and responsibilities for the Work described in this Section.
- B. The coordination and installation Work described in this section is integral with the Artwork. This work will be held to close scrutiny by the Arts Commission. The Principal Project Company shall hire qualified workers with demonstrable experience in handling, protection, and installation of glass, tile, and other materials used in the Artwork and shall ensure that such workers and materials meet the applicable qualifications set forth in clauses (C) and (D) below.
- C. Glass Artwork Manufacturer Qualifications:
  1. Manufacturer shall have experience sufficient to demonstrate at least 15 Artwork projects of similar size with digitally printed images on glass used at exterior locations.
  2. Manufacturer of Artwork glass shall be capable of providing digitally printed inks on the same surface as low-E coatings.
  3. All fabrication of glass, including cutting, drilling, grinding, and notching, shall be completed prior to application of artwork.
  4. Digitally printed glass shall be viewed from 5 feet under natural daylight conditions for inspection of image quality.
    - a. Defects such as pinholes, fisheyes, perceived color variation, and/or streaks shall not be acceptable when observable at 5 feet or more.

- b. Image variation including off-parallel, missing, or shift images shall not be acceptable when observable at a distance of 5 feet. Image variation along the edges of the glass are not acceptable if they occur more than 1/8" from edge of glass.

D. Installer of Artwork Qualifications:

1. Installer shall have at least 5 years demonstrable experience in installation of similar artworks of types, materials, and sizes to be installed for this Project and shall be acceptable to the Arts Commission. Experience shall be documented in the form of a list of five (5) relevant completed projects with contact information for project references and a resume.
2. Installer must demonstrate experience in handling finely crafted elements, evidence of service orientation, capability of meeting close tolerances, and ability to work with the Arts Commission and Artists who will oversee and supervise the installation of the Artwork.

E. Mock-ups:

1. For glass Artwork panels, Principal Project Company shall provide three full size mock-ups as will be discussed/confirmed at the pre-production meeting. Final location of the mockups will be as approved by the SFAC Public Art Project Manager. The mock-ups shall be a complete installation to illustrate the interface between Artwork and joints between glass panels, including applicable sealants and lighting as indicated on the drawings or required by the specifications. Once approved, the full size in place mock-ups will be used as the standard for the subsequent installation quality of all glass panels for Artwork.
2. For two-dimensional wall mounted tile artwork, Principal Project Company shall install at least a 4'-0" x 4'-0" area on each wall to receive artwork. Installed samples are to serve as a mock-up for review and approval by the Arts Commission, Artist, and Principal Project Company for the installation workmanship, spacing and visual effect.
3. Each such mock-up, if approved by the Arts Commission and the City's Authorized Representative, shall be the standard for installation of all art elements of the same type and may be incorporated in the final installation.
4. If any mock-up is not approved by the Arts Commission and the City's Authorized Representative, Principal Project Company shall remove rejected mock-ups and create new mock-ups for review until approval is provided.

**1.9 DELIVERY, STORAGE, AND HANDLING**

- A. Principal Project Company shall receive, inspect, store, transport and handle Artwork and installation components with extreme care; and shall provide protective wrapping and padding as requested by the Arts Commission, and as otherwise required, until Artwork installation is completed.

**1.10 WARRANTY**

- A. Principal Project Company shall provide a 5-year warranty for all labor and materials related to the installation of all Artwork.

## **PART 2 - PRODUCTS**

### **2.1 ARTISTS AND ARTWORK**

- A. The Principal Project Company shall communicate solely with the Arts Commission through the Public Art Project Manager for all matters related to the Project installation schedule, delivery, storage, handling, actual installation, protection, and all other considerations related to the Artwork.
- B. The Principal Project Company shall not contact any Artist directly without prior written authorization from the Public Art Project Manager.

### **2.2 INSTALLATION MATERIALS AND COMPONENTS**

- A. All setting materials, grout, sealants, metal connections, anchors and fasteners and accessories shall be specified in shop drawings by Principal Project Company
- B. Colors for exposed items and materials will be selected by the Public Art Project Manager from manufacturer's custom colors.
- C. Metal Connections, anchors and fasteners for glass Artwork shall:
  - 1. provide for expansion and contraction of artwork and substrate caused by a temperature range of 120 degrees F over a 12-hour period without detrimental effect to artwork, substrate, or supports.
  - 2. support loads imposed by Artwork and to bridge variations in wall construction.

## **PART 2 - EXECUTION**

### **2.3 EXAMINATION**

- A. Project Principal Company shall verify that surfaces, supporting structures, materials, and locations to receive Artwork have been reviewed and approved by the Public Art Project Manager and Arts Commission prior to installation of Artwork. If the Public Art Project Manager and Arts Commission determine that unsatisfactory conditions exist, Principal Project Company shall not commence installation until such conditions have been corrected.
- B. Project Principal Company shall verify that field measurements are as shown on reviewed and SFAC-approved shop drawings.
- C. Project Principal Company shall verify that staging area is of appropriate size and configuration for delivery and unloading of Artworks.
- D. Project Principal Company shall verify that the delivery access from street level to the designated art locations is of the appropriate size, configuration and handling for delivery and unloading of Artworks.

### **2.4 INSTALLATION**

- A. Project Principal Company shall (i) provide a minimum of one month notice to SFAC and Artist prior to the actual start date of Artwork installation and (ii) show notice date in the Principal Project Company's Project Schedule as a milestone.
- B. Principal Project Company is responsible for installing the Artwork in accordance with the requirements in the specification and as indicated in the Final Design Documents.

- C. Principal Project Company shall be responsible for coordinating and implementing the work as required for the SFAC and the Artist as indicated in the Final Design Documents.
- D. Project Principal Company shall protect the Artworks per approved installation plan.
- E. At Substantial Completion, Project Principal Company shall (i) remove protective coverings only when directed by the Public Art Project Manager; and (ii) clean the Artwork, along with related setting materials and support or attachment devices to the satisfaction of the Public Art Project Manager and Arts Commission.

## **2.5 ACCEPTANCE OF ARTWORK BY CITY**

- A. The Public Art Project Manager will inspect and document Artwork upon completion of the Artwork installation.
- B. The Public Art Project Manager and Arts Commission will approve or reject the condition of the Artwork upon notice of Substantial Completion as part of the Final Acceptance procedures.

## **2.6 ACCEPTANCE OF ARTWORK BY PRINCIPAL PROJECT COMPANY**

- A. Project Principal Company shall provide Risk of Loss insurance for the Artwork.
- B. Upon acceptance of Artwork by the Public Art Project Manager and Arts Commission, Project Principal Company shall protect Artwork in accordance with corresponding, approved Submittals.
- C. Project Principal Company shall pay costs associated with the correction of any damage to Artwork caused during construction. Principal Project Company shall make repairs to Artwork to the satisfaction of the Arts Commission and the Artist.

## **2.7 PROTECTION OF ARTWORK BY PRINCIPAL PROJECT COMPANY**

- A. Project Principal Company shall protect Artworks from damage during and after installation and damage from adjacent construction work. Protection includes but is not limited to non-staining, non-adhesive protective coverings, temporary equipment and other materials.
- B. Project Principal Company shall remove coverings at time of Substantial Completion.
- C. Principal Project Company shall be responsible for damages resulting from mishandling or inadequate protection until Art Commission approval or Final Acceptance, whichever is earlier. Damaged Artwork shall be repaired or replaced at the Principal Project Company's expense.

## **2.8 CLEANING**

- A. Immediately prior to Substantial Completion, Project Principal Company shall remove coverings and clean Artwork, along with related setting materials and support/attachment devices, in a manner acceptable and under the supervision of the Public Art Project Manager and Arts Commission. Project Principal Company shall coordinate a test area with the Public Art Project Manager and clean the test area before proceeding with the rest of the Artwork. Project Principal Company shall ensure that installed Artwork is free of dust, debris, and foreign matter.

## **PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01 31 33 - PARTNERING PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This specification sets forth the requirements for the City and Principal Project Company to establish a collaborative partnering process for the Project. The partnering process will assist the Parties to develop a collaborative environment so communication, coordination, and cooperation are the norm, and to encourage resolution of conflicts at the lowest responsible management level.
- B. The partnering process is not intended to have any legal significance or to be construed as denoting a legal relationship of agency, partnership, or joint venture between the City and Principal Project Company.
- C. This specification does not supersede or modify any other provisions of this Agreement, nor does it reduce or change the respective rights and duties of the Parties under this Agreement, or supersede contractual procedures for the resolution of disputes, including the submittal of a timely Notice of Contract Dispute.

#### 1.2 DEFINITIONS

Unless specifically defined in this specification, all capitalized terms have the same meaning as defined in Exhibit 1 (Abbreviations and Definitions) of this Agreement.

- A. Executive Team: Senior leaders from both the City and Principal Project Company organizations responsible for steering the Project to success. The Executive Team may function as the Project's board of directors.
- B. Project Team: Key members of the City and Principal Project Company responsible for managing, implementing, and executing the Project, and who will participate in the partnering process.
- C. Stakeholders: Any third party with a vested interest in the Project's outcome. Examples include end users, neighbors, vendors, and regulatory and funding agencies.

#### 1.3 PURPOSE/GOALS

- A. The goals of project partnering are to:
  - 1. use early and regular communication with involved parties;
  - 2. establish and maintain a relationship of shared trust, equity and commitment;
  - 3. identify, quantify, and support attainment of mutual goals;
  - 4. develop strategies for using risk management concepts and identify potential project efficiencies;
  - 5. implement timely communication and decision-making;
  - 6. resolve potential problems at the lowest possible level to avoid negative impacts;
  - 7. hold periodic workshops to maintain the benefits of a partnered relationship;

8. establish periodic joint evaluations of the partnering process and attainment of mutual goals.

#### 1.4 COSTS

- A. Each party shall bear 50% of the costs of the partnering process set forth in this Section. No mark-up, overhead or other fees shall be added to the partnering costs. If the Principal Project Company fails or refuses to pay the facilitator invoices, the City may pay such invoices and deduct the Principal Project Company's portion from any amount that is due or may become due under the Agreement.
- B. The fees and expenses of the facilitator, partnering training and workshop site costs, if any, shall be paid for by Principal Project Company.
- C. Principal Project Company shall pay the invoices of the facilitator and/or workshop site costs after approval by both Parties and may seek reimbursement for City's share on its invoices.

### PART 2 - PRODUCTS (NOT USED)

### PART 3 - EXECUTION

#### 3.1 PARTNERING INITIATION

- A. No later than 60 days following NTP 1, Principal Project Company shall send the City a written invitation to enter into a partnering relationship for the Project.

#### 3.2 PARTNERING ELEMENTS

- A. At minimum, the Parties shall incorporate into the partnering relationship the following elements:
  1. **Executive Sponsorship.** A commitment from the Executive Team to support and participate in the partnering process.
  2. **Collaborative Partnering.** A structured and scalable process made up of elements that develop and grow a culture (i.e., value system) of trust between the Parties. Together, the combination of elements including the partnering charter, executive sponsorship, partnering workshops, accountability tools for the Project Team, and the facilitator create a collaborative atmosphere on the project.
  3. **Facilitator.** The Parties shall select a professional neutral facilitator according to the process described in Section 3.3, below, to lead workshops.
  4. **Partnering Charter and/or mission statement.** The Parties shall create a partnering charter that is the guiding focus for the Project Team. It shall document the Project Team's vision and commitment to work openly and cooperatively together toward mutual success during the Term. The partnering charter helps to maintain accountability and clarity of agreements made and allows for broader communication of the Project Team's distinct goals and partnering process. At minimum, the partnering charter must include the following elements:
    - a. Mutual goals, including, at minimum, core goals related to the Project's schedule, budget, quality, and safety.
    - b. Partnering maintenance plan that describes the frequency of partnering sessions, described in [Section 3.2.A.7], below.

- c. Dispute resolution plan that includes an Issue Resolution Ladder, described in [Section 3.2.A.6], below.
  - d. Team commitment statement and signatures.
5. **Partnering Workshops.** The Parties shall hold the following partnering workshops:
- a. **Kick-off Partnering Workshop.** The Parties shall hold a kick-off partnering workshop to mutually develop the framework for a successful partnering process. During the kick-off partnering workshop the Parties shall: (i) identify the members of the Project Team, Executive Team, and initial Stakeholders; (ii) draft a partnering charter and its components, described in [Section 3.2.A.4], above; (v) determine the locations for partnering workshops; and (vi) address other administrative details, as necessary.
  - b. **Project Team Partnering Workshops.** The Parties shall hold regularly scheduled partnering workshops for the Project Team as determined in the kick-off partnering workshop. Each workshop is a formalized meeting focused on developing a collaborative culture among the Project Team. The Project Team may use these workshops to set goals or commitments for the Project, attend joint training sessions, and perform other tasks. These partnering workshops are intended for the Project Team, though other partnering participants may attend as needed depending on the subject matter. Quarterly workshops are recommended.
  - c. **Executive Team Partnering Workshops.** The Parties shall hold partnering workshops or sessions for the Executive Team as determined in the kick-off partnering workshop.
6. Stakeholder Participation
- a. If the Parties mutually agree, they may hold partnering workshops or sessions where they invite Stakeholders. The purpose of these workshops or sessions is that they be conducted as listening sessions where Stakeholders provide input. Frequency shall be as determined in the kick-off partnering workshop. Bi-annually workshops are recommended.
7. **Issue Resolution Ladder:** The Parties shall mutually develop a stepped process that structures informal, project-level negotiations between the Parties to addresses issues or disputes (“Issue Resolution Ladder”). The intent of this Issue Resolution Ladder is to provide a process that quickly elevates issues or disputes up the chain of command between the Parties before they proceed to mediation. The objective is to resolve issues or disputes at the lowest practical level and to not allow individual project issues to disrupt project momentum. When an issue or dispute is escalated one level, it is expected that a special meeting focusing on the negotiated settlement for that issue will be called with the goal of settling as quickly as possible.

Sample Issue Resolution Ladder			
Team Level	City Department	Principal Project Company	Time to Elevate
1	Project Manager	Project Manager	2 weeks
2	Project Director	Project Director	2 weeks
3	Division Manager	CEO	2 weeks

4	Deputy Department Director	Equity Member's Project Principal	2 week
---	----------------------------	-----------------------------------	--------

8. Project Survey:
  - a. The Parties shall participate in periodic partnering evaluation surveys to measure progress on mutual goals and short-term key issues as they arise.

### 3.3 SELECTION OF A FACILITATOR

- A. **No later than 90 days** after NTP1 the Parties shall meet to mutually select a professional neutral facilitator for the Project in time to schedule and lead the kick-off partnering workshop. The facilitator shall lead other, follow-up partnering workshops and, if necessary or required, additional sessions.
- B. The qualifications for the facilitator are, as follows:
  1. The facilitator shall be trained in the recognized principles of partnering;
  2. The facilitator shall have at least three years' experience in providing partnering facilitation services for public-sector construction projects;
  3. The facilitator shall have experience in construction management, negotiations, labor-management mediation, and/or human relations; and
- C. The City, Principal Project Company, and the selected facilitator shall execute a third-party facilitator agreement. This agreement shall establish a budget for fees and expenses of the facilitator, workshop site costs, if any, and the terms of the facilitator's role consistent with the requirements of this specification.
- D. The facilitator shall be evaluated by the Project Team: (i) at the end of the kick-off partnering workshop; and (ii) at the close-out partnering session.
- E. If either the City or Principal Project Company is not satisfied by the services provided by the facilitator, a new and mutually acceptable facilitator shall be chosen in a reasonable amount of time and a new agreement shall be executed by Principal Project Company and the new Professional Neutral Facilitator pursuant to [Paragraph 3.3.C].

### 3.4 FACILITATOR QUALIFICATIONS AND REQUIREMENTS; EVALUATIONS

- A. The facilitator shall be trained in the recognized principles of partnering.
- B. The facilitator shall have the following professional experience and qualifications:
  1. At least 3 years' experience in partnering facilitation with a demonstrated track record, including public sector construction for a city or other municipal agency; and,
  2. Skill set that may include construction management, negotiations, labor management mediation, and/or human relations.
- C. The facilitator shall be evaluated by the partnering team: (1) at the end of the kick-off partnering workshop; and (2) at the project close-out partnering session.

**END OF SECTION**

## **SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. General: This Section specifies administrative and procedural requirements for the submittal of pre-construction and construction photographs.

#### **1.2 SUBMITTALS**

- A. General: All submitted photos will be kept by the City and will not be returned.
  - 1. Pre-construction photographs: Project Principal Company shall submit pre-construction photographs in digital format as a condition precedent to NTP 2. Photos shall survey the Project Site with enough detail to show the conditions of the Project Site and adjacent buildings (exteriors and interiors) before the start of the D&C Work. PPC shall provide photographs from both the exterior of the building as well as the interior spaces.
    - a. Photographs shall be individually labeled using numbering or lettering that identifies the location on a site plan and floor plans as well as a roof plan, see additional requirements below.
  - 2. Construction Photographs: Project Principal Company shall submit construction photographs as described herein.
- B. Format: Unless otherwise directed by the City, Project Principal Company shall submit photographs in digital format as high resolution images showing the date and time photographs were taken, transmitted on a CD, DVD, USB drive, or other medium as acceptable to the City.

### **PART 2 - PRODUCTS**

#### **2.1 PHOTOGRAPHIC MEDIA**

- A. Digital Images: Project Principal Company shall provide images in uncompressed TIFF or JPEG format, produced by a digital camera with a minimum sensor size of 10.0 megapixels and at an image resolution of not less than 3072 by 2304 pixels. The City will have all rights as owner of all photographs, including unrestricted use of and right to publish images.

### **PART 3 - EXECUTION**

#### **3.1 PHOTOGRAPHIC REQUIREMENTS**

- A. General: Project Principal Company shall take photographs using the maximum range of depth of field and that are in focus to clearly show the D&C Work. Photographs with blurry or out of focus areas will not be accepted.
  - 1. Project Principal Company shall maintain a key plan with each set of construction photographs that identifies each photographic location.

B. Construction Photographs

1. Frequency: Project Principal Company shall take photographs as necessary to show progress of D&C Work, as a minimum coinciding with the 1st and 15th days of every month.
2. Project Principal Company shall take photos, including those for each bid item, showing different areas of D&C Work in progress. Photographs shall be taken such that the item or location being photographed shall be determinable from within the set of photographs.
3. Project Principal Company shall provide a location plan indicating the viewpoint from which the above-described photographs were taken and what they were taken of for each photograph. When possible, Project Principal Company shall take the photographs from the same location to provide a history of the progression of the Work.

C. Completion Photographs

1. Project Principal Company shall take photographs of each major phase or component of the D&C Work, as requested by the City and at a minimum at both Substantial Completion and Final Acceptance. Each major phase shall be established and identified in the Project Schedule.

D. Additional Photographs: The City may issue requests for additional photographs, in addition to the periodic photographs required to be submitted in accordance with this Section 01 32 33.

1. The City will provide PPC with three-Day's Notice of the requirement for additional photographs.
2. Circumstances that could require additional photographs include:
  - a. The City's request for special publicity photographs.
  - b. Special events planned at the Project Site.
  - c. Immediate follow-up when on-site events result in construction damage or losses.
  - d. Extra record photographs after Final Acceptance.

**END OF SECTION**

## SECTION 01 35 43 - ENVIRONMENTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes:
1. General Construction Best Management Practices
  2. Stockpile Management Best Management Practices
  3. Dust Control Best Management Practices
  4. Standard Stormwater Best Management Practices
  5. Spill and Leak Control Best Management Practices
  6. Emissions-Control Best Management Practices
  7. Construction Noise Control Best Management Practices
  8. Naturally Occurring Asbestos (NOA)
  9. Asbestos Dust Mitigation Plan
  10. Night Work
  11. Environmentally Sensitive Area (ESA)
  12. Bird Protection
  13. Bat Protection (Not Applicable)
  14. Tree Protection
  15. Project Site Restoration
  16. NOT USED
  17. Human Remains
  18. Archeological Resource Protection
  19. Historical Cultural Resource Protection
  20. San Francisco Environmental Code Clean Construction Requirements for Work in an Air Pollutant Exposure Zone (APEZ)
  21. Construction Project Site Runoff Control Permit
  22. Storm Water Pollution Prevention Plan (Not Applicable)
  23. Water Quality Permitting
  24. Emergency or Backup Diesel Generator Health Risk Reduction Plan
  25. Fixed Mechanical Equipment Noise Control for Building Operations

26. Design Measures to Reduce Project Specific Wind Impacts

B. Plan Information Related to This Section

The following supplemental information shall be shown on the Design Documents:

1. Air Pollution Exposure Zone (APEZ) extent (see Article 3.20 of this section)
2. Areas within an MS4 within the jurisdiction of the Port of San Francisco (see Article 3.04 of this section)
3. Environmentally Sensitive Area (ESA) - Archaeological Monitoring Required for Ground Disturbance (see Article 3.18 of this section)
4. ESA - Biology/Other (see Article 3.11 of this section)
5. Disturbed areas whose surface is not otherwise converted to gravel, to pavement, to new landscaping as indicated on plans, or to new facilities (see Article 3.15 of this section)
6. Existing historic material in right-of-way, including granite curb (see Article 3.19 of this section)
7. Limits of mapped naturally occurring asbestos (see Article 3.05 and 3.06 of this section)
8. Species of trees to be removed or pruned (see Article 3.14 of this section)

**1.2 REFERENCES**

- A. "Standard Construction Measures for all San Francisco Public Works Projects". San Francisco Public Works, July 1, 2017
- B. American National Standards Institute (ANSI). 2008. American National Standard for tree care operations – Tree Shrub and Other Woody Plant Maintenance – Standard Practices (A300 Part 1): Pruning. New York,
- C. American National Standards Institute (ANSI). 2006. Safety Requirements for arboricultural Operations (Z133). New York, NY
- D. Andrews, Jim, P.E., David Buehler, P.E., Harjodh Gill, Ph.D., Wesley L. Bender, Transportation and Construction Vibration Guidance Manual [CT-HWANP-RT-20-365.01.01]. California Department of Transportation, April 2020
- E. Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, And Surface Mining Operations (California Code of Regulations Title 17, Section 93105)
- F. Bald and Golden Eagle Protection Act, 16 USC § 668.
- G. Bay Area Air Quality Management District, "Current Rules". Available at <http://www.baaqmd.gov/rules-and-compliance/current-rules>
- H. Bay Area Air Quality Management District, California Environmental Quality Act Air Quality Guidelines. May 2017. Available at <http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa>
- I. Berglund, B. Guidelines for Community Noise - A complete, authoritative guide on the effects of noise pollution on health. World Health Organization, Geneva, 1999
- J. California Code of Regulations, Title 8 Sec. 1592

- K. California Department of Transportation, "The Construction Site Best Management Practices (BMPs) Manual". Available at <https://dot.ca.gov/programs/construction/storm-water-and-water-pollution-control/manuals-a>
- L. California Fish and Game Code §§ 3503, 3513, and 3800
- M. California Register of Historical Resources. Available at [https://ohp.parks.ca.gov/?page\\_id=21238](https://ohp.parks.ca.gov/?page_id=21238)
- N. California State Water Resources Control Board, Construction General Permit Order. See [https://www.waterboards.ca.gov/water\\_issues/programs/stormwater/construction/general\\_permit\\_reissuance.html](https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html)
- O. California Stormwater Quality Association (CASQA), Construction BMP Handbook. Available at: <https://www.casqa.org/resources/bmp-handbooks>
- P. Caltrans Storm Water Quality Handbooks Construction Site Best Management Practices Manual available for download at: <https://dot.ca.gov/programs/construction/storm-water-and-water-pollution-control/manuals-and-handbooks>
- Q. San Francisco Municipal Transportation Agency, 2012. Regulations for Working in San Francisco Streets, 8th ed. Available at: <https://www.sfmta.com/reports/construction-regulations-blue-book>
- R. City of San Francisco, June 27, 2006. "Pruning Standards for Trees". Available at [http://sfpublicworks.org/sites/default/files/234-SF\\_Pruning\\_Std\\_6.27approved.pdf](http://sfpublicworks.org/sites/default/files/234-SF_Pruning_Std_6.27approved.pdf)
- S. Federal Migratory Bird Treaty Act (16 USC § 703–711, 50 CFR 10)
- T. Geological Features & Special Permits (California Public Resources Code Section 4307 and Section 4309)
- U. National Historic Preservation Act of 1966, (16 U.S.C. 470)
- V. National Register of Historic Places. Available at <https://www.nps.gov/subjects/nationalregister/database-research.htm>.
- W. Native American Historic Resource Protection Act; Archaeological, Paleontological, and Historical sites; Native American Historical, Cultural, and Sacred sites (California Public Resources Code Section 5097-5097)
- X. San Francisco Department of Public Health, "Monitoring Guidelines for SFHC Article 22B". May be obtained by contacting SFDPH at [EnvHealth.DPH@sfdph.org](mailto:EnvHealth.DPH@sfdph.org) or:(415) 252-3800.
- Y. San Francisco Environment Code Chapter 19: Mandatory Recycling and Composting. See [https://codelibrary.amlegal.com/codes/san\\_francisco/latest/overview](https://codelibrary.amlegal.com/codes/san_francisco/latest/overview).
- Z. San Francisco Environment Code Chapter 25: Clean Construction Requirements for Public Works. See [https://codelibrary.amlegal.com/codes/san\\_francisco/latest/overview](https://codelibrary.amlegal.com/codes/san_francisco/latest/overview).
- AA. San Francisco Health Code Article 22B – Construction Dust Control Ordinance #176-08. See [https://codelibrary.amlegal.com/codes/san\\_francisco/latest/overview](https://codelibrary.amlegal.com/codes/san_francisco/latest/overview).
- BB. San Francisco Industrial Waste Ordinance #19-92
- CC. San Francisco Planning Code Article 10: Preservation of Historical Architectural and Aesthetic Landmarks. See [https://codelibrary.amlegal.com/codes/san\\_francisco/latest/overview](https://codelibrary.amlegal.com/codes/san_francisco/latest/overview)

- DD. San Francisco Planning Code Article 11: Preservation of Buildings and Districts of Architectural, Historical, and Aesthetic Importance in the C-3 Districts. See [https://codelibrary.amlegal.com/codes/san\\_francisco/latest/overview](https://codelibrary.amlegal.com/codes/san_francisco/latest/overview).
- EE. San Francisco Planning Department, "Environmental Review Resources". See: <http://sf-planning.org/consultant-sponsor-resources>.
- FF. San Francisco Police Code, Article 29, Ordinance #274-72 ("Noise Ordinance"). See [https://codelibrary.amlegal.com/codes/san\\_francisco/latest/overview](https://codelibrary.amlegal.com/codes/san_francisco/latest/overview).
- GG. San Francisco Public Health Code, Article 22B: Construction Dust Control Requirements. See [https://codelibrary.amlegal.com/codes/san\\_francisco/latest/overview](https://codelibrary.amlegal.com/codes/san_francisco/latest/overview).
- HH. San Francisco Public Utilities Commission, Design Guidelines and Standards. Available at <https://www.sfpuc.org/construction-contracts/design-guidelines-standards>
- II. San Francisco Public Works Code, Article 4.1 Sewer Use Ordinance. See [https://codelibrary.amlegal.com/codes/san\\_francisco/latest/overview](https://codelibrary.amlegal.com/codes/san_francisco/latest/overview).
- JJ. San Francisco Public Works Code, Article 4.2 Sewer System Management Ordinance. See [https://codelibrary.amlegal.com/codes/san\\_francisco/latest/overview](https://codelibrary.amlegal.com/codes/san_francisco/latest/overview).
- KK. San Francisco Public Works Code, Ordinance No. 260-13, Construction site Runoff Ordinance. See [https://codelibrary.amlegal.com/codes/san\\_francisco/latest/overview](https://codelibrary.amlegal.com/codes/san_francisco/latest/overview).
- LL. San Francisco Public Works Order 158,170, Wastewater discharges into the City sewerage system. See <https://sfpublicworks.org/services/permits/public-works-orders>.
- MM. San Francisco Public Works Order 171,333, Dust Generation and Control Regulations. See <https://sfpublicworks.org/services/permits/public-works-orders>.
- NN. San Francisco Public Works Order 171,378 Dust Control Order. See <https://sfpublicworks.org/services/permits/public-works-orders>.
- OO. San Francisco Public Works Order 171,442 Regulation for Excavating and Restoring Streets in San Francisco. See <https://sfpublicworks.org/services/permits/public-works-orders>.
- PP. San Francisco Public Works Order 172,596, Guidelines for Processing and Issuance of Special Sidewalk Permits within the Downtown Streetscape Areas. See <https://sfpublicworks.org/services/permits/public-works-orders>.
- QQ. San Francisco Public Works Order 174,878, Regulations and Slip Resistant Standards for Any Manhole, Vault, or Sub-Sidewalk Basement Cover, Grille, Grate on the Public Sidewalk. See <https://sfpublicworks.org/services/permits/public-works-orders>.
- RR. San Francisco Public Works Order 178,940, Regulations for Excavating and Restoring Streets in San Francisco. See <https://sfpublicworks.org/services/permits/public-works-orders>.
- SS. San Francisco Public Works Order 200,369, Standard Paving Materials in San Francisco's Public Right of Ways. See <https://sfpublicworks.org/services/permits/public-works-orders>.
- TT. San Francisco Public Works Order 201,954, Recycling Cobblestones and Granite Curb. See <https://sfpublicworks.org/services/permits/public-works-orders>.
- UU. Swiecki, Tedmund J.; Bernhardt, Elizabeth A. 2013. A reference manual for managing sudden oak death in California. Gen. Tech. Rep. PSW-GTR-242. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Grove

### 1.3 DEFINITIONS

- A. Air Pollutant Exposure Zone: A zone having a substantially greater than average concentration of air pollutants as defined in San Francisco Health Code Section 3804.
- B. ALERT sheet: Single-page flyer produced by the San Francisco Planning Department and provided to Principal Project Company, containing a notification that the project site may be located in an archaeologically sensitive area.
- C. Alternative Fuels: Any transportation fuel that is less polluting than gasoline or petroleum diesel fuel, as determined by the California Air Resource Board and that is shown to have lower lifecycle carbon emissions than gasoline or petroleum diesel. Alternative Fuels may include but are not limited to natural gas; propane; biofuels from low carbon, sustainable and preferably local sources; hydrogen.
- D. Alternative Sources of Power: Utility-based electric power or other power sources other than diesel engines.
- E. CARB: The California Air Resources Board.
- F. Archaeological resources: Remains of past human activity, including historic and prehistoric material such as tools and tool fragments, hearth and food remains, structural remains, and human remains.
- G. Bridge: A structure that carries a utility or railroad or vehicle, pedestrian, or other traffic over, under, or around obstructions or waterways.
- H. Building: A building as defined in the San Francisco Planning Code Section 102, Definitions.
- I. CDFW: The California Department of Fish and Wildlife.
- J. (Not used).
- K. Clean Construction: The performance of all Construction Work required to be performed in the Contract Documents meeting the requirements in Sections 2504, 2505 and 2506 of the Environment Code, as applicable.
- L. Construction Activities: The performance of all Construction Work, except for the issuance or obtaining of a site permit.
- M. (Not Used).
- N. Construction Phase: A particular construction activity over a certain period of time. Construction Phases may include demolition, site preparation, grading, building construction, architectural coatings, and paving. Multiple Construction Phases of a single project may take place at the same time.
- O. SFDPH: The San Francisco Department of Public Health.
- P. Environmentally Sensitive Area (ESA): Area within or near construction limits where access is prohibited or limited in order to protect environmental resources. An ESA – Biology is an ESA established to protect biological resources.

- Q. Equipment Type: A category of off-road equipment (movable equipment not approved for driving on highways). Types of off-road equipment include bore/drill rigs, cranes, crawler tractors, excavators, graders, off-highway tractors, off-highway trucks, other construction equipment, pavers, paving equipment, rollers, rough terrain forklifts, rubber-tired dozers, rubber-tired loaders, scrapers, skid steer loaders, surfacing equipment, tractors/loaders/backhoes, and trenchers.
- R. Erosion and Sediment Control Plan (ESCP): A site-specific plan that details the use, location and emplacement of sediment and erosion control devices.
- S. Feasible: When applied to an action required of Principal Project Company, that action can be accomplished without resorting to extraordinary means and measures.
- T. Ground surface: The top of existing soil or the level of the finished grade of a facility, sidewalk, or roadway.
- U. Historic buildings, historic structures, and other historic resources: Buildings, structures, or other resources labeled as historic structures on Design Documents or in Reference Documents.
- V. Inactive nests: Nests that do not contain eggs, chicks, or raptors displaying reproductive behavior.
- W. In-Water Work: Work to be conducted below Mean Higher High Water (MHHW) lines as defined by the National Oceanic and Atmospheric Administration.
- X. Land disturbance: Any movement of earth or a change in the existing natural soil cover or existing topography that may result in soil erosion from wind, or water, and the moving of sediments into or upon waters, lands or public rights-of-way within the City and County of San Francisco, including, but not limited to building demolition, clearing, grading, grubbing, filling, stockpiling, excavating and transporting over land.
- Y. Major Construction Project: A public work to be performed within the geographic limits of the City and County of San Francisco that uses off-road equipment and that is estimated to require 20 or more cumulative days of work, including non-consecutive days, to complete.
- Z. Most Effective Verified Diesel Emission Control Strategy (VDECS): a device, system or strategy that is verified, pursuant to Division 3, Chapter 14, of Title 13 of the California Code of Regulations, to achieve the highest available level of pollution control.
- AA. Nesting Season: The City Planning Department anticipates nesting or attempted nesting by migratory and non-game birds from February 15 to August 31.
- BB. Off-Road Engine: A non-road engine as defined in Title 40 of the Code of Federal Regulations, Section 89.2.
- CC. Off-Road Equipment: Equipment with an off-road engine having greater than 25 horsepower and operating for more than 20 total hours over the entire duration of Construction Activities.
- DD. On-Road Equipment: A heavy-duty vehicle as defined in Title 40 of the Code of Federal Regulations, Section 86.1803-01.
- EE. Paleontological resources: Fossils and the deposits in which they are found. Fossils are evidence of ancient life preserved in sediments and rock. Examples of paleontological resources are the remains of (1) animals, (2) animal tracks, (3) plants, and (4) other organisms. Archaeological resources are not paleontological resources. Fossils found within an archaeological resource are generally considered archaeological not paleontological resources.

- FF. PAR: Pedestrian access route as defined in the ADA and ABA Accessibility Guidelines for the Public Right-of-Way (An accessible, continuous, and unobstructed path of travel for use by pedestrians with disabilities within a pedestrian circulation path).
- GG. Plant species that may harbor *Phytophthora*: The City Planning Department considers host species to include: Coast Live Oak (*Quercus agrifolia*), Canyon Live Oak (*Quercus chrysolepis*), California Black Oak (*Quercus kelloggii*), Shreve's Oak (*Quercus parvula* var. *shrevei*), Tanoak (*Notholithocarpus densiflorus*), California bay laurel (*Umbellularia californica*).
- HH. Portable Diesel Engine: A diesel engine that is portable as defined in 71 California Code of Regulations, Section 93116.2(bb).
- II. Property line: The line at the ground surface at which the public right-of-way adjoins a platted parcel.
- JJ. Rain event: A rain event is a forecast for the project area by the National Weather Service of a 50 percent chance of occurrence within the following 72 hours of an amount of precipitation of 0.50 inch or greater.
- KK. Regulated Species: Species protected by one or a combination of the following:
1. Federal Endangered Species Act of 1973, 16 USC§ 1531 et seq.
  2. California Endangered Species Act, Fish & Game Code§§ 2050-2115.5
  3. Fish & Game Code§§ 1600-1616
  4. National Environmental Policy Act, 42 USC§ 4321 et seq.
  5. California Environmental Quality Act, Pub Res Code§ 21000 et seq.
  6. Other law or regulation governing activities that affect species or their habitats.
- LL. Routine Biological Activities: Biological monitoring, surveying, or other activity that does not require a take permit from the US Fish and Wildlife Service or National Oceanic and Atmospheric Administration (NOAA) Fisheries or a take permit or memorandum of understanding from the California Department of Fish and Wildlife.
- MM. Sensitive receptor (air quality): Residence, school, childcare center, hospital or other health-care facility or group living quarters.
- NN. Sensitive Use: A category of building use identified as a Sensitive Use in Health Code Section 3804.
- OO. Sensitive receptor (noise): Any environment listed in Guidelines for Community Noise - A complete, authoritative guide on the effects of noise pollution on health (World Health Organization, Geneva, 1999). Table 4.1, for which the recommended noise levels are low, as low as possible, or a maximum LAeq[dB] <70. These include:
1. Outdoor living areas
  2. Dwellings, indoors
  3. Inside bedrooms
  4. Outside bedrooms (window open)
  5. School classrooms and pre-schools, indoors

- 6. Pre-school bedrooms, indoors
  - 7. School, playground outdoor
  - 8. Hospital, ward rooms, indoors
  - 9. Hospitals, treatment rooms, indoors
  - 10. Outdoors in parkland and conservation areas
- PP. Service-Approved Biologist: Biologist whose activities must be approved by a state or federal agency as provided in applicable permit, license, agreement, certification, or any combination of these.
- QQ. Soil: Native fill or introduced earthen fill. It does not include materials that were previously introduced as part of roadway pavement section (including asphalt concrete wearing surface, roadway base, and subbase).
- RR. Stormwater Pollution Prevention Plan (SWPPP): A detailed plan that identifies potential sources of stormwater pollution, describes the practices that will be used to prevent stormwater pollution, and identifies procedures the operator will implement to comply with all requirements in the construction general permit.
- SS. Take: Legal definition regarding harm to protected species as defined in 16 USC § 1532 and California Fish & Game Code § 86.
- TT. Tier 2 Off-Road Emission Standards: The Tier 2 new engine emission standards in Title 13, California Code of Regulations, Section 2423(b)(1)(A) and/or Title 40, Code of Federal Regulations, Part 89.112(a).
- UU. Unique Archaeological Resource is as defined in the California Environmental Quality Act statute at § 21083.2.
- VV. VDECS: A verified diesel emission control strategy, designed primarily for the reduction of diesel particulate matter emissions, which has been verified by ARB pursuant to Verification Procedures, Warranty and In-Use Strategies to Control Emissions from Diesel Engines, Title 13, California Code of Regulations, Sections 2700-2710. VDECS can be verified to achieve Level 1 diesel particulate matter reductions (at least 25 percent), Level 2 diesel particulate matter reductions (at least 50 percent), or Level 3 diesel particulate matter reductions (at least 85 percent).
- WW. Visible dust: Dust comprising visible emissions as defined in Bay Area Air Quality Management Board Regulation 6 – Particulate Matter.

#### **1.4 SUBMITTALS**

- A. Principal Project Company shall submit the following to City prior to mobilization, or as otherwise stated herein:
- 1. The following plans and permits, with Regulatory Agency approvals wherever required:
    - a. Pre-construction survey for nesting birds that may be affected during construction work. (see Article 3.12 of this section)
    - b. Photographs of existing landscaping at the limit-of-work line(s). (see Article 3.14 of this section)

- c. Tree protection fence locations and stake placement provided at least two weeks in advance of the date for any on-site review of the fence and stake placement. (see Article 3.14 of this section)
- d. Written and/or photographic documentation of methods for avoidance of Environmentally Sensitive Areas. (see Article 3.11 of this section)
- e. A copy of written notice, accompanied by proof of submittal, provided to the Bay Area Air Quality Management District in accordance with the requirement of the "Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations," in advance of roadway construction and maintenance activities in areas soils containing naturally occurring asbestos. (see Article 3.08 of this section)
- f. Prior to issuance of construction permits, and prior to commencement of each construction stage, a Project-specific construction noise control plan shall be reviewed and approved by City Planning Department and City. (see Article 3.07 of this section)
- g. Prior to issuance of construction permits, Principal Project Company's construction emissions minimization plan (CEMP) shall be reviewed and approved by City Planning Department and City. (see Article 3.06 and 3.20 of this section for CEMP plan requirements)
- h. Principal Project Company's initial dust control plan (DCP). (see Article 3.03 of this section)
- i. SFDPH Permit and notification for removal and installation of fuel or chemical storage tanks (see Article 3.23 of this section)
- j. SFDPH Well Construction/Decommissioning or Soil Borings Permit (see Article 3.23 of this section)
- k. Finalized Asbestos Dust Mitigation Plan approved by BAAQMD (see Article 3.09 of this section)
- l. Prior to issuance of construction permits, and prior to commencement of each construction stage, a Noise Control Plan shall be reviewed and approved by City Planning Department and City (see Article 3.07 of this section)
- m. San Francisco Public Works Night-Noise Permit (see Article 3.10 of this section)
- n. Prior to issuance of a construction permit, an Archeological Monitoring Plan shall be reviewed and approved by City Planning Department.
- o. The issued Construction Project Site Runoff Control Permit for the project from the SFPUC with written and schematic summary of details. (see Article 3.21 of this section)
- p. The issued WDID for the Stormwater Pollution Prevention Plan (SWPPP) from the Regional Water Quality Control Board with certified SWPPP inspection checklist. (see Article 3.22 of this section)
- q. (Not Used)
- r. Underground Storage Tank (UST) Permit (see Article 3.23 of this section)

- s. Well Construction/Decommissioning or Soil Borings Permit (see Article 3.23 of this section)
2. For the subject matter expert specialist services required to be retained and provided by Principal Project Company to perform work in this Section, submit qualifications for the following firms and persons specified in this Section to demonstrate their capabilities and experience to ensure full compliance with this Section:
- a. Qualified Acoustical Consultant: A Board-Certified Institute of Noise Control Engineering (INCE) member or other qualified consultant or engineer approved by City.
  - b. Qualified Arborist: The Qualified Arborist who possesses a professional certification from the International Society of Arboriculture, and/or possesses a valid C-27 and/or a C-61/D-49 license in the State of California.
  - c. Specialty Environmental Monitor – archaeologist: One who in the determination of City is qualified to monitor land-disturbing activities for effects to buried archaeological resources.
  - d. Qualified Biologist is one whose activities must be approved by a State or federal agency as provided in the applicable permit, license, agreement, certification, or any combination of these. In the event that none of these apply, the biologist must possess at a minimum a bachelor's degree in Wildlife Biology or a closely related discipline, as approved by City.
  - e. Qualified Historic Architect or Historic Preservation Professional: Any consultant within the "Historic Resource Consultant Pool" as established by the San Francisco Planning Department.
  - f. Qualified SWPPP Practitioner (QSP): Individual who is authorized by the State Water Resources Control Board (SWRCB) to develop and revise Stormwater Pollution Prevention Plans. The QSP will have prepared a minimum of five (5) SWPPPs, including at least two (2) SWPPPs for Risk Level 2 and/or LUP Type 2. All five (5) SWPPPs will be available on SMARTS and to document these QSD qualifications. The QSP will have a minimum of 4 years demonstrable experience implementing SWPPPs and performing field inspections including two years on Risk Level 2 and/or LUP Type 2 projects under the General Permit. In addition to the CASQA certification, if Principal Project Company's QSP is a registered Civil Engineer, registered landscape Architect, or professional hydrologist, Principal Project Company's QSP will also possess one of the following certifications:
    - 1) A Certified Professional (and Investigator) in Erosion and Sediment Control (CPESC) registered through Enviro Cert International, Inc.
    - 2) A Certified Professional in Storm Water Quality (CPSWQ) registered through Enviro Cert International, Inc.
- B. Principal Project Company shall submit the following to City during the course of the Construction Work:
- 1. Principal Project Company shall submit the "ALERT" sheet affidavit within five business days of the start of Construction Work. (see Article 3.18 of this section)
  - 2. (Not Used)

3. Documentation of disposal in landfill or at a commercial composting facility of plant materials potentially harboring the *Phytophthora ramorum* pathogen within one week of disposal. (see Article 3.14 of this section)
  4. Certificates of Quarantine Compliance from County Agricultural Commissioner documenting that hay, straw, or mulch used on the project has been inspected and is weed free before installation of stormwater BMPs. (see Article 3.04 of this section)
  5. ESCP inspection checklists transmitted on a monthly basis (see Article 3.21/3.22 of this section)
  6. Notification(s) that Change Orders or other changes in construction conditions will alter the ESCP, and any additional modifications to the ESCP (see Article 3.21/3.22 of this section)
  7. Analytical water-quality monitoring results (see Article 3.21-3.23 of this section)
  8. Noise complaint logs (see Article 3.07 of this section).
  9. Photographic documentation of signage to be posted by the Principal Project Company as required by this section:
    - a. A sign with the telephone number and a City person to contact regarding dust complaints and the BAAQMD's phone number (see Article 3.03 of this section)
    - b. Legible and visible posted signs, in English, Spanish, and Chinese, in designated queuing areas and at the construction site to remind operators of the engine-idling limit (see Article 3.06 of this section)
    - c. Signs on-site pertaining to permitted construction days and hours and noise complaint procedures and who to notify in the event of a problem, with telephone numbers listed (see Article 3.07 of this section)
    - d. A legible and visible sign summarizing the Construction Emissions Minimization Plan (see Article 3.06 of this section)
  10. Photographic documentation of temporary fence Type ESA at the entire perimeter of ESA -- Biology as shown on the Design Documents (see Article 3.11 and 3.14 of this section).
- C. Principal Project Company shall submit to the San Francisco Planning Department after completion of construction activities and prior to receiving a final certificate of occupancy:
1. A final construction emissions minimization plan (CEMP) report summarizing construction activities, including the start and end dates and duration of each construction phase, and the specific information required in the CEMP. (see Article 3.06 of this section)

## 1.5 VIOLATIONS

- A. Principal Project Company shall be responsible for all costs incurred or necessary to ensure compliance of its operations and their performance of the Construction Work with all applicable Environmental Laws and the requirements of this section, including the following:
1. If violations of the conditions of this section result in monetary fines, these will immediately be paid by the Principal Project Company.

2. If Principal Project Company finds the Design Documents are at variance with State or Federal environmental-regulatory requirements, Principal Project Company shall give the City prompt written notice thereof and shall make the Design Documents consistent with State or Federal environmental-regulatory requirements.
  3. If violations of the conditions of this section result in fees charged by City Planning Department, state, or federal agencies to defray the costs of document processing and review, consultation with applicants, and administration of the statutory requirement, Principal Project Company shall pay the fees.
  4. Principal Project Company shall be responsible for all monetary compensation for physical damage resulting from violations of conditions of this section. If the damage is to an environmental resource, including vegetation, wildlife, natural communities, cultural resources, and water quality that is protected by Federal law (including resources subject to Federal permitting and/or subject to evaluation under the National Environmental Policy Act), State law (including resources subject to state permitting and/or to evaluation under the Environmental Quality Act), and/or City Planning Department ordinance, Principal Project Company shall pay for all costs associated with environmental assessment of the damage and the costs of mitigation as determined by each AHJ.
  5. Principal Project Company shall be responsible for all costs, including labor and material costs, for any site restoration or remediation necessary in the opinion of City to address the consequences of violations of this section.
  6. In the event that violations of this section result in civil action(s) against the City, Principal Project Company shall pay all consequent legal fees associated with the action(s) and damages assessed in the action(s) against the City.
  7. The City will provide no compensation to Principal Project Company for Project delays or work stoppages resulting from failure by Principal Project Company to comply with the terms of this section.
  8. Any costs associated with requirements for additional environmental training imposed by City will be borne exclusively by Principal Project Company.
- B. City reserves the right to require additional training, issue environmental non-compliance notices, have the necessary work performed by others at Principal Project Company's expense, assess non-compliance points or penalties, or to deduct or withhold all monies required therefore as permitted under the Contract Documents.
- C. City and the Planning Department will inspect and monitor Principal Project Company's adherence to the requirements specified herein and will report on Principal Project Company's compliance. Pursuant to California Assembly Bill 3180 (chapter 1232), the City Planning Department at its own discretion will monitor Principal Project Company's compliance with the requirements of this section. Said monitoring and reporting activities may include qualitative, quantitative and video observations and data collection on the impacts of noise, vibration air quality, traffic, street pavement damage, water quality, cultural resources, biological resources and hazardous materials.
1. Principal Project Company shall cooperate with such inspection and monitoring activities, provide access to the Work site to establish and secure monitoring stations, and make its facilities and records available to the City Planning Department for performing such monitoring.
  2. The City Planning Department will issue a Non-Compliance Notice to Principal Project Company for any detected non-compliance with the provisions herein or of any environmentally objectionable acts and the corrective action to be taken.

3. The City Planning Department will inspect and monitor Principal Project Company's adherence to the requirements specified herein and will report on Principal Project Company's compliance.
- D. If Principal Project Company uses off-road equipment and/or off-road engines in violation of the Clean Construction requirements set forth in Administrative Code Section 6.25 and Chapter 25 of the Environment Code, City will suffer actual damages that will be impractical or extremely difficult to determine. Accordingly, Principal Project Company agrees to pay City the amount of \$100 per day per each piece of off-road equipment and each off-road engine used to complete Construction Work on the Project in violation of the Ordinance. Such amount will not be considered a penalty, but rather agreed monetary damages sustained by City because of Principal Project Company's failure to comply with the Clean Construction requirements.
1. False Representations: False representations by the Principal Project Company, in connection with the bidding, execution or performance of the Agreement, regarding the nature or character of the off-road equipment and/or off-road engines to be utilized or to the City Planning Department about the nature or character of the off-road equipment and/or off-road engines actually used may subject Principal Project Company to the consequences of noncompliance specified in Section 2510 of the Environment Code, including but not limited to the penalties prescribed therein. The assessment of penalties for noncompliance will not preclude the City Planning Department from exercising any other rights or remedies to which it is entitled.
- E. Trees and plants destroyed or damaged beyond repair due to Principal Project Company's negligence, failure to provide adequate protection, or failure to perform recommended selective pruning will be compensated by Principal Project Company at no additional cost to the City.
1. Damage beyond repair that requires replacement will be determined by the Public Works Bureau of Urban Forestry.
    - a. If Principal Project Company should cause minor damage as defined by nicked tree trunks, limbs and branches or broken branches to trees or shrubs during the course of construction, Principal Project Company shall pay the following penalties at the beginning of each billing period:
      - 1) Principal Project Company shall be penalized the sum of One Hundred dollars (\$100) for the first incident which causes minor damage to trees or shrubs.
      - 2) Principal Project Company shall be penalized the sum of Two Hundred dollars (\$200) for the second incident which causes minor damage to trees or shrubs.
      - 3) Principal Project Company shall be penalized the sum of Five Hundred dollars (\$500) for the third and subsequent incidents which cause minor damage to trees or shrubs.
    - b. Principal Project Company shall replace any trees or shrubs that suffer more serious damage, including damage to roots 2-inches in diameter or larger, during construction at no additional cost to the City. The Public Works Bureau of Urban Forestry will determine the value of such replacement trees or shrubs. In addition to Principal Project Company's restoration approved by the Public Works Bureau of Urban Forestry, the Principal Project Company shall be assessed damages for the difference in the dollar value of the damaged tree or other plant material, and the dollar value of the replacement.

- c. The dollar value will be determined by the Public Works Bureau of Urban Forestry from the "Guide for Establishing Values of Trees and Other Plants," prepared by the Council of Tree and Landscape Appraisers, current edition. Damages assessed will be deducted from moneys due or that may become due to Principal Project Company.
  - d. Principal Project Company shall in addition be liable for the cost to the City for removing the damaged tree(s). This cost will cover 1.5 times the hourly wage of all person(s) at the site for the required hours to remove the tree(s) and haul offsite as directed by the Public Works Bureau of Urban Forestry.
2. Replacement will include the replacement plant material, transportation, installation, a 30-day maintenance period, and a one-year warranty.
  3. Planting location for replacements may be different from the original location and will be determined by the Public Works Bureau of Urban Forestry.
  4. Replace shrubs, ground cover and turf with plants similar in species, size and shape.
  5. Replace trees with plants of same species, size and shape.
  6. Replacements for trees of 2"-8" caliper will be replaced with similar sized plants; trees over 8" caliper will be 60" box size.
  7. Since age and size of existing tree may prohibit replacement with same size tree, the difference in caliper between size of damaged tree and replacement of tree will be compensated by Principal Project Company.
  8. Principal Project Company shall fell trees to be removed so that trees to remain are not injured.
- F. Principal Project Company is responsible for liquidated damages of \$1,600 for each day for which the presence of the Specialty Environmental Monitor – Archaeologist was requested but not cancelled within the prescribed timeframe.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION**

### **3.1 GENERAL CONSTRUCTION BEST-MANAGEMENT PRACTICES**

- A. Principal Project Company shall maintain the Project Site and Construction Work areas under its control and adjacent public rights-of-way in a clean and orderly state, a safe condition, and remove all accumulations of debris and surplus materials at the end of each workday. Waste materials, trash, and debris are the property of the Principal Project Company.
  1. Principal Project Company shall initiate and maintain a specific daily program to prevent the accumulation of debris at the construction site, storage and staging areas, parking areas, and along streets, roads, and haul routes in the immediate vicinity of the Project Site, to include, at a minimum:
    - a. Keeping all debris, hazardous/contaminated material, surplus concrete and excavated materials off the roadway and sidewalks and out of catch basins at all times.

- b. Damp-sweeping all pedestrian walkways and dispose of debris around the site perimeter on a daily basis and as often as determined by City.
  - c. Daily inspection of traffic areas and haul routes to enforce debris and clean up requirements and daily removal of all debris from the Project Site and Construction Work areas, including haul routes, caused directly or indirectly by Principal Project Company's operations.
  - d. Ensuring that materials to be used for construction are stored in designated structures or areas by the appropriate trades. Maintain such areas or structures in a clean condition daily for the portion of the Term that commences on NTP 2 and ends on the Final Acceptance Date.
  - e. Maintaining hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly and dispose those types of materials in a lawful manner. Principal Project Company shall comply with requirements of NFPA 241 for removal of combustible waste material and debris.
  - f. Providing and maintaining covered containers for the deposit of debris and keep them covered.
  - g. Disposing of all food-related trash items (e.g., wrappers, cans, bottles, food scraps) in closed trash containers, which shall be emptied daily. Principal Project Company shall provide separate containers for recyclables, compostables, and landfill-bound trash. Burying or burning of trash and debris on the Project Site is not permitted.
  - h. In the event that Principal Project Company observes any rodent or insect infestation, Principal Project Company shall effectively control such infestation by the use of such poisons, gas traps, or insecticidal sprays as meet the written approval of the Director of Public Health (San Francisco Public Works Code, Article 17: Control of Dumps Disposing of Materials from Construction or Demolition, Section 858: Rodent and Insect Control) as verified by City.
  - i. Providing licensed waste material handlers to service portable sanitary facilities and trash dumpsters weekly, or more often if needed or if directed by City.
  - j. Controlling aerial deposition of site materials, including metals, nutrients, organics, sediment, other particulates, and trash.
  - k. Overseeing all cleaning of areas by trades using them and ensure that resulting accumulations are deposited in appropriate containers.
2. Principal Project Company is specifically prohibited from disposing of paint, petroleum products, dirty water, soil sterilants, concrete slurry or any other deleterious materials to soil.
  3. Principal Project Company shall maintain the Project Site, equipment, fences and signs free of graffiti. As warranted, Principal Project Company shall remove all graffiti daily, using methods which cause no damage to the Project, Construction Work or existing facilities.
  4. Principal Project Company shall locate site construction staging areas away from public view and on paved or previously disturbed areas to the extent feasible.
  5. No firearms will be allowed within the construction limits.

6. At Final Acceptance, Principal Project Company shall leave the Project Site in clean and orderly condition.

### **3.2 STOCKPILE-MANAGEMENT BEST MANAGEMENT PRACTICES**

- A. Principal Project Company shall implement the following stockpile management best management practices to ensure no visible dust and to control stormwater discharges of stockpiled material, including all erodible stockpiled construction materials and landscape materials:
  1. Locate stockpiles at a minimum of 50 yards away from concentrated flows of storm water, drainage courses and inlets.
  2. Stockpiles must be kept adequately wetted, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile.
  3. Any excavated soils should be removed from the Project Site by the end of the day, if in the opinion of City, this can be accomplished without resorting to extraordinary means and measures.
  4. Stockpiles/storage piles greater than ten cubic yards or 500 square feet of excavated materials, backfill material, import material, gravel, sand, road base, and/or soil that will remain inactive for more than seven (7) days will be covered with a 10 mil (0.01 inch) polyethylene plastic or equivalent tarp and braced it down, or use other equivalent soil stabilization techniques as approved by City.
  5. Principal Project Company shall monitor the National Weather Service forecast daily for forecasts of a rain event. When a rain event is forecasted for the Project area by the National Weather Service with at least a 50 percent chance of occurrence within the following 72 hours, Principal Project Company shall cover stockpiles with a 10 mil (0.01 inch) polyethylene plastic or equivalent tarp and brace it down.
  6. During the rainy season, Principal Project Company shall also implement the following best management practices:
    - a. Stockpiles shall be protected with a temporary linear sediment barrier berm prior to the onset of precipitation. Surround stockpiled material with fiber rolls, gravel sediment barrier, silt fence or other runoff controls as approved by the City Planning Department.
    - b. Use inlet controls such as block gravel sediment barriers when stockpiles are proximate to catchbasins. Silt fencing will be additionally installed at the foot of the slope around the entire perimeter of stockpiled soil.
    - c. Where necessary, V-ditches and silt traps/sediment traps will be installed at the perimeters of stockpiles to collect runoff to allow flow to continue to storm drain inlets.

### **3.3 DUST-CONTROL BEST MANAGEMENT PRACTICES**

- A. Principal Project Company shall ensure no visible dust is generated through construction.
  1. Principal Project Company is responsible for taking all reasonable measures to furnish all labor, equipment, and means required to carry out effective measures whenever and as often as necessary to prevent its operation from producing dust in amounts damaging to surrounding properties or causing a nuisance to businesses and local residents.

2. Principal Project Company shall post a publicly visible sign with the telephone number and person to contact at Principal Project Company regarding dust complaints. The BAAQMD's phone number will also be visible to ensure compliance with applicable regulations.
- B. Principal Project Company shall not engage in any construction or grading operation on property unless all the following dust mitigation measures are initiated at the start and maintained throughout the duration of the construction or grading activity:
1. Vehicle and equipment maintenance:
    - a. Principal Project Company shall maintain tire inflation to the manufacturers' inflation specifications.
    - b. Principal Project Company shall limit vehicle speed limit on unpaved roads to 15 miles per hour (mph), or less if required to minimize dust emissions.
    - c. Principal Project Company shall ensure that equipment, trucks and tires are washed down before moving from the active areas on to a paved public road to minimize deposition of dust-causing materials.
    - d. Principal Project Company shall load haul trucks, hauling debris, soils, sand or other such materials so that the material does not extend above the walls or back of the truck bed. Principal Project Company shall wet each load before covering and shall tightly cover the surface of each load before the haul truck leaves the loading area.
      - 1) The Principal Project Company shall cover and line the truck bed ("burrito wrap") with 10mil HDPE for all truckloads of soils containing naturally-occurring asbestos.
  2. Limitations on grinding, crushing, and ground disturbance:
    - a. Principal Project Company shall plan and execute the work in such manner as to ensure that the total of soils-disturbing construction activities never amount to one half acre of area at any one time unless otherwise directed by City.
    - b. Principal Project Company shall terminate surface excavation and grading activities when wind speeds exceed 25 miles per hour.
    - c. Principal Project Company cannot perform screening or crushing operations without the appropriate BAAQMD and Cal-EPA/DTSC permits for these activities.
  3. Principal Project Company shall ensure that all borrow areas are protected with appropriate erosion control measures to the satisfaction of City.
  4. Use of water for dust control:
    - a. Whenever feasible, Principal Project Company shall use reclaimed water for dust control activities.
    - b. Principal Project Company shall treat and amend all water for dust control with biodegradable, non-polluting, non-toxic dust control agent.
    - c. Principal Project Company shall conduct mist or spraying activity in such a way as to prevent puddling or generation of runoff.

- d. Prior to any ground disturbance, Principal Project Company shall apply enough water to the area to be disturbed to prevent visible emissions from crossing the Project Site boundaries.
  - e. Principal Project Company shall perform continuous water spraying during dust generating activities, including but not limited to demolition, excavation, and earthmoving.
  - f. Principal Project Company shall keep areas being graded or excavated wetted to the extent required to prevent visible emissions from crossing the Project Site and property line.
  - g. Principal Project Company shall wet all exposed soil surfaces at least three times daily during dry weather or more frequently if dust is blowing or if required by City.
  - h. Principal Project Company shall ensure that a water truck and/or water buffalo always is readily available at the Project Site. Localized dust controls such as water hoses shall be pre-connected to a water source or water canisters to immediately control visible dust emissions at each active work area.
  - i. Principal Project Company shall ensure that water trucks are equipped with hand-held hoses. Hoses shall be equipped with micro-misters and micro-foggers.
  - j. In wet areas, Principal Project Company shall ensure that caution signs are posted to prevent slipping hazards.
5. Principal Project Company shall provide dust control for disturbed surface areas to include one or more of the following so as to prevent dust from becoming airborne:
- a. Keeping the surface wetted so that no visible dust is produced.
  - b. Establishment and maintenance of surface crusting.
  - c. Application of chemical dust suppressants or chemical stabilizers according to the manufacturers' recommendations as needed.
  - d. Covering with tarp(s) or vegetative cover.
  - e. Installation of wind barriers across open areas.
6. Principal Project Company shall implement the following for management of excavated material and demolition debris at the Project Site:
- a. Minimize to the extent feasible the amount of excavated material or demolition wastes stored at the site.
  - b. Minimize the amount of excavated materials stored at the site.
  - c. Remove all demolition debris from the site no later than the end of each workday.
7. Principal Project Company shall clean up spillage on City streets, whether directly or indirectly caused by Principal Project Company's operations.
8. Principal Project Company shall eliminate track-out from the construction site and, at a minimum shall comply with the following:

- a. Principal Project Company shall immediately remove any visible track-out of asphalt, soil, gravel, debris and dirt from a paved public road at any location where vehicles enter and exit the site.
  - b. All visible mud or dirt track-out from areas of land disturbance onto adjacent City streets shall be removed using wet power vacuum street sweepers at least once per day.
  - c. The use of dry power sweeping is prohibited.
  - d. Principal Project Company shall install one or more of the following track-out prevention measures at all entry and exit points. These track-out controls are to be cleaned, maintained and replaced to keep their use effective for the project duration.
    - 1) A gravel pad designed using good engineering practices to clean the tires of exiting vehicles.
    - 2) A metal griddle (rumble plate) tire shaker.
    - 3) A wheel wash system.
    - 4) Pavement extending for not less than fifty (50) consecutive feet from the intersection with the paved public road; or
    - 5) Any other measure as effective as the measures listed above as approved by City.
9. Principal Project Company shall implement the following regimen of sweeping:
- a. Keep the entire site of the work and adjacent areas (including sidewalks, 500 consecutive feet in all directions of intersections, walkways and roadways) continuously free of dirt and dust by wet sweeping at least three times per shift, including at the end of the workday. Use a wet sweeping or a HEPA filter equipped vacuum device on at all entry and exit points more frequently if needed to keep free of dirt and dust.
  - b. Clean visible track-out on the paved public road using wet sweeping or a HEPA filter equipped vacuum device.
  - c. Always maintain a regenerative air or high efficiency vacuum sweeper-vehicle on the Project Site. City will evaluate the effectiveness of Principal Project Company's vacuum sweeper-vehicle and, if necessary, will require Principal Project Company to provide a more powerful and effective sweeper.
10. When directed by City, Principal Project Company shall use dust enclosures, curtains, and dust collectors to control dust.
- C. Prior to grading or excavating an approved Site-Specific Dust Control Plan (DCP) under the Dust Control Ordinance (San Francisco Health Code Article 22B) is required.
- 1. Principal Project Company shall incorporate in its Project Schedule the time it will take for the SFPDH to review and approve the DCP application and the DCP. Principal Project Company shall take into account and incorporate in its Project Schedule the time it will take to implement the provisions of the DCP.

2. Principal Project Company shall submit a completed application and pay the associated fees to the SFDPH. Principal Project Company may not commence Construction Work, demolition, excavation, grading, foundation work, or other permitted activities until Principal Project Company has submitted to City and City Planning Department a copy of SFDPH director's written approval of the DCP, the plan provisions have been implemented, and the City has subsequently given Principal Project Company permission to proceed. All provisions of the approved plan become the responsibility of the Principal Project Company.
3. Principal Project Company shall interpret as mandatory all guidance in the Department of Public Health's handout "Monitoring Guidelines for SFHC Article 22B" in the event that the Plan requires monitoring.

### **3.4 STANDARD STORMWATER BEST-MANAGEMENT PRACTICES**

- A. Unless otherwise superseded by the terms of the Erosion and Sediment Control Plan, Principal Project Company shall design, install, and maintain effective Project-specific Project Site sediment controls to minimize the discharge of pollutants utilizing site-specific BMPs. These BMPs include but are not limited to the following:
  1. Immediately initiate stabilization for disturbed areas whenever earth disturbance has permanently ceased on any portion of the site, or temporarily ceased on any portion of the site where earth disturbance will not resume for a period exceeding 14 calendar days.
  2. Principal Project Company may stabilize soil exposed soil using bonded-fiber matrices, hydromulches, spray tackifiers, or other land-applied products: Principal Project Company shall apply the product according to the manufacturer's instructions and guidance; and apply the product according to the manufacturer's guidance to allow for ample cure time and to prevent treatment chemicals from being transported by runoff.
  3. Principal Project Company may use Erosion Control Blankets to control to stabilize disturbed and exposed soil if exposed soil generates visible runoff.
- B. Principal Project Company shall install BMPs, including temporary sediment barriers, soil stabilization measures, and sediment basins, sufficient to control erosion and subsequent sediment discharges from the Project Site, at locations with potential for erosion and as otherwise directed by City. These include all exposed soils and construction site entrances and exits.
  1. Principal Project Company shall design BMPs according to the California Stormwater Quality Association's (CASQA) current Construction BMP Guidance Handbook and utilize outlet structures that withdraw water from the surface, unless infeasible.
  2. Sandbags shall be stockpiled on site and placed there at intervals as directed by City. After rain events, Principal Project Company shall check for and remove sediment trapped by sandbags at staging area. Principal Project Company shall replace sandbags if deterioration is evident.
  3. BMPs shall be relocated as necessary for construction operations, with prior written approval from City.
  4. BMPs shall be installed so as not to compromise safety of vehicles operating in roadways adjacent to erosion control BMPs.
  5. Principal Project Company shall remove the temporary BMPs when permanent measures are in place.

- C. Principal Project Company shall contain packaged landscape materials (e.g., fertilizers) when they are not being actively used, and apply erodible landscape material at quantities and rates according to manufacturer recommendations or based on written specifications by knowledgeable and experienced field personnel. Principal Project Company shall discontinue the application of any erodible landscape material at least 2 days before a forecasted precipitation event.
- D. During the rainy season, Principal Project Company shall inspect all erosion control measures daily and after each storm. Any damaged BMP shall be repaired at the close of each day and whenever rain is forecast. During the rainy season, erosion control BMPs (with the exception of sprayed products) shall be available on-site, or at a nearby location (e.g., common lay-down yard), year-round with trained persons able to deploy the product.
- E. Principal Project Company shall conduct a pre-rain-event inspection within 72 hours prior to any forecasted rain event. Precipitation forecast information shall be obtained from the National Weather Service Forecast Office (e.g., by entering the zip code of the project's location at <https://www.weather.gov/>) and shall be included as part of the inspection checklist weather information. If extended forecast precipitation data (greater than three days) is available from the National Weather Service, the pre-precipitation event inspection may be done up to 120 hours in advance. During periods when storms are forecast, Principal Project Company shall:
  - 1. Inspect all stormwater drainage areas to identify leaks, spills, or uncontrolled pollutant sources and when necessary, implement appropriate corrective actions to control pollutant sources.
  - 2. Ensure that excavated soils are not be placed in streets or on paved area, and all paved areas are to be kept clear of earth material and debris.
  - 3. Remove any excavated soils from the Project Site by the end of the day if feasible.
  - 4. Clean and skim drainages and detention basins daily.
- F. Principal Project Company shall divert run-on water flowing onto the construction site from off-site areas to prevent its contributing to the construction site's stormwater. Installation of run-on diversion shall occur prior to entering an area affected by construction activity. Principal Project Company shall ensure that run-on flow diversion is conveyed through or around the construction activity in plastic pipe or an engineered conveyance channel in a manner that will not cause erosion due to flow diversion.
- G. Principal Project Company shall secure and contain concrete washout areas and other washout areas that may contain additional pollutants to prevent discharge into the underlying soil and onto the surrounding areas and into the sewerage system. Principal Project Company shall ensure that wash waters from equipment and vehicle washing, wheel wash water, masonry wash waters, and other wash waters are captured and treated prior to discharge or disposal at a permitted facility that can accept that waste. Washout areas shall be covered prior to and during a precipitation event.
- H. Principal Project Company shall remove sediment and trash accumulated in drainages or detention basins as soon as possible. In addition, oil and material floating on water surface must be skimmed weekly and the debris properly disposed of. Principal Project Company shall cover waste disposal containers at the end of every business day and during a precipitation event.
- I. Principal Project Company shall minimize soil compaction in areas other than where the intended function of a specific area dictates that it be compacted.

- J. Principal Project Company shall implement the following materials selection and handling BMPs to the extent feasible:
1. Minimize exposure of construction materials, equipment, and maintenance supplies (e.g., fuels, lubricants, paints, solvents, adhesives) to precipitation.
  2. Identify and protect the products used and/or expected to be used and the end products that are produced and/or expected to be produced from exposure to stormwater. Products do not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (e.g., poles, equipment pads, cabinets, conductors, insulators, bricks, roofing, and siding).
  3. Implement BMPs to control the discharge of plastic materials and limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist. Principal Project Company shall consider the use of plastic materials resistant to solar degradation where plastic materials are deemed necessary.

### **3.5 SPILL AND LEAK CONTROL BEST MANAGEMENT PRACTICES**

- A. Principal Project Company shall assign and train spill-response personnel, who will address spills and leaks immediately and dispose of leaked materials properly in accordance with the law.
- B. Principal Project Company shall provide spill cleanup material on site to adsorb, remove and contain any spill or releases from leaving the active work area and entering into any storm drain or sewer inlet. Principal Project Company shall maintain a fully stocked spill kit(s) at the Project Site for immediate deployment. Principal Project Company shall keep enough spill cleanup material with vehicles and equipment to handle potential spills. Spill cleanup equipment will include absorbent socks, over pack drums, personal protective equipment, shovel, labels, valves, valve charts, valve wrenches to shut off water supply, etc.
- C. Principal Project Company shall ensure On-site vehicles are periodically monitored for leaks during the workday.
- D. Principal Project Company shall store inactive equipment with drip pans to contain any fluid leaks. Drip pans containing oil must be drained into waste oil drums on a regular basis.
- E. Principal Project Company shall ensure that all hazardous material stored on-site, including but not limited to lubrication oil, hydraulic fluids, waste oils, fuels, solvents and hazardous or toxic wastes, is stored in watertight secondary containment or in a completely enclosed storage area. The containment must be covered with temporary tarps to prevent storm water contact.
- F. Principal Project Company shall provide containment (e.g., secondary containment) of sanitation facilities (e.g., portable toilets) to prevent discharges of pollutants.
- G. Principal Project Company shall dispose of spent cleanup materials at a California-permitted waste-disposal facility. Leaked materials that constitute hazardous waste shall be disposed of in accordance with applicable hazardous materials specifications.
- H. Principal Project Company shall ensure that containers remain closed at all times except when transferring contents. Heavy containers (in excess of 60 lb.) of oil or hazardous material shall not be moved by a single unassisted worker unless the worker employs a drum dolly.
- I. Principal Project Company shall use funnels, pumps with closed hose systems, or other means to prevent spills while transferring material from large containers to small ones. Pumps in operation shall not be left unattended.

- J. Principal Project Company shall place all equipment or vehicles which are to be fueled in a designated area away from catchbasins fitted with functional, appropriate leak-containment BMPs. Principal Project Company shall (i) maintain clean fuel-dispensing area(s) using dry cleanup methods (sweeping for removal of litter and debris or use of rags and absorbents for leaks and spills), (ii) place drip pans or other containment beneath each connection point to capture all spills and drips, (iii) cover storm drains in the vicinity during transfer and (iv) maintain ample spill clean-up equipment adjacent to the fueling area.
- K. Principal Project Company shall conduct an end-of-day inspection of the Work area for leaks, spills or other discharges.
- L. Principal Project Company's designated Project Safety Officer shall immediately be alerted to any spill occurring in the Work area. It is the responsibility of the Project Safety Officer to direct the cleanup activities and contact City immediately in accordance with the requirements of the Contract Documents .
- M. Principal Project Company is responsible for recording all steps taken to control spills in the field notes/daily log.

### **3.6 EMISSIONS-CONTROL BEST MANAGEMENT PRACTICES**

- A. Principal Project Company shall comply with the following engine requirements:
  - 1. All off-road equipment greater than or equal to 25 horsepower shall have engines that meet U.S. EPA or California Air Resource Board (CARB) Tier 4 Final off-road emission standards. Principal Project Company shall register and obtain an Equipment Identification Number (EIN) per vehicle/equipment over 25 horsepower with the California Air Resources Board.
  - 2. Where access to alternative sources of power are available, portable diesel engines shall be prohibited. If access to alternative sources of power is infeasible, portable diesel engines shall meet the requirements of subsection 3.6.A.1 above.
- B. Principal Project Company may pursue the following waiver:
  - 1. City Planning Department may waive the equipment requirements of subsection 3.6.A.1 if a particular piece of off-road Tier 4 Final equipment is not regionally available, not technically feasible, or would not produce desired emissions reduction due to expected operating modes. In granting the waiver, Principal Project Company must demonstrate with substantial evidence that the project construction does not exceed the BAAQMD threshold for NOx (54 lbs/day) by resulting in a net increase of average daily NOx emissions greater than 4 pounds per day. The Principal Project Company must also demonstrate with substantial evidence that the overall combined construction and operational excess cancer risk does not exceed 7 per 1 million persons exposed at nearby sensitive receptors.
- C. Principal Project Company shall ensure that all equipment is tuned and maintained in accordance with the manufacturer's specifications. Principal Project Company shall instruct construction workers and equipment operators on the maintenance and tuning of construction equipment and require that such workers and operators properly maintain and tune equipment in accordance with manufacturer specifications.
- D. Principal Project Company shall limit the hours of operation of heavy-duty equipment and/or amount of equipment in use to what is needed.

- E. Principal Project Company shall prohibit idling of motors when equipment is not in use or when trucks are waiting in queues. The idling time of all construction equipment used at the site shall not exceed 5 minutes.
  - 1. Diesel engines, whether for off-road or on-road equipment, shall not be left idling for more than two minutes at any location, except as allowed for in applicable State regulations regarding idling for off-road and on-road equipment (e.g., traffic conditions, safe operating conditions). If such equipment is within 100 feet of a school zone idling times shall be limited to 30 consecutive seconds.
  - 2. Principal Project Company shall post legible and visible signs, in English, Spanish, and Chinese, in designated queuing areas and at the construction site to remind operators of the idling limit.
  
- F. Principal Project Company's Construction Emissions Minimization Plan (CEMP) requirements include:
  - 1. Before starting onsite construction activities, Principal Project Company shall submit a CEMP to City Planning Department for review and approval. The CEMP shall state, in reasonable detail, how Principal Project Company will meet the requirements of section 3.6 of this specification.
  - 2. The CEMP shall include estimates of the construction timeline by phase, with a description of each piece of off-road equipment required for every construction phase. The description may include, but is not limited to equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number, and expected fuel use and hours of operation.
  - 3. Principal Project Company shall ensure that all provisions of the approved CEMP are incorporated into the Project Agreement Technical Requirements and are followed in daily construction activities. The CEMP shall include a certification statement that Principal Project Company agrees to comply fully with the CEMP.
  - 4. Principal Project Company shall make the CEMP available to the public for review onsite during working hours. Principal Project Company shall post at the construction site a legible and visible sign summarizing CEMP. The sign shall also state that the public may ask to inspect the CEMP for the project at any time during working hours and shall explain how to request to inspect the CEMP. Principal Project Company shall post at least one copy of the sign in a visible location on each side of the construction site facing a public right-of-way.
  
- G. Principal Project Company shall perform the following monitoring:
  - 1. After start of construction activities, Principal Project Company shall submit biannual reports to City Planning Department documenting compliance with the Construction Emissions Minimization Plan.

### **3.7 CONSTRUCTION NOISE CONTROL BEST MANAGEMENT PRACTICES**

- A. Prior to issuance of any demolition permit or building permit, Principal Project Company shall submit a project-specific construction noise control plan to City Planning Department for review and approval. The construction noise control plan shall be prepared by a qualified acoustical engineer, with input from the design-build contractor, and include all feasible measures to reduce construction noise. The construction noise control plan shall identify noise control measures to meet a performance target of construction activities not resulting in a noise level greater than 90 dBA at noise-sensitive receptors and 10 dBA above the ambient noise level at

noise-sensitive receptors. Principal Project Company shall ensure that requirements of the approved construction noise control plan are incorporated into the Project Agreement Technical Requirements and followed during construction activities. If nighttime construction is required, the plan shall include specific measures to reduce nighttime construction noise. The construction noise control plan shall also include measures for notifying the public of construction activities, complaint procedures, and a plan for monitoring construction noise levels in the event complaints are received. The construction noise control plan shall include the following measures to the degree feasible, or other effective measures, to reduce construction noise levels.

1. Use construction equipment that is in good working order, and inspect mufflers for proper functionality; and
2. Select “quiet” construction methods and equipment (e.g., improved mufflers, use of intake silencers, engineer enclosures); and
3. Use construction equipment with lower noise emission ratings whenever possible, particularly for air compressors; and
4. Prohibit the idling of inactive construction equipment for more than five minutes; and
5. Locate stationary noise sources (such as compressors) as far from nearby noise-sensitive receptors as possible (including future onsite noise-sensitive receptors at the Phase 2 Bryant Street housing development under phased construction scenarios for the refined project under the Final EIR), muffle such noise sources, and construct barriers around such sources and/or the construction site; and
6. Avoid placing stationary noise-generating equipment (e.g., generators, compressors) within noise-sensitive buffer areas (as determined by the acoustical engineer) immediately adjacent to neighbors (including future onsite noise-sensitive receptors at the Phase 2 Bryant Street housing development under phased construction scenarios for the refined project under the Final EIR); and
7. Enclose or shield stationary noise sources from neighboring noise-sensitive properties (including the future onsite noise-sensitive receptors at the Phase 2 Bryant Street housing development under phased construction scenarios for the refined project under the Final EIR) with noise barriers to the extent feasible. To further reduce noise, locate stationary equipment in pit areas or excavated areas, if feasible; and
8. Install temporary barriers, barrier-backed sound curtains and/or acoustical panels around working powered impact equipment and, if necessary, around the perimeter of active construction areas or phases. When temporary barrier units are joined together, the mating surfaces shall be flush with each other. Gaps between barrier units, and between the bottom edge of the barrier panels and the ground, shall be closed with material that completely closes the gaps, and dense enough to attenuate noise.
9. Under the phased construction scenarios for the refined project as defined in the Final EIR, develop strategies to reduce exposure to construction noise in coordination with future onsite noise-sensitive receptors at the Phase 2 Bryant Street Housing development under phased construction scenarios for the refined project under the Final EIR. Some options to reduce noise include limiting noise to Phase 2 Bryant Street housing development receptors by delaying or limiting occupancy in units closest to the construction zone or notifying receptors of loud construction periods. These options should be explored as part of the noise control plan prepared by a qualified noise consultant and the design-build contractor.

- B. The construction noise control plan shall include the following measures for notifying the public of construction activities, complaint procedures, and monitoring construction noise levels, including the following requirements, procedures, and corrective measures:
1. Designate an on-site construction noise manager for the project; and
  2. Notify neighboring noise-sensitive receptors within 300 feet of the project construction area at least 30 days in advance of high-intensity noise-generating activities (e.g. pier prilling, pile driving, and other activities that may generate noise levels greater than 90 dBA at noise-sensitive receptors) about the estimated duration of the activity (including future onsite noise-sensitive receptors at the Phase 2 Bryant Street housing development under the phased construction scenarios for the refined project under the Final EIR); and
  3. Post a sign onsite describing noise complaint procedures and a complaint hotline number that shall always be answered during construction, and provide to City and City Planning Department photographic documentation that the signage has been posted; and
  4. Implement a procedure for documenting all noise complaints received in a noise complaint log which shall be kept up to date and available to City upon request. At a minimum, the following information will be documented in the log: date of complaint, contact information for person providing a noise complaint, reason for the complaint, action taken and/or resolution; and
  5. Notify City within 48 hours of each noise complaint with an explanation of the corrective measures taken, if applicable, and notify City Planning Department within one week of receiving a complaint; and
  6. Establish a list of measures for responding to and tracking complaints pertaining to construction noise, taking all reasonable steps to resolve the complaint and the source of the noise impact, including providing additional monitoring as required, and modifying or implementing better attenuation controls for any construction equipment or activities that generated the excessive noise levels. Such measures may include the evaluation and implementation of additional noise controls at sensitive receptors (residences, hospitals, convalescent homes, schools, church, hotels and motels, and sensitive wildlife habitat); and
  7. Principal Project Company shall subsequently perform further periodic inspections to confirm that the modified or improved noise control minimization measures are effective; and
  8. Conduct noise monitoring (measurements) at the beginning of major construction phases (e.g., demolition, grading, excavation) and during high-intensity construction activities to determine the effectiveness of noise attenuation measures and, if necessary, implement additional noise control measures.
- C. The construction noise control plan shall include the following additional measures in the event of pile-driving activities:
1. When pile driving is to occur within 600 feet of a noise-sensitive receptor, implement "quiet" pile-driving technology (such as pre-drilling of piles, sonic pile drivers, auger cast-in-place, or drilled-displacement, or the use of more than one pile driver to shorten the total pile-driving duration [only if such measure is preferable to reduce impacts to sensitive receptors]) where feasible, in consideration of geotechnical and structural requirements and conditions;

2. Where the use of driven impact piles cannot be avoided, properly fit impact pile driving equipment with an intake and exhaust muffler and a sound-attenuating shroud, as specified by the manufacturer; and
  3. Conduct noise monitoring (measurements) before, during, and after the pile-driving activity.
- D. Notwithstanding the requirements stated in section 3.06.A and 3.06.B, before the onset of Construction Work, Principal Project Company shall implement minimization controls to ensure that the maximum noise level from any individual article of powered construction equipment other than to impact tools and equipment will not be greater than 80 dB(A) at 100 feet, to the greatest extent feasible.
1. Principal Project Company shall notify neighbors and occupants within 300 feet of the Project construction area at least 30 days in advance of impact-related noise-generating activities about the expected noise levels and their estimated duration.
  2. Principal Project Company shall implement the following controls with respect to the use of all impact equipment:
    - a. Noise from impact tools may not exceed 90 dBA 1-hour  $L_{eq}$  at the surface property line nearest to ongoing construction activities.
    - b. Impact tools and equipment shall have intake and exhaust mufflers recommended by the manufacturers thereof and approved by the Director of San Francisco Public Works or the Director of Building Inspection as best accomplishing maximum noise attenuation.
    - c. Pavement breakers, jackhammers, and similar impact equipment shall be equipped with acoustically attenuating shields and shrouds and/or jackets as recommended by the manufacturers thereof and approved by the City Planning Department.
    - d. Use of impact tools shall be restricted to the daytime construction hours of 8:00 a.m. to 3:30 p.m.
    - e. Principal Project Company shall use sonic or vibratory sheet pile drivers, rather than impact sheet pile drivers. Where the use of vibratory sheet pile drivers cannot be avoided, properly fit impact sheet pile driving equipment with an intake and exhaust muffler and a sound-attenuating shroud, as specified by the manufacturer.
    - f. Principal Project Company shall limit phases of construction that require daily use of impact equipment to periods of no more than 10 consecutive days.
  3. If, before construction mobilization, Principal Project Company determines that these standards and/ or one or more of these controls cannot be applied, Principal Project Company shall immediately alert the City Planning Department. If directed by the City Planning Department, Principal Project Company must revise the project-specific construction noise control plan and resubmit for City Planning Department review and approval. Principal Project Company's proposed revisions to the construction noise control plan must be prepared by a qualified acoustical engineer and demonstrate to the City Planning Department what alternative measures will be taken to reduce the impacts of construction noise to the extent feasible. The revised construction noise control plan must be approved by the City Planning Department and Principal Project Company shall enact all of its provisions before Project Principal Company commences Construction Work that may exceed the standards or omit the controls required above.

- a. If, as determined by City, the requirement for the construction noise control plan arises during the course of construction, such as through Principal Project Company's exceedances of these noise standards and/or by Principal Project Company's inability to apply one or more of these controls, Principal Project Company shall be directed by City to cease the use of equipment that is responsible for exceedances. Principal Project Company may resume the use of such equipment after the construction noise control plan is approved and all its provisions are enacted. City will not be responsible for any financial consequences to Principal Project Company of such work slowdowns or stoppages.
- E. Unless otherwise stated herein, Principal Project Company shall implement sufficient best-available control techniques to ensure that noise generated by each piece of powered construction equipment when in use is below the 80 dB(A) at 100 feet threshold. These may include but are not limited to any combination of the following:
  1. The use of mufflers, intake silencers, ducts, engine enclosures and acoustic attenuating shields, barriers, or shrouds for construction equipment and trucks.
  2. The use of hydraulic or electric-powered in preference to diesel-powered construction equipment.
  3. The use of drilling equipment in preference to impact equipment whenever feasible.
  4. Installation of temporary improvements to the noise-reduction capability of adjacent buildings.
  5. Erection of temporary plywood noise barriers around construction sites, and construction of temporary or permanent noise barriers around staging areas, shafts, and flow-control construction areas.
    - a. Where temporary barrier units are joined together, the mating surfaces shall be flush with each other. Gaps between barrier units, and between the bottom edge of the barrier panels and the ground, shall be closed with material that completely closes the gaps, and dense enough to attenuate noise.
- F. Principal Project Company shall locate stationary noise sources (e.g., ventilation fans, generators, dewatering pumps) as far away from the perimeter of the construction area as feasible and away from residential and commercial uses. Principal Project Company shall enclose equipment such as large compressors, generators, and large dewatering pumps at a minimum in 1-inch-thick plywood sheds. Openings in these enclosures shall face inwards towards the center of the Project-construction area.
- G. Principal Project Company shall direct all truck traffic to designated truck routes that avoid areas that are predominantly residential areas to the extent feasible.
- H. The Principal Project Company will periodically monitor the effectiveness of noise attenuation measures by taking noise measurements. In the event that noise exceedances are recorded, Principal Project Company shall modify existing or implement better attenuation controls for any construction equipment or activities that generated the excessive noise levels. Principal Project Company shall subsequently perform further periodic inspections and monitoring to confirm that the modified noise control minimization measures are effective.
  1. When directed by City, Principal Project Company shall submit revisions to the approved construction noise control plan for review and written approval if, in the sole determination of City, modified noise control minimization measures are not effective. In the event that revisions to the construction noise control plan are required, Principal Project Company shall cease the use of equipment that is responsible for exceedances.

Principal Project Company may resume the use of such equipment after the revised construction noise control plan is approved and all its provisions are enacted. City will not be responsible for any financial consequences to Principal Project Company of such work slowdowns or stoppages.

### **3.8 NATURALLY OCCURRING ASBESTOS (NOA)**

- A. For all work in any areas of serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA), as known through USGS map, soil assessment, soil sampling or other information, Principal Project Company shall adhere to the provisions of California Code of Regulations § 93105, Title 17, California Code of Regulations - Asbestos Airborne Toxic Control Measure (ATCM) for Construction and Grading Operations and CCR Title 8, Section 1529, Asbestos.
- B. If Principal Project Company disturbs, grades or excavates more than one acre (43560 sq. ft.) of area mapped as containing NOA, such Construction Work may not be implemented without first obtaining written approval by BAAQMD of an Asbestos Dust Mitigation Plan and written approval of City.
  - 1. In the event that a Project Change Order results in an exceedance of this threshold, no Project ground disturbance, grading, or excavation may occur without first obtaining written approval by BAAQMD of Asbestos Dust Mitigation Plan (ADMP), implementation of the ADMP, and written approval of City.
- C. At no cost to the City, Principal Project Company shall hire an experienced Certified Industrial Hygienist (CIH) to serve as Cal/OSHA Asbestos Class II asbestos operations Asbestos Competent Person (ACP).
  - 1. The ACP shall train Principal Project Company's workers and tradespeople who may come into contact with serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) for Class II work activity level as per the Cal/OSHA standard 8 CCR § 1529.
  - 2. The ACP shall be present at the Work site in compliance with requirements specified in the Cal/OSHA standard 8 CCR § 1529, and whenever Construction Work is conducted where serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) is present.
  - 3. The ACP shall enforce the dust-control provisions of these specifications.
- D. Before work in areas of NOA shown in the Design Documents that intersect with areas of roadway construction and maintenance which require the disturbance of soils by construction and grading, Principal Project Company shall submit the Bay Area Air Quality Management District's (BAAMQD) "Notification Form for Road Construction and Maintenance Operations" to BAAMQD fourteen business days in advance of land disturbance of soils containing NOA.
- E. Unanticipated Discovery of Naturally Occurring Asbestos (NOA):
  - 1. If NOA is unexpectedly encountered after the project has started, Principal Project Company shall immediately notify City and shall:
    - a. Submit a notification to the BAAQMD no later than the next business day using the Asbestos Dust Mitigation Plan (ADMP) Discovery Notification Form found at the link below:  
[https://www.baaqmd.gov/~/\\_media/Files/Compliance%20and%20Enforcement/Asbestos/admp\\_discovery\\_application.ashx?la=en](https://www.baaqmd.gov/~/_media/Files/Compliance%20and%20Enforcement/Asbestos/admp_discovery_application.ashx?la=en), and followed by email to the BAAQMD, and at the same time notify City with the same details.

- b. Principal Project Company shall immediately implement the ADMP provisions and may continue Construction Work with the written approval from City.
- c. Any measures imposed by the BAAQMD pursuant to the submittal of the ADMP Discovery Notification will be provided to City and implemented by Principal Project Company within 24 hours of receipt.

### **3.9 ASBESTOS DUST MITIGATION PLAN**

- A. If Principal Project Company by its means and methods disturbs, grades or excavates more than one acre (43560 sq. ft.) and the site is known through USGS map assessment, soil sampling or other information indicating that the Project will be disturbing NOA, as shown in the Design Documents, the following indicated control, administrative, reporting and submittal requirements will apply.
  - 1. Sixty days (60) days before commencement of grading, and excavation activities, Principal Project Company shall submit to City an Asbestos Dust Mitigation Plan (ADMP) for review.
  - 2. Upon City's written approval, Principal Project Company shall submit the ADMP, the ADMP application, and the BAAQMD Regulation 3 Fees to the APCO for its review and approval. Principal Project Company shall furnish all information required by the BAAQMD to amend and finalize the ADMP. Principal Project Company shall not be reimbursed for the BAAQMD Regulation 3 Fees.
  - 3. No soil disturbance, construction or grading shall commence unless the ADMP and its amendments is approved by the BAAQMD. Prior to commencement of any grading and excavation activities, Principal Project Company shall implement the ADMP. Principal Project Company shall implement and maintain the ADMP from the commencement of the Construction Work through the duration of the Project Construction Work.
  - 4. Principal Project Company at its own cost shall furnish all labor, equipment, and means required to prepare and implement the ADMP, conduct the ambient and perimeter air monitoring as required by the BAAQMD's terms of approval of the ADMP and California Code of Regulations, Title 17, Section 93105. Principal Project Company shall incorporate in its Project Schedule the time it will take for the BAAMQD to review and approve the ADMP application and the ADMP. Principal Project Company shall take into account and incorporate in its Project Schedule the time it will take for the BAAMQD to review the storage and staging locations, etc., for the final approval of the ADMP. Any fines imposed on the City by the BAAQMD as a result of Principal Project Company's negligence will be passed on to Principal Project Company.
  - 5. Principal Project Company, at no cost to the City, will perform perimeter air monitoring for asbestos at the Project Site during its soil disturbance activities for the duration of the Project. This will be in accordance with the approved ADMP. Principal Project Company shall submit all record keeping and reporting to the BAAQMD on a weekly basis or as per a reporting schedule requested by BAAQMD.

### **3.10 NIGHT WORK**

- A. If Principal Project Company is to perform any part of the Work between the hours of 8 p.m. and 7 a.m. or on weekends or holidays, subject to any and all special permits and authorizations, Principal Project Company shall comply with all of the following:
  - 1. Lighting Controls

- a. Lighting systems with flood, spot, or stadium type luminaires shall be aimed downward at the Work and rotated outward no greater than 30 degrees from nadir (straight down).
  - b. When, in the opinion of City, the lighting is disturbing adjoining property, Principal Project Company shall modify the lighting arrangement or add hardware to shield the light trespass.
  - c. When working adjacent to marine environments (the Pacific Ocean, San Francisco Bay, tidal inlets of the Bay), artificial lighting of the construction area during nighttime hours shall be minimized to the maximum extent practicable without substantial impairment of workers' safety and working conditions. At least two weeks prior to the commencement of Construction Work, Principal Project Company shall submit a lighting plan demonstrating that all lighting will be directed away from the marine environment and natural areas for written approval by City.
2. Noise controls:
- a. Principal Project Company must obtain and comply with a noise permit pursuant to Police Code Section 2908 prior to starting any Construction Work between the hours of 8 p.m. and 7 a.m. Principal Project Company must apply for noise permits at least 15 working days in advance of night (i.e., between 8:00 p.m. and 7:00 a.m.), weekend, and holiday work. The requirements of the Contract Documents, including safety requirements, apply for all night, weekend, and holiday Work performed. The noise permit will be obtained from and approved by Bureau of Street Use and Mapping, 49 South Van Ness Ave, Suite 3rd Floor, San Francisco, CA 94103.
  - b. Project Principal Company shall reduce the use of vehicles for night Construction Work that are legally required to be equipped with backing warning alarms to the extent feasible for night Construction Work, and Principal Project Company shall implement administrative controls as defined in the California Code of Regulations, Title 8 Sec. 1592 for worker protection for backing movements by other vehicles.
  - c. Principal Project Company shall not perform Construction Work between the hours of 8:00 p.m. and 7:00 a.m. of the following day if the noise level created thereby is in excess of the ambient noise level by 5 dBA at the nearest property line, unless approved by City and unless a noise permit for such work has been obtained pursuant to the Police Code Section 2908.

### **3.11 ENVIRONMENTALLY SENSITIVE AREA (ESA)**

- A. Principal Project Company shall be aware of and protect environmentally sensitive areas (ESAs) within or near construction limits where access is prohibited or limited in order to protect environmental resources.
  - 1. Principal Project Company shall implement Caltrans temporary fence Type ESA at the entire perimeter of any ESA -- Biology as shown in the Contract Documents.
  - 2. Principal Project Company shall prevent personnel and equipment from entering the ESA.
  - 3. Principal Project Company shall coordinate methods for avoidance intrusion into ESAs with City and provide written and photographic documentation of these methods used in the field before NTP2.

### 3.12 BIRD PROTECTION

- A. Principal Project Company shall perform all Construction Work in a manner that complies with the Migratory Bird Treaty Act (MBTA) and California Department of Fish and Game Code Section 3503, 3503.5, and 3513 (in addition to the Federal Endangered Species Act and California Endangered Species Act for listed birds).
1. Principal Project Company is advised that it is unlawful under the California Fish and Game Code at §3503 to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by California Code. Principal Project Company is advised that it is unlawful under the California Fish and Game Code at §3503.5 to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by California Code.
- B. Where Construction Work begins in advance of the bird-nesting season (February 15 through August 31), Principal Project Company shall be responsible for passively deterring birds from establishing active nests within the work area during construction, including on equipment. Methods for doing so may include installing bird deterrents (e.g., flash tape, false eyes, and audio deterrents), covering equipment with bird netting when not in use, and minimizing onsite attractants like slash or debris piles. Deterrents will be installed during the non-nesting season (September to February 14), unless otherwise approved by City. Principal project Company shall comply with the following:
1. Before trimming or removing trees, shrubs, and vegetation and/or performing structure alteration during bird nesting season (February 15 through August 31), a Qualified Biologist must be obtained by Principal Project Company to provide a pre-construction survey for nesting bird that may be affected during Construction Work.
  2. Principal Project Company's Qualified Biologist shall conduct the nesting bird pre-construction survey within the 14 days before the commencement of Construction Work. If commencement of Construction Work is delayed beyond the two-week timeframe, the survey shall be repeated. If Construction Work begins in different areas at different times or there are periods of more than two weeks when no Construction Work is being conducted, Principal Project Company shall ensure that additional surveys are conducted by the Qualified Biologist in each area before the commencement of Construction Work in such area.
  3. Principal Project Company shall be responsible for coordinating with City on schedule and confirming that surveys have been completed prior to initiation of any tree, shrub, and vegetation removal during this time. There will be no cost to the City (time or schedule) if there is a delay in the start of Construction Work at any location due to Principal Project Company's providing inadequate time for the Principal Project Company's Specialty Biological Monitor to perform a required survey.
  4. The Qualified Biologist shall conduct migratory bird surveys within 250 feet of the construction area boundaries for nesting passerines and 500 feet for nesting raptors, as allowed by landowner access.
  5. If no active nests are detected during surveys, then no additional mitigation is required.
  6. If inactive nests (those that do not contain eggs, chicks, or raptors that appear to be establishing a nest) are identified and removal is authorized in writing by the City, Principal Project Company shall provide equipment and labor to remove the nest. Principal Project Company shall assume the support of a man lift for 5 working days.

7. If active bird nests are identified by the Qualified Biologist, no Work may occur at that tree or structure and in the surrounding area:
    - a. For active nests found in trees, a 100-foot exclusion buffer of temporary fencing shall be erected around the tree with the active nest,
    - b. For active nests found on bridges, a 100-foot exclusion buffer shall be established around the nest site, and no Work may occur within the 100-foot buffer until the Qualified Biologist has verified that young birds have left the nest, and that active nesting has been completed.
    - c. For any active nests containing raptor species, the exclusion buffer will be 300-feet.
  8. Principal Project Company shall immediately upon finding an injured or dead bird or discovering migratory or nongame bird nests within or adjacent to limits of project construction:
    - a. Stop all Work within a 100-foot radius of the discovery.
    - b. Notify City.
  9. If active nests are detected, no Construction Work shall occur within 50 feet of any passerine nest or within 300 feet of any active raptor nest, unless otherwise allowed by the City.
- C. Principal Project Company shall perform one or a combination of the following protection measures as required to prevent further nesting by birds in trees or structures during Project construction:
1. Install exclusion devices
  2. Use nesting-prevention measures
  3. Remove and dispose of partially constructed and unoccupied nests of migratory or nongame birds on a regular basis to prevent their occupation.

### **3.13 BAT PROTECTION**

- A. Not applicable

### **3.14 TREE PROTECTION**

- A. Prior to NTP2, Principal Project Company shall arrange a meeting on the site with City, Contractor, and such others as City may direct to review the Project Schedule, the "Trees of Concern", the tree and landscape protection Submittals for this Section, the coordination with Work of other trades, and the selective thinning and clearing requirements. Adjustments to the type and extent of the protection shall be addressed at the time of the meeting.
1. Principal Project Company shall coordinate the meeting and inform all parties in writing (5) business days in advance of the scheduled meeting.
- B. Principal Project Company's equipment shall arrive on the Project Site clean of soil, seeds, and plant parts. Before tracked and heavy construction equipment leaves the Project Site, any accumulation of plant debris, soil and mud shall be washed off the equipment or otherwise removed onsite, and air filters shall be blown out. This shall be done in a manner that allows for collection of any plant debris, soil and mud for off-site disposal to prevent the spread of weeds.

- C. Principal Project Company shall implement the following practices and measures to prevent damage to trees within the area of Work:
1. Vehicles and equipment shall be operated in such a manner as to avoid damage to tree and bush trunks, leaves and branches. Principal Project Company shall ensure that no damage to trees or landscaping is caused by maneuvering of vehicles or equipment, stacking of materials and equipment, or storage of vehicles, equipment, or supplies.
  2. Pruning of trees shall be performed in conformance with the City of San Francisco Pruning Standards for Trees (June 27, 2006) (available at [https://sfpublicworks.org/sites/default/files/234-SF\\_Pruning\\_Std\\_6.27approved.pdf](https://sfpublicworks.org/sites/default/files/234-SF_Pruning_Std_6.27approved.pdf)), only as authorized by the City's Bureau of Urban Forestry, and under the supervision of the qualified arborist. Thinning shall not remove more than thirty percent (30%) of the existing leaf surface.
  3. Principal Project Company shall not place backfill under protected trees unless indicated otherwise. Where fill is required for grading, and as indicated in the Design Documents, no fill shall be placed above existing grade line at trunks. Fill soil must percolate at a rate of 1" per hour minimum.
  4. Principal Project Company shall not change site grades which cause drainage to flow into or to collect near protected trees.
  5. Principal Project Company shall not use protected trees as support posts, power poles, crane stays, sign posts, or anchorage for ropes, guy wires, power lines, or other similar functions.
  6. Principal Project Company shall not damage trees through exposure to excessive water or heat from equipment, utility line construction, or burning of trash under or near shrubs or trees.
- D. Principal Project Company shall implement the following practices and measures to prevent damage to tree roots:
1. Principal Project Company's vehicles and equipment shall not be driven off-road except along designated routes as far away as practical from tree root zones.
  2. Principal Project Company is prohibited from stockpiling any excavation or construction materials within the canopy of trees, on lawn areas or near shrubs.
  3. Excavated material (fill and overlay) shall not be deposited under the leaf/needle canopy of established trees. The excavated material shall be placed in piles along one side of a paved surface. In no case will Principal Project Company place the excavated material closer than 6-feet from the base of a tree.
  4. Principal Project Company shall immediately clean and remove any construction residue that falls within the canopy of a tree or near shrubs.
  5. Principal Project Company shall exclude grading or placement of heavy equipment within the drip line of trees on or adjacent to the site, unless approved by City. If approved by City, Principal Project Company's arborist will recommend and Principal Project Company shall implement measures to protect the tree (e.g., protecting the roots from compaction). Principal Project Company shall be responsible for replacing any damaged trees as directed by the City Planning Department.
  6. Principal Project Company shall tunnel around roots where practical; otherwise, roots will be cut off approximately six inches (6") from construction and shall comply with the following:

- a. Principal Project Company shall not rip or tear roots and shall prune injured roots cleanly and backfill as soon as possible.
  - b. If trimming of roots greater than 2-inches in diameter or fibrous root bundles of similar diameter is necessary during the course of construction, a Qualified Arborist provided by Principal Project Company shall supervise the trimming of such roots.
  - c. If immediate backfill is not possible, exposed roots shall not be allowed to dry out before permanent backfill is placed. Temporary earth cover shall be provided, or exposed roots shall be packed with wet peat moss or four (4) layers of wet untreated burlap and temporarily supported and protected from damage until permanently covered with backfill.
7. Principal Project Company shall not induce damage to tree root systems from flooding, erosion, excessive wetting or drying resulting from dewatering or other operations.
8. Principal Project Company shall observe the following restrictions on underground trenching in the vicinity of trees:
- a. Principal Project Company is prohibited from using powered equipment for trench and excavation Work within the tree drip line or where root intrusion exists on asphalt pathways to be reconstructed without written approval from City prior to start of such excavation work. Principal Project Company shall retain a Certified Arborist as needed to provide written direction at Principal Project Company's expense.
  - b. When excavating or trenching within the canopy of trees to remain, the Planning Department will be given 48 hours' notice.
  - c. Trenching within the canopy of trees may not proceed without a professional arborist present to perform compensatory root and branch pruning.
  - d. Principal Project Company shall place all piping 3 ½-inches and smaller and all conduits a minimum of 18-inch below the existing finished grade. New conduits shall be located at least 25-feet away from all tree trunks, 20-feet away from all buildings, 10-feet away from any pathway lighting, and 5 feet away from and parallel to any asphalt or concrete paths.
  - e. Principal Project Company shall place all piping 4-inches and larger a minimum of 3-feet below the existing finished grade except when approved by the City Planning Department to clear root systems. In no case shall the 4-inch or larger pipe be placed less than 2-feet below the finished grade.
  - f. Principal Project Company shall bend and/or transition underground conduit and piping so that the conduit or piping will thread between tree roots.
  - g. When possible, trenches shall not be run of the side of the tree exposed to prevailing winds as roots are primarily anchored on the windward side. Trenches shall not be cut across more than one quadrant of the tree root zone.
  - h. In areas where trenching is required under low hanging tree branches (8 to 12-feet off the ground), Principal Project Company shall operate equipment to a maximum height of 10-feet to avoid contact and possible damage to the tree branches.
  - i. Piping and conduit trenching work shall include the use of machinery that will not extend above 10-feet vertically for 5% of the linear trenching performed.

- j. Trenching to a maximum of 3-feet as measured horizontally may be executed without written approval from the City Planning Department for the placement of pipe fittings and quick couplers at any location outside the drip line of any tree.
  - 9. Trees to be preserved within the Work area shall be protected by Principal Project Company as follows:
    - a. 6-foot tall temporary tree protection composed of 2x4s shall be constructed to surround the outer edge of the tree basin.
    - b. 2x4s shall be mounted on 2-inch diameter galvanized iron posts, which shall be anchored into the soil on opposite corners of the guard and driven into the ground to 2-foot depth, avoiding any roots greater than 2-inches in diameter.
    - c. 2x4s shall be installed as a toe board surrounding the base of the tree protection for ADA compliance.
    - d. Orange snow fencing shall be placed around the tree protection.
    - e. Refer to Appendix 'A' for additional information.
  - 10. Principal Project Company shall install on all trees within a band extending six feet past the limits of the Construction Work hay bales or rolls of erosion control wattling, secured around trunk to a height of 6 feet, or as otherwise directed by City.
- E. Principal Project Company is informed that San Francisco is a Quarantine County for the Sudden Oak Death pathogen *Phytophthora* and that where trees of the following species are known by Principal Project Company to be removed, or marked on the plans as intended for removal, by grubbing or otherwise, or pruning -- Coast Live Oak (*Quercus agrifolia*), Canyon Live Oak (*Quercus chrysolepis*), California Black Oak (*Quercus kelloggii*), Shreve's Oak (*Quercus parvula* var. *shrevei*), Tanoak (*Notholithocarpus densiflorus*), California bay laurel (*Umbellularia californica*) -- the following precautionary measures against the spread of *Phytophthora* will apply.
- 1. Plants of species that may harbor *Phytophthora* shall be chipped on site and the chips spread at the location of the same trees and/or shrubs that produced the debris. This plant debris may not be used for any purpose at any other location.
  - 2. If spreading on site is not possible, materials shall be disposed of in landfill or at an industrial-scale composting facility. Principal Project Company shall provide documentation of such disposal to the City Planning Department.
  - 3. For sites identified as potentially harboring *Phytophthora*, Principal Project Company shall ensure that the following actions are performed:
    - a. All workers scrape, brush, and/or hose off accumulated soil and mud from clothing, gloves, boots, and shoes before leaving the site.
    - b. Mud and plant debris are removed by blowing out or power washing chipper trucks, chippers, bucket trucks, fertilization and soil aeration equipment, cranes, and other vehicles before leaving the site.
    - c. Soil and mud are removed or washed off from on vehicle tires, boots, shovels, stump grinders, trenchers, etc., before use at another site.
    - d. Tools used in tree removal/pruning are disinfected with Lysol® spray, a 70% or greater solution of alcohol, or a solution consisting of 1 part household bleach to 9 parts water before leaving the site.

### 3.15 SITE RESTORATION

- A. Principal Project Company shall furnish all material, labor, equipment, and service necessary to revegetate disturbed areas whose surface is not otherwise converted to gravel, pavement, new landscaping as indicated on plans, or new facilities.
- B. Principal Project Company shall strip and dispose of at an offsite location the top three inches of soil from work areas where soil will be left exposed after the conclusion of Construction Work. Any remaining topsoil below this depth up to 12 inches deep generated during site grading and/or excavation shall be stockpiled separately onsite for reuse during revegetation. All topsoil stockpiles shall be covered with plastic and labeled while stored onsite to avoid improper use or disposal.
- C. Principal Project Company shall ensure that any imported fill material, soil amendments, gravel etc., required for construction and/or restoration activities that would be placed in the upper 12 inches of the ground surface are free of vegetation and plant material. Certified, weed-free, imported erosion-control materials (or sterile rice straw in upland areas) shall be used exclusively.
- D. Revegetation
  1. Principal Project Company shall ensure that all seed complies with the California Seed Law of the Department and Agriculture. Seed materials shall meet all applicable inspections required by law. No non-native or invasive species shall be used in any restoration seeding.
  2. Principal Project Company shall ensure that all seeding occurs between September 15 and December 15 unless otherwise approved by City.
  3. Prior to hydroseeding, Principal Project Company shall prepare disturbed areas whose surface is not otherwise converted to gravel, pavement, or new facilities as seed beds, including:
    - a. Scarifying and decompacting soils to a depth of no less than 12 inches; and
    - b. Removing rocks greater than ½ inch and removing weeds; and
    - c. Restoring stockpiled topsoil; and
    - d. Incorporating sufficient compost to restore the area to original grade after having been trackwalked. Compost producers must be permitted by the Department of Resources Recycling and Recovery, Local Enforcement Agencies, and any other State and local agencies that regulate solid waste plants. If exempt from State permitting provisions, the composting plant must certify it complies with the guidelines and procedures for production of compost under 14 CA Code of Regs § 17868. Compost producers must be participants in the United States Composting Council's seal of testing assurance program.
  4. Principal Project Company shall ensure that commercially obtained seed is labeled according to State and federal laws, under the California Food and Agricultural Code, and by the vendors supplying the seed. Seed shall be delivered to the Project Site in unopened supplier's sealed containers bearing original certification labels and the seed tag attached. Containers opened prior to inspection or without a label or tag shall not be accepted. Each seed bag shall be delivered to Project Site sealed and clearly marked as to the species, purity, percent germination, weed seed, inert material, dealer's guarantee, and date of test.

5. Principal Project Company shall store seed in a cool dry location away from moisture and contaminants. Seed materials shall be stored on site for no longer than two weeks. All storage locations shall be subject to written approval by City.
6. Principal Project Company shall ensure that seed is State-certified of the latest season's crop. Seed shall be delivered in original sealed packages bearing producer's guaranteed analysis for purity, germination, weed seed content, and inert material. Seed bags shall include manufacturer's tags in conformance with AMS Seed Act and applicable State laws. Wet, moldy, or otherwise damaged seed will be rejected by City.
7. Principal Project Company shall ensure that seed has been tested for purity and germination not more than (15) fifteen months prior to the application of the seed.
8. Principal Project Company shall ensure that seed is stock origination from within the San Francisco Bay Area Counties (San Francisco, San Mateo, Santa Cruz, Santa Clara, Alameda, Contra Costa, Solano, Napa, Sonoma, Marin). Seed suppliers include Pacific Coast Seed, Livermore, CA (925) 373 4417; Lerner Seed, Bolinas, CA (415) 868 9407; Hedgerow Farms, Winters, CA (530) 662-6847; and others.
9. Principal Project Company shall ensure that the minimum quantity of seed to be applied is in the quantities for each species (in pounds per acre) recommended by the seed supplier, mixed proportionally, which must be stated on the supplier's original label(s) on the original sealed packages.
10. Principal Project Company shall ensure that seed mix is as specified in column A "SEED MIX", below. If one or more species of grass, wildflower, and/or subshrub is not readily available, Principal Project Company may substitute a species of grass, wildflower, and/or subshrub from column B "SUBSTITUTIONS" below. For linear areas of restoration, such as may be required to restore areas following trenching, less than 4' in width, subshrub species may be omitted. Other modifications to the seed mix may be made if approved by City. Principal Project Company shall allow at least 14 working days for written approvals to modifications to the seed mix.
11. Principal Project Company shall ensure that seed is a minimum of 70 percent Pure Live Seed and 80 percent Germination unless otherwise approved in advance by City.

E. SEED MIX

1. SEED MIX

*Achillea millefolium* (Yarrow, wildflower)

*Acmispon glaber* (deerweed, subshrub)

*Artemisia californica* (California sagebrush, subshrub)

*Bromus carinatus* (California brome, grass)

*Elymus glaucus* (Blue wildrye, grass)

*Eschscholzia californica* (California poppy, wildflower)

*Festuca microstachys* (Small fescue, grass)

*Hordeum brachyantherum* (California meadow barley, grass)

*Lupinus bicolor* (annual lupine, wildflower)

*Stipa pulchra* (Purple needlegrass, grass)

2. SUBSTITUTIONS

*Chlorogalum pomeridianum* (amole, soap plant, wildflower)

*Diplacus aurantiaca* (sticky monkeyflower, wildflower)

*Eriogonum nudum* (Naked buckwheat, subshrub)

*Grindelia stricta* var. *platyphylla*, (beach gum daisy, wildflower)

*Hordeum brachyantherum* (California meadow barley, grass)

*Iris douglasiana* (Douglas iris, wildflower)

*Lupinus microcarpus* (chick lupine, wildflower)

*Phacelia californica* (California phacelia, wildflower)

*Scrophularia californica* (California bee plant, wildflower)

*Trifolium ciliolatum* (foothill clover, wildflower)

*Trifolium wormskioldii* (cow clover, wildflower)

- F. Principal Project Company shall ensure that tackifier is applied as part of the hydroseed slurry if hydroseed method is employed. If broadcast seeding method is employed, tackifier or sterile straw may be applied after seeding. Principal Project Company shall comply with the following:
1. Mixing shall be performed in a tank with a built-in, continuous agitation and recirculation system of sufficient operating capacity to produce a homogeneous slurry and a discharge system that will apply the slurry at continuous and uniform rate. The tank shall have a minimum working capacity of 700 gallons. City may authorize in writing the use of equipment of smaller capacity if it is demonstrated that such equipment is capable of performing all the operations satisfactorily. Mixing shall be performed in the presence of Principal Project Company's QC Manager and City. Principal Project Company shall submit bags of materials used in the mix to City.
  2. Water, fiber, stabilizing emulsion and other ingredients except seed shall be added to the tank simultaneously so that the finished load is a homogeneous mix of the specified ingredients. Seed shall be added last and shall be discharged within 1 hour. If mixture remains in tank for more than 1 hour, it shall be removed from the job site and replaced at Principal Project Company's expense. Once fully loaded, the slurry shall be agitated for 5 minutes to allow for uniform and thorough mixing. The slurry shall have the proper consistency to adhere to the soil even on slopes without clumping or running. Slurry shall be uniformly applied in a sweeping motion under pressure over the entire designated area to form a mat. The hydroseeded area shall not be rolled.
  3. Seed and tackifier shall be applied to the disturbed areas in one operation at rates of 50 pounds per acre and 90-120 pounds per acre, respectively. At all times, materials shall be kept uniformly mixed in the hydromulcher tank during the application operation.
- G. For areas greater than 2,500 sq feet, Principal Project Company shall utilize hydroseeding, but for areas under 2,500 sq feet, Principal Project Company shall broadcast seed, rake in the seed in two directions and cover with 1 inch layer of compost.

**3.16 NOT USED**

### **3.17 HUMAN REMAINS**

- A. If the body of a deceased human being in any stage of decomposition or completeness is encountered, all work in the area must halt and the San Francisco County Coroner must be contacted, pursuant to California Public Resources Code Sections 5097.98, and 5097.99.

### **3.18 ARCHAEOLOGICAL RESOURCE PROTECTION**

- A. Prior to issuance of construction permits, Principal Project Company shall have an Archeological Monitoring Plan reviewed and approved by City Planning Department. Principal Project Company shall ensure compliance with the approved Archeological Monitoring Plan which shall govern for the associated construction activities as stated in the approved plan.
- B. Any soil disturbing activities below a depth of two feet below ground surface by Principal Project Company shall be preceded by the distribution by Principal Project Company of the San Francisco Planning Department archeological resource “ALERT” sheet to any Principal Project Company Contractor or Subcontractor (including demolition, excavation, grading, foundation, pile driving, etc. firms); or Utility involved in soil disturbing activities within the Project Site, and all field personnel, including machine operators, field crew, pile drivers, supervisory personnel, etc..
  - 1. Following the distribution of the “ALERT” sheet, Principal Project Company shall provide City with a signed affidavit confirming that all field personnel have received copies of the “ALERT” sheet.
    - a. The “Alert” sheet and affidavit are available for download at:  
<https://www.sfpublishworks.org/services/project-manual-and-reference-documents>
  - 2. If potential subsurface archaeological resources are discovered at the site, Principal Project Company shall promptly report their discovery to City. Subsurface archaeological finds may include any of the following:
    - a. Concentrations of shellfish remains
    - b. Evidence of fire (ashes, charcoal, burnt earth, fire-cracked rocks)
    - c. Concentrations of bones
    - d. Recognizable Native American artifacts (arrowheads, shell beads, stone mortars (bowls), humanly shaped rock)
    - e. Building foundation remains
    - f. Trash pits
    - g. Privies (Out-house holes)
    - h. Floor remains
    - i. Wells
    - j. Concentration of bottles, broken dishes, shoes, buttons, cut animal bones, hardware, household items, barrels, etc.
    - k. Debris from the Great 1906 Earthquake and Fire (thick layers of burned building debris, charcoal, nails, fused glass, burned plaster, burned dishes, etc.)
    - l. Wood structural remains (building, ship, wharf, etc.)

- m. Clay roof/floor tiles
  - n. Stone walls or footings
  - o. Gravestones
3. City will issue a written order to suspend work directing Principal Project Company to cease all Construction Work only at the location of the potential cultural resources find to allow City to assess the significance of the find.
  4. Principal Project Company shall comply with all applicable Laws and any additional avoidance and minimization measures specified by City to minimize potential effects on cultural resources, which may include additional site security.
- C. Where any soil-disturbing activity below the depth specified in paragraph 3.18(B)(1) below is to occur within an area noted and depicted on the Design Documents as an area of particular archaeological sensitivity for which monitoring is required, a Specialty Environmental Monitor – Archaeologist, provided by Principal Project Company, shall be present to conduct monitoring for the presence of potential archaeological resources. Principal Project Company shall comply with the following:
1. Archaeological monitoring is required for any ground disturbance below 2 feet of the existing ground (paved or unpaved) surface.
  2. Principal Project Company shall be responsible for confirming that the required Specialty Environmental Monitor – Archaeologist is on-site as required prior to performing said work.
  3. The Specialty Environmental Monitor – Archaeologist may order Principal Project Company to cease Work if a potential archaeological resource is detected. The Principal Project Company shall notify City immediately of such order. The Principal Project Company shall cease all construction operations only at the location of the potential archeological resource find to allow City to assess the significance of the find.
  4. Principal Project Company shall comply with all applicable Laws and any additional avoidance and minimization measures specified by City to minimize potential effects on archeological resources, which may include additional site security. Principal Project Company is advised that the discovery of unique archaeological resources may entail extended periods of work suspension.

**3.19 HISTORIC CULTURAL RESOURCE PROTECTION**

- A. Principal Project Company shall protect historic resources shown and labeled in the Design Documents and Reference Documents that are adjacent to, or in the right-of-way adjacent to or occupied by, the Project, including:
1. Not used.
  2. All distinctive sidewalk elements, such as brick surfacing, brick gutters, granite curbs, cobblestones, non-standard sidewalk scoring and streetscape elements such as terrazzo finishes, sidewalk lights, and special sidewalk finishes that appear to be 45 years or older are potential historic resources and shall be protected in place, salvaged and re-installed, or replaced in kind to match the character of the existing condition as shown in the Design Documents or Reference Documents and/or found in place. Principal Project Company shall avoid damaging and protect in place any features described above and shall notify City of any feature not identified in the Design Documents that is in conflict with the proposed Work.

- B. Principal Project Company shall comply with San Francisco Public Works Orders for the restoration of granite (granodiorite) curb in historic districts and the preservation of existing granite curb and existing surficial bricks and cobblestones, and shall comply with the following:
1. Compliance information shown in the Contract Documents:
    - a. All existing granite curb, and existing surficial bricks and cobblestones, within the area of proposed curb-and-gutter work is shown on the Project construction drawings.
    - b. The areal extent of All National Register of Historic Places historic districts, California Register of Historical Resources historic districts, and historic districts as identified by San Francisco Planning Code Articles 10 and 11 districts, for which the period of historic significance is coeval with the period of use of granite as a curb material by the City of San Francisco is shown on the project construction drawings.
    - c. The Principal Project Company is hereby informed that the following limits of Work are located within a historic district as shown in the Design Documents:
      - 1) None
  2. Except as noted below, all linear sections of curb, including driveways, within the Project limits within the limits of a historic district, regardless of existing condition, shall be restored using granite salvaged during demolition of the existing curb, supplemented with replacement granite sections, regardless of whether the curb line has moved.
    - a. Granite curb within the boundaries of a historic district shall only be replaced with concrete curb for new curb ramp radius construction, or as part of new linear and radius curb sections of new curb corner extensions installed for traffic calming ("bulb-outs").
    - b. A corner extension that extends for longer than the minimum distance required for the installation of corner ADA curb ramps is considered sidewalk widening; such sections shall require the installation of granite curb.
    - c. No granite, cobblestones, or brick gutter shall be restored within a pedestrian accessible route (PAR) (see San Francisco Public Works Order No: 200369).
  3. Any granite curb section not within a historic district shall be salvaged and reset in the location from which it was salvaged. If the curb line is moved as a result of the Project, the salvaged granite curb shall be reset parallel to its previous location. Salvaged granite curb is not required to be used on new linear and radius curb sections of new curb corner extensions ("bulb-outs") and may not be reused within a PAR.
  4. Granite curb shall be installed in sections a minimum of 4-feet in length. If a section of granite to be replaced or restored is less than 4' long, then the scope of Work must be expanded so that the minimum length of any single length of granite installed by Principal Project Company or extant and retained in position is a minimum of 4' long.
  5. City stockpiles of salvaged granite curb, when available, are made available to Principal Project Company upon application to the relevant department.
  6. Specifications for new granite curb are as follows:
    - a. Material: Stone curb shall be made from granite, free from defects or flaws that might impair its usefulness as curb.

- b. Dimensions: Each piece of curb shall be at least 4 feet long, 6 inches thick at top and bottom, and 16 inches deep.
  - c. Dressing: The top of the curb and its face for a depth of 6 inches shall have a first-class peen-hammered finish. These surfaces shall be true and properly squared and have no holes. A tolerance of 1/4 inch will be allowed in width of top of curb. The back of the curb, for a depth of 2 inches, shall be pointed to a fair surface, free from inequalities exceeding 1/2 inch, when measured from a straight edge. The joints of the curb shall show an even edge for a depth of 8 inches and will be kept full. The joints below the dressed portion shall not be pitched more than 1/4 inch under square. The joints throughout the dressed portion of the ends shall not exceed 1/4 inch. All edges bordering dressed surfaces shall be sharply defined.
  - d. Where gutters are deeper than 6 inches, the face of the granite curb shall be peen-hammered to the full depth of the gutter. The lower part of each stone shall be roughly squared and shall have an average thickness of not less than 6 inches at the bottom and at no point shall the thickness be less than 4 inches.
  - e. The curb for corners shall be cut to the prescribed curved lines, with joints on true radial lines. The joints between the several blocks of stones shall not exceed 1/8 inch.
  - f. Previously salvaged granite curb that meets the above specification is acceptable.
7. Except as noted above (PAR, bulb-outs), existing brick gutter shown on drawings shall be salvaged and reset in its original location, and existing surficial cobblestones shall be salvaged and reset in their original location.
- a. City stockpiles of salvaged brick will be made available to Principal Project Company if available upon application to the relevant department. New replacement gutter brick shall be brick of approximately the same dimensions and approximate color of the existing brick and shall conform to ASTM standard specification C1272 – 17 for Heavy Vehicular Paving Brick Type R as well as meet criteria set forth in San Francisco Public Works guidance for slip resistance.
  - b. Other than brick gutter to be replaced/restored, no brick or cobblestone surfacing may be removed from the surface of the travel way without prior written approval by City.
8. Principal Project Company shall exercise care to minimize damage in transporting salvaged granite curb, brick, and cobblestones that Principal Project Company is returning to City.
- a. Minimum size of cobblestone that may be returned is 4 inches square (16 square inches). Bricks to be returned must be whole.
  - b. Principal Project Company shall neatly and securely place the granite curb on pallets so it can be moved about safely after delivery. The cobblestones and/or brick shall be neatly and securely placed on pallets so they can be moved about safely after the delivery.
  - c. The salvaged granite curb, bricks, and cobblestones that will not be reset shall be delivered, including off loading, to a storage site within the City. Principal Project Company shall provide a minimum of forty-eight (48) hours prior notice of delivery, and delivery is limited to Monday through Friday 8:00 a.m. to 2:00 p.m. Principal Project Company shall provide a forklift for unloading.

- d. Prior to transporting, Principal Project Company shall ensure that the brick and/or cobblestones are cleaned of dirt, grout and/or concrete. Principal Project Company shall take care during the transporting of the brick and cobblestones to minimize damage before delivery to City.

C. NOT USED

**3.20 SAN FRANCISCO ENVIRONMENT CODE CLEAN CONSTRUCTION REQUIREMENTS FOR WORK IN AN AIR POLLUTANT EXPOSURE ZONE (APEZ)**

- A. Principal Project Company is informed that as the Project will use off-road powered construction machinery and is projected to last longer than 19 days, the following additional requirements of San Francisco Environment Code Chapter 25 apply. These requirements may be waived by the City Planning Department at the Contractor's request if the City Planning Department determines the absence of sensitive uses as defined by the Environment Code within 1,000-feet of the project construction limits as shown on the project drawings and/or if the project requires a limited amount of Off- Road Equipment for a limited duration.
- B. Reference section 3.06.A and 3.06.B of this specification regarding equipment engine emissions standards, sources of power, and waivers.
- C. Principal Project Company shall submit a Construction Emissions Minimization Plan (CEMP) to the City Planning Department for review and written approval for compliance with Chapter 25 of the San Francisco Environment Code.
- D. Principal Project Company shall submit its initial CEMP no less than 28 days prior to mobilization. The CEMP will state, in reasonable detail, how the Principal Project Company shall meet the requirements of Section 2505 of the Environment Code.
  - 1. The CEMP shall include estimates of the construction timeline by phase, with a description of each piece of off-road equipment required for each Construction Phase.
  - 2. The description shall include equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number, and expected fuel usage and hours of operation.
  - 3. For the VDECS installed, the description shall include technology type, serial number, make, model, manufacturer, CARB verification number level, and installation date and hour meter reading on installation date.
  - 4. For off-road equipment using alternative fuels, the description shall also specify the type of alternative fuel.
  - 5. Principal Project Company may use the Clean Construction Equipment Inventory Template to satisfy the CEMP requirements. Refer to the following link for that template: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>
- E. Principal Project Company agrees to comply fully with the CEMP and acknowledges that a significant violation of the CEMP will constitute a material breach of the Agreement. Principal Project Company must submit a signed CEMP Certification Statement to the City Planning Department. Refer to the following link for the Emissions Plan Certification Statement Template: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>.
- F. After City Planning Department review and written approval, Principal Project Company shall make the CEMP available to the public for review onsite during working hours.

- G. Principal Project Company shall post at the construction site a legible and visible sign summarizing the CEMP. Refer to the following link for the Clean Construction Sign Template: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>.
  - 1. The sign shall also state that the public may ask to inspect the CEMP for the project at any time during working hours and will explain how to request to inspect the CEMP.
  - 2. Principal Project Company shall post at least one copy of the sign in a visible location on each side of the construction site facing a public right-of-way.
- H. Principal Project Company shall submit quarterly and biannual reports to City Planning Department documenting compliance with the CEMP within seven business days of the end of each quarter.
- I. Principal Project Company shall submit a final CEMP report within four weeks of achieving Substantial Completion summarizing compliance of the Construction Work with the CEMP, including the start and end dates and duration of each Construction Phase
- J. The San Francisco Public Works Director may waive requirements of Chapter 25 of the Environment Code on the grounds set forth in Section 2507 of the Environment Code at the request of Principal Project Company, if such request is submitted to the City Planning Department
  - 1. For any waiver granted, the City Planning Department will within two business days prepare a written notice of the waiver and a written memorandum explaining the basis for the waiver and the steps that will be taken to safeguard public and City employee health during the noncomplying work. The memorandum will also state the requirements subsequently imposed upon the contractor to minimize the use of noncomplying equipment or engines during the noncomplying work.
  - 2. Requests for such waivers must be provided to the City Planning Department no fewer than two weeks prior to the planned implementation of the waiver and must be accompanied by conclusive substantiating information. Waivers are granted at the sole discretion of the San Francisco Public Works Director. The City will provide no compensation to the contractor for any consequences of the denial of a waiver request.

**3.21 CONSTRUCTION SITE RUNOFF CONTROL PERMIT**

- A. Principal Project Company shall obtain a Construction Site Runoff Control Permit from the San Francisco Public Utilities Commission, Wastewater Enterprise, Collection System Division (SFPUC-WWE/CSD).
  - 1. The Construction Site Runoff Control Permit Application shall include an Erosion and Sediment Control Plan (ESCP) developed signed and stamped by a Qualified Stormwater Pollution Prevention Plan Developer or Practitioner (QSD or QSP). The Erosion and Sediment Control Plan shall include a vicinity map showing the location of the Project Site in relationship to the surrounding area's water courses, water bodies, and other significant geographic features; a site survey; suitable contours for the existing and proposed topography, area drainage, proposed construction and sequencing, proposed drainage channels; proposed erosion and sediment controls; dewatering controls where applicable; soil stabilization measures where applicable; maintenance controls; sampling, monitoring, and reporting schedules; and any other information deemed necessary by the SFPUC.
    - a. A SWPPP for which a WDID has been issued will be accepted in lieu of an ESCP.

- B. Principal Project Company shall submit the Construction Site Runoff Control Permit Application within (30) thirty calendar days after NTP 2 for review and approval by City. Principal Project Company is responsible for obtaining the Construction Site Runoff Control Permit in a timely manner and prior to the commencement of any land-disturbing activities.
  - 1. Concurrent with the approved ESCP, Principal Project Company shall provide City with a checklist for City's written approval prepared and stamped by the QSD or QSP listing all requirements of the ESCP.
- C. Principal Project Company shall not commence demolition or earthmoving activities until City has verified ESCP implementation.
  - 1. If required by the terms of the Construction Site Runoff Control Permit, or at the request of City, Principal Project Company shall also provide a QSD or QSP to verify ESCP implementation to the satisfaction of City.
- D. At least two working days before each the following milestones, Principal Project Company shall provide the SFPUC with a transmittal, with a copy to City, to inform the SFPUC inspector that the following are about to occur:
  - 1. Commencement of Construction Work.
  - 2. Erosion and sediment control measures are completely installed and stabilized.
  - 3. Final grading has been completed.
  - 4. Substantial Completion.
- E. Principal Project Company shall maintain a copy of the Construction Site Runoff Control Permit and Erosion and Sediment Control Plan onsite at all times.
- F. Principal Project Company shall daily inspect, maintain, and repair all graded surfaces and erosion and sediment controls, drainage structures, and other protective devices, plantings, and ground cover installed while construction is active.
- G. Every person who operates any erosion and sediment control or controls must provide analytical inspection and maintenance information as set forth in the Construction Site Runoff Control Permit.
  - 1. Unless otherwise specified by the terms of the Construction Site Runoff Control Permit, the QSP/QSD or personnel trained by the QSP/QSD will use City -approved checklist to document weekly visual inspections to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended.
  - 2. Principal Project Company shall keep all completed inspection checklists and related documentation with the ESCP on-site or electronically and transmit copies of the previous month's checklists to City on the first business day of each month during project construction accompanied by a certification under penalty of perjury that such information is accurate and true.
- H. Principal Project Company shall permit City and/or representatives of the SFPUC to perform inspections as may be deemed necessary.
- I. Principal Project Company shall provide devices or locations necessary to conduct sampling or metering operations, if required by the terms of the Construction Site Runoff Control Permit and/or requested by City.

1. If effluent water-quality monitoring is required by the Construction Site Runoff Control Permit, sampling must be performed by a QSD, QSP, or persons trained by the QSP. pH and turbidity may be assessed using field meters; all other parameters will require laboratory analysis unless an exception is approved by City. Monitoring reporting shall be as prescribed in the project Construction Site Runoff Control Permit.

- J. Principal Project Company's QSD shall (i) immediately inform City in the event that Project Change Orders or other change in construction conditions alters the implementation of the ESCP, (ii) update the ESCP to address changes affecting construction site-runoff management, and (iii) submit the revised ESCP to the SFPUC. Principal Project Company shall implement the revised ESCP as soon as feasible after acceptance by the SFPUC. Principal Project Company shall immediately communicate any additional modifications to the ESCP requested by the SFPUC to the City Planning Department and the City

### **3.22 NOT USED**

### **3.23 CITY WATER-QUALITY PERMITTING**

- A. Well Construction/Decommissioning or Soil Borings Permit: Before conducting soil boring or constructing a well, Principal Project Company must obtain a permit issued by SFDPH to construct or operate an environmental or geotechnical well or soil boring.
1. These wells include, but are not limited to, cone penetrometers, inclinometers, piezometers, cathodic wells, exploratory wells, extraction wells, recovery wells, monitoring wells, temporary wells, irrigation wells, industrial wells, dewatering wells, wick drains, hydropunch soil borings, and soil borings drilled for geotechnical or environmental purposes (whether or not groundwater is encountered). This information is not intended as a substitute for familiarity with applicable Laws and regulations.
  2. Principal Project Company shall use a driller with a C-57 state license.
  3. Principal Project Company shall contact the SFDPH Environmental Health Branch, Monitoring Well Section at least 15 Working Days in advance of drilling at (415) 252-3800.
- B. Underground Storage Tank (UST) Permit: Before modification, repair, removal and/or installation of fuel or chemical storage tanks, Principal Project Company shall obtain the written approval of the SFDPH, in compliance with Articles 21, 21A and 22 of the San Francisco Public Health Code, and its implementing regulations, compliance with applicable provisions of Chapters 6.7 and 6.75 of the California Health and Safety Code, Section 25280 et al. Contact the SFDPH Environmental Health Branch, HMUPA at (415) 252-3800.
1. If UST(s) are unexpectedly encountered during the course of construction, Principal Project Company shall stop Work at the site of the UST and alert City.

### **3.24 EMERGENCY OR BACKUP DIESEL GENERATOR HEALTH RISK REDUCTION PLAN**

- A. The Principal Project Company shall comply with the following:
1. Require all emergency or backup diesel generators to meet Tier 4 Final emission standards, reduce annual testing limit to 20 hours per year for each generator; or
  2. Require all emergency or backup diesel generators to be battery-powered; or
  3. Retain a qualified air quality consultant to develop a Diesel Generator Health Risk Reduction Plan. The Principal Project Company shall submit the plan to City Planning Department for review and approval prior to issuance of a permit for emergency diesel generators from the San Francisco Department of Building Inspection or the Bay Area Air

Quality Management District. The plan must include, for each diesel generator, a description of the anticipated venting location, engine specifications, and annual maintenance testing procedures. The plan must demonstrate with substantial evidence that annual maintenance testing will not result in the project's overall construction and operational cancer risk exceeding 7 per one million persons exposed at nearby offsite sensitive receptors.

- B. Principal Project Company shall be required to maintain records of the testing schedule for each diesel generator for the life of that generator and to provide this information for review to City Planning Department within three months of requesting such information.

### **3.25 FIXED MECHANICAL EQUIPMENT NOISE CONTROL FOR BUILDING OPERATIONS**

- A. Prior to approval of a building permit, the Principal Project Company shall submit documentation to City Planning Department, demonstrating with reasonable certainty that the building's fixed mechanical equipment (such as heating, ventilation and air conditioning [HVAC] equipment):

1. Meets the noise limits specified in sections 2909 (b) and 2909 (d) of the noise ordinance (i.e., an 8-dB increase above the ambient noise level at the property plane for commercial or mixed-use properties; and
2. Interior noise limits of 55 dBA and 45 dBA for daytime and nighttime hours inside any sleeping or living room in a nearby dwelling unit on a residential property assuming windows open, respectively).
3. Acoustical treatments required to meet the noise ordinance may include, but are not limited to:
4. Enclosing noise-generating mechanical equipment; and
5. Installing relatively quiet models of air handlers, exhaust fans, and other mechanical equipment; and
6. Using mufflers or silencers on equipment exhaust fans; and
7. Orienting or shielding equipment to protect noise-sensitive receptors (residences, hospitals, convalescent homes, schools, churches, hotels and motels, and sensitive wildlife habitat) to the greatest extent feasible; and
8. Increasing the distance between noise-generating equipment and noise-sensitive receptors; and/or
9. Placing barriers around the equipment to facilitate the attenuation of noise.

- B. Compliance with this fixed-mechanical equipment noise control for building operations standard requirement does not obviate the need for the equipment to demonstrate compliance with the noise ordinance throughout the lifetime of the project.

### **3.26 DESIGN MEASURES TO REDUCE PROJECT SPECIFIC WIND IMPACTS**

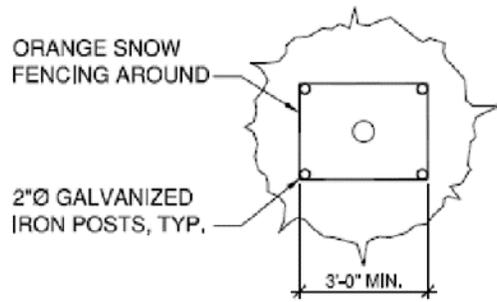
- A. The project sponsor team shall implement as many of the design measures identified in the wind impact mitigation report as needed to reduce the proposed project's or project variants' potential to create a new wind hazard or exacerbate an existing wind hazard in publicly accessible areas of substantial pedestrian use to less-than-significant levels, such as:

1. porous facades on portions of the north, east and west sides for natural ventilation as part of the heating, ventilation, and air conditioning strategy for the new transit facility at the second and third levels; and

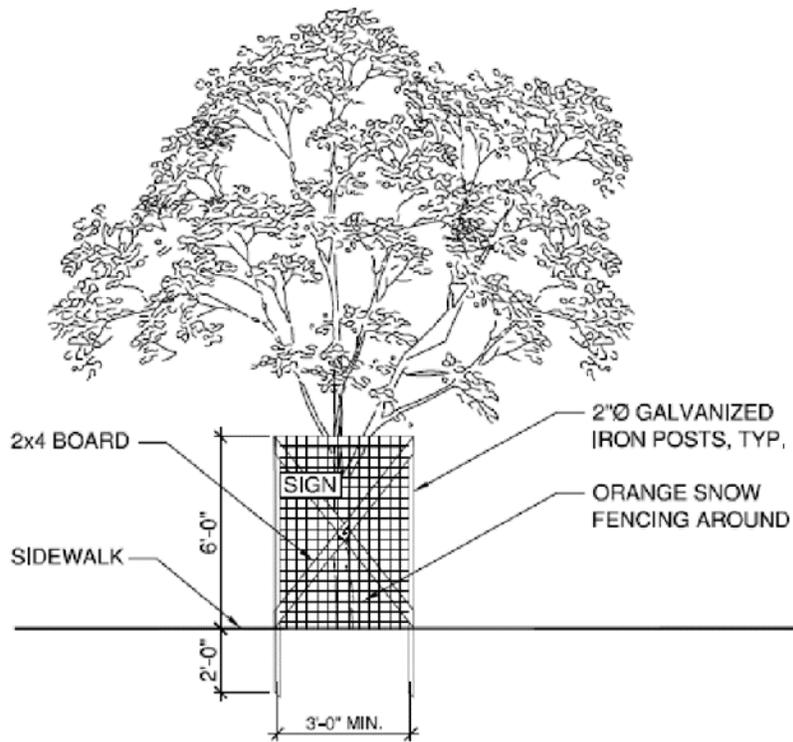
2. recessed building corner up to 12 feet in height at the southwest corner of proposed building near Bryant Street and Mariposa Street intersection; and
  3. vertical elevated screens on portions of the second and third levels of the west façade; and
  4. vertical wind screens at grade level on the adjacent Bryant Street sidewalk near the Bryant Street and Mariposa Street intersection; and
  5. additional on-site landscaping or off-site streetscape improvements and wind screens.
- B. If changes to the building design or massing are proposed after certification of the Final Environmental Impact Report,
1. additional wind analysis may be required to confirm the modified design does not result in any 9-hour wind hazard exceedances and to minimize 1-hour wind hazard exceedances.
  2. If City Planning Department determines that the modified design could result in wind hazard criterion exceedances (for example, due to the removal of one or more wind reducing features), the Principal Project Company shall retain a qualified wind consultant to prepare a wind analysis under the direction of the City Planning Department. The wind analysis may require a wind tunnel test and shall identify wind reduction measures needed to avoid 9-hour wind hazard exceedances and to minimize 1-hour wind hazard exceedances.
- C. The final wind impact mitigation report should not find that the project produces a net increase of the already identified wind hazard exceedances. City Planning Department shall approve the final list of wind reduction measures that the project sponsor team shall implement.

**END OF SECTION**

**APPENDIX A (01 35 43): SAMPLE TREE PROTECTION STREET TREE**



**PLAN VIEW**



**STREET TREE PROTECTIVE FENCE**

SCALE: 1/4" = 1'-0"

**APPENDIX B: COMPLETE ENVIRONMENTAL MITIGATION AND MONITORING PLAN**

APPENDIX APPLIES TO:

01 35 43

01 35 50

# MITIGATION MONITORING AND REPORTING PROGRAM: MITIGATION, IMPROVEMENT & PUBLIC WORKS STANDARD CONSTRUCTION MEASURES

<i>Record No.:</i>	Case No. 2019-021884ENV	<i>Block/Lot:</i>	3971/001
<i>Project Title:</i>	SFMTA Potrero Yard Modernization Project	<i>Lot Size:</i>	4.4 acres
<i>BPA Nos:</i>	Submittal pending	<i>Project Sponsor:</i>	Chris Lazaro, SFMTA, (415) 549-6572
<i>Zoning:</i>	Public (P) Use District 65-X Height and Bulk District	<i>Lead Agency:</i>	San Francisco Planning Department
		<i>Staff Contact:</i>	Jennifer McKellar, Planning – (628) 652-7563

Tables 1 and 3 below indicate when compliance with each mitigation and improvement measure must occur. Some mitigation and improvement measures span multiple phases. Substantive descriptions of each mitigation measure’s requirements are provided on the following pages in the Mitigation Monitoring and Reporting Program. The San Francisco Municipal Transportation Agency (SFMTA) is the project sponsor and property owner of the project site at 2500 Mariposa Street (Potrero Yard). Together the SFMTA and a private project co-sponsor (developer) are referenced below as the project sponsor team. In addition, pursuant to the May 11, 2023, memorandum regarding Public Works’ Authority for project delivery of the Potrero Yard Project and the May 31, 2020, attachment referenced therein, San Francisco Public Works assumes responsibility for environmental compliance, including applicable Standard Construction Measures in Tables 2 and 6 below.

### Period of Compliance

<b>Table 1: Adopted Mitigation Measure</b>	<b>Prior to the start of Construction*</b>	<b>During Construction**</b>	<b>Post-Construction or Operational</b>	<b>Compliance with MM completed?</b>
Mitigation Measure M-CR-1a: Documentation of Historical Resource	X			
Mitigation Measure M-CR-1b: Salvage Plan	X			
Mitigation Measure M-CR-1c: Interpretation of the Historical Resource	X			
Mitigation Measure M-CR-1d: Oral Histories	X			
Mitigation Measure M-TCR-1: Tribal Cultural Resources Preservation and/or Interpretive Program	X	X	X	
Mitigation Measure M-NO-1: Construction Noise Control	X	X		
Mitigation Measure M-NO-2: Vibration-Sensitive Equipment at 2601 Mariposa Street (KQED Building)	X	X		
Mitigation Measure NO-3: Fixed Mechanical Equipment Noise Control for Building Operations	X		X	

Mitigation Measure M-AQ-1: Off-Road Construction Equipment Emissions Minimization	X	X		
Mitigation Measure M-AQ-3: Emergency Diesel Generator Health Risk Reduction Plan	X		X	
Mitigation Measure M-WI-1: Design Measures to Reduce Project-Specific Wind Impacts	X			
Mitigation Measure M-GE-6a: Inadvertent Discovery of Paleontological Resources	X	X		
Mitigation Measure M-GE-6b: Preconstruction Paleontological Evaluation for Class 3 (Moderate) Paleontological Sensitivity Sediments during Construction	X	X		

\*Prior to any ground disturbing activities at the project site.

\*\*Construction is broadly defined to include any physical activities associated with construction of a development project including, but not limited to: site preparation, clearing, demolition, excavation, shoring, foundation installation, and building construction.

**Period of Compliance**

<b>Table 2: Adopted Public Works Standard Construction Measure</b>	<b>Prior to the start of Construction*</b>	<b>During Construction**</b>	<b>Post-Construction or Operational</b>	<b>Compliance with SCM completed?</b>
SCM #1: SEISMIC AND GEOTECHNICAL STUDIES	X	X		
SCM #2: AIR QUALITY	X	X		
SCM #3: WATER QUALITY	X	X		
SCM #4: TRAFFIC	X	X		
SCM #5: NOISE	X	X		
SCM #6: HAZARDOUS MATERIALS	X	X		
SCM #7: BIOLOGICAL RESOURCES	X	X		
SCM #8: VISUAL AND AESTHETIC CONSIDERATIONS, PROJECT SITE	X	X		
SCM #9: CULTURAL RESOURCES	X	X		

\*Prior to any ground disturbing activities at the project site.

\*\*Construction is broadly defined to include any physical activities associated with construction of a development project including, but not limited to: site preparation, clearing, demolition, excavation, shoring, foundation installation, and building construction.

(Continues on next page)

**Period of Compliance**

<b>Table 3: Adopted Improvement Measure</b>	<b>Prior to the start of Construction*</b>	<b>During Construction**</b>	<b>Post-Construction or Operational</b>	<b>Compliance with Improvement Measure completed?</b>
Improvement Measure I-TR-A: Construction Management Plan – Additional Measures	X	X		
Improvement Measure I-TR-B: Driveway and Loading Operations Plan (DLOP)			X	

\*Prior to any ground disturbing activities at the project site.

\*\*Construction is broadly defined to include any physical activities associated with construction of a development project including, but not limited to: site preparation, clearing, demolition, excavation, shoring, foundation installation, and building construction.

**Signatures:**

 I agree to implement the attached mitigation measure(s) and standard construction measures as described herein as conditions of project approval.

  
\_\_\_\_\_  
Private Project Co-Sponsor (Developer)

**December 22, 2023**  
\_\_\_\_\_  
Date

Note to project sponsor team: Please contact [CPC.EnvironmentalMonitoring@sfgov.org](mailto:CPC.EnvironmentalMonitoring@sfgov.org) to begin the environmental monitoring process prior to the submittal of your building permits to the San Francisco Department Building Inspection.

*(Continues on next page)*

# MITIGATION MONITORING AND REPORTING PROGRAM

Table 4: MITIGATION MEASURES FOR THE POTRERO YARD MODERNIZATION PROJECT

MONITORING AND REPORTING PROGRAM <sup>1</sup>				
Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<b>MITIGATION MEASURES AGREED TO BY PROJECT SPONSOR TEAM</b>				
<b>HISTORIC ARCHITECTURAL/CULTURAL RESOURCES</b>				
<b>Mitigation Measure M-CR-1a: Documentation of Historical Resource (HRER Part II, Mitigation Measure 1)</b>				
<p>Prior to issuance of a demolition permit, the project sponsor team shall undertake Historic American Building/Historic American Landscape Survey-like (HABS/HALS-like) documentation of the building features. The documentation shall be undertaken by a professional who meets the Secretary of the Interior’s Professional Qualifications Standards for Architectural History, History, or Architecture (as appropriate) to prepare written and photographic documentation of the Potrero Trolley Coach Division Facility. The specific scope of the documentation shall be reviewed and approved by the Planning Department but shall include the following elements:</p> <p><b>Measured Drawings</b> – A set of measured drawings shall be prepared that depict the existing size, scale, and dimension of the historic resource. Planning Department staff will accept the original architectural drawings or an as-built set of architectural drawings (e.g., plans, sections, elevations). Planning Department staff will assist the consultant in determining the appropriate level of measured drawings.</p> <p><b>Historic American Buildings/Historic American Landscape Survey-Level Photographs</b> – Either Historic American Buildings/Historic American Landscape Survey (HABS/HALS) standard large-format or digital photography shall be used. The scope of the digital photographs shall be reviewed by Planning Department staff for concurrence, and all digital photography shall be conducted according to the latest National Park Service (NPS) standards. The</p>	<p>Project Sponsor Team and qualified consultant, at the direction of the ERO</p>	<p>Prior to issuance of excavation permit or commencement of construction</p>	<p>Planning Department preservation staff shall review and approve the documentation package</p>	<p>Considered complete upon completion of the Planning Department approved documentation provided to the repositories in their preferred format and the print-on-demand booklet is made available to the public, upon request</p>

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>photography shall be undertaken by a qualified professional with demonstrated experience in HABS/HALS photography. Photograph views for the data set shall include contextual views; views of each side of the building and interior views, including any original interior features, where possible; oblique views of the building; and detail views of character-defining features. All views shall be referenced on a photographic key. This photographic key shall be on a map of the property and shall show the photograph number with an arrow to indicate the direction of the view. Historic photographs shall also be collected, reproduced, and included in the data set.</p> <p><b>HABS/HALS Historical Report</b> – A written historical narrative and report shall be provided in accordance with the HABS/HALS Historical Report Guidelines. The written history shall follow an outline format that begins with a statement of significance supported by the development of the architectural and historical context in which the structure was built and subsequently evolved. The report shall also include architectural description and bibliographic information.</p> <p><b>Video Recordation (HRER Part II, Mitigation Measure 3)</b> – Video recordation shall be undertaken before demolition or site permits are issued. The project sponsor team shall undertake video documentation of the affected historical resource and its setting. The documentation shall be conducted by a professional videographer, one with experience recording architectural resources. The documentation shall be narrated by a qualified professional who meets the standards for history, architectural history, or architecture (as appropriate) set forth by the Secretary of the Interior’s Professional Qualification Standards (36 Code of Federal Regulations Part 61). The documentation shall include as much information as possible—using visuals in combination with narration—about the materials, construction methods, current condition, historic use, and historic context of the historical resource. This mitigation measure would supplement the</p>				

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>traditional HABS/HALS documentation, and would enhance the collection of reference materials that would be available to the public and inform future research.</p> <p><b>Softcover Book</b> – A Print-on-Demand softcover book shall be produced that includes the content from the historical report, historical photographs, HABS/HALS photography, measured drawings, and field notes. The Print-on-Demand book shall be made available to the public for distribution. The project sponsor team shall transmit such documentation to the History Room of the San Francisco Public Library, San Francisco Architectural Heritage, the Planning Department, and the Northwest Information Center. The HABS/HALS documentation scope will determine the requested documentation type for each facility, and the project sponsor team will conduct outreach to identify other interested groups. All documentation will be reviewed and approved by the Planning Department’s staff before any demolition or site permit is granted for the affected historical resource.</p>				
<p><b>Mitigation Measure M-CR-1b: Salvage Plan (HRER Part II, Mitigation Measure 2)</b></p>				
<p>Prior to any demolition that would remove character-defining features, the project sponsor team shall consult with the planning department as to whether any such features may be salvaged, in whole or in part, during demolition/alteration. The project sponsor team shall make a good faith effort to salvage materials of historical interest to be utilized as part of the interpretative program.</p>	<p>Project Sponsor Team/qualified preservation consultant at the direction of the ERO</p>	<p>Prior to issuance of construction permits</p>	<p>Planning Department</p>	<p>Considered complete after salvage occur and interpretive program is complete</p>
<p><b>Mitigation Measure M-CR-1c: Interpretation of the Historical Resource (HRER Part II, Mitigation Measure 4)</b></p>				
<p>The project sponsor team shall facilitate the development of an interpretive program focused on the history of the project site. The interpretive program should be developed and implemented by a qualified professional with demonstrated experience in displaying information and graphics to the public in a visually interesting</p>	<p>Project Sponsor Team, construction contractors, and qualified consultant, at the</p>	<p>Prior to issuance of excavation permit or commencement of construction</p>	<p>Planning Department preservation staff shall review and approve the interpretive program plan</p>	<p>Considered complete upon the Planning Department’s approval and the Project Sponsor Team’s implementation of the interpretive program plan</p>

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>manner, such as a museum or exhibit curator. This program shall be initially outlined in a proposal for an interpretive plan subject to review and approval by Planning Department staff. The proposal shall include the proposed format and the publicly-accessible location of the interpretive content, as well as high-quality graphics and written narratives. The proposal prepared by the qualified consultant describing the general parameters of the interpretive program shall be approved by Planning Department staff prior to issuance of the architectural addendum to the site permit. The detailed content, media, and other characteristics of such an interpretive program shall be approved by Planning Department staff prior to issuance of a Temporary Certificate of Occupancy.</p> <p>The interpretative program shall include but not be limited to the installation of permanent on-site interpretive displays or screens in publicly accessible locations. Historical photographs, including some of the large-format photographs required by Mitigation Measure M-CR-1a, may be used to illustrate the site’s history. The oral history program required by Mitigation Measure M-CR-1d will also inform the interpretative program.</p> <p>The primary goal is to educate visitors and future residents about the property’s historical themes, associations, and lost contributing features within broader historical, social, and physical landscape contexts. These themes would include but not be limited to the subject property’s historic significance for its association with the earliest years of San Francisco’s Municipal Railway, the United States’ first publicly owned street railway and for its distinctive characteristics as a car barn, for its post-Earthquake period of construction, and as the work of master Michael M. O’Shaughnessy.</p>	<p>direction of the ERO</p>			
<p>Mitigation Measure M-CR-1d: Oral Histories (HRER Part II, Mitigation Measure 5)</p>				

**MONITORING AND REPORTING PROGRAM<sup>1</sup>**

<b>Adopted Mitigation Measures</b>	<b>Implementation Responsibility</b>	<b>Mitigation Schedule</b>	<b>Monitoring / Reporting Responsibility</b>	<b>Monitoring Actions / Completion Criteria</b>
<p>The project sponsor team shall undertake an oral history project on the resource that may include interviews of people such as former SFMTA employees, or other community members who may offer informative historic perspectives on the history and significance of the resource. The project shall be conducted by a professional historian in conformance with the Oral History Association’s Principles and Best Practices (<a href="https://www.oralhistory.org/principles-and-best-practices-revised-2018/">https://www.oralhistory.org/principles-and-best-practices-revised-2018/</a>). In addition to transcripts of the interviews, the oral history project shall include a narrative project summary report containing an introduction to the project, a methodology description, and brief summaries of each conducted interview. Copies of the completed oral history project shall be submitted to the San Francisco Public Library, Planning Department, and other interested historical institutions. The oral history project shall also be incorporated into the interpretative program.</p>	<p>Project Sponsor Team and qualified consultant, at the direction of the ERO</p>	<p>Prior to issuance of excavation permit or commencement of construction</p>	<p>Planning Department preservation staff shall review and approve the documentation package</p>	<p>Considered complete upon the Planning Department’s approval and the Project Sponsor Team’s implementation of the interpretive program plan</p>
<p><b>Mitigation Measure M-TCR-1: Tribal Cultural Resources Preservation and/or Interpretive Program</b></p>				
<p>During ground-disturbing activities that encounter archeological resources, if the Environmental Review Officer (ERO) determines that a significant archeological resource is present, and if in consultation with the affiliated Native American tribal representatives, the ERO determines that the resource constitutes a tribal cultural resource (TCR) and that the resource could be adversely affected by the proposed project, the proposed project shall be redesigned so as to avoid any adverse effect on the significant tribal cultural resource, if feasible.</p> <p>If the ERO, in consultation with the project sponsor, determines that preservation-in-place of the TCR would be both feasible and effective, then the archeological consultant shall prepare an archeological resource preservation plan (ARPP). Implementation of</p>	<p>Project Sponsor Team, construction contractors, and qualified consultant, at the direction of the ERO</p>	<p>Consultation and planning starting upon discovery of a potential TCR during archeological testing or during construction excavations; interpretive program to be implemented prior to issuance of building occupancy permit</p>	<p>Environmental Review Officer (ERO) or designee</p>	<p>In the event of the discovery of a TCR, considered complete after implementation of the Planning Department approved interpretation program</p>

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>the approved ARPP by the archeological consultant shall be required when feasible.</p> <p>If the ERO, in consultation with the affiliated Native American tribal representatives and the project sponsor, determines that preservation-in-place of the TCR is not a sufficient or feasible option, then the project sponsor shall implement an interpretive program of the TCR in consultation with affiliated Native American tribal representatives. An interpretive plan produced in consultation with affiliated Native American tribal representatives, at a minimum, and approved by the ERO, would be required to guide the interpretive program. The plan shall identify proposed locations for installations or displays, the proposed content and materials of those displays or installation, the producers or artists of the displays or installation, and a long-term maintenance program. The interpretive program may include artist installations, preferably by local Native American artists, oral histories with local Native Americans, artifacts displays and interpretation, and educational panels or other informational displays.</p>				
<b>NOISE</b>				
<b>Mitigation Measure M-NO-1: Construction Noise Control</b>				
<p>The SFMTA and private project co-sponsor and/or its contractors on SFMTA’s behalf (referred to below as project sponsor team) shall prepare construction noise control documentation as detailed below. Prior to issuance of any demolition or building permit, the project sponsor team shall submit a project-specific construction noise control plan to the Environmental Review Officer (ERO) or the ERO’s designee for approval. The construction noise control plan shall be prepared by a qualified acoustical engineer, with input from the construction contractor, and include all feasible measures to reduce construction noise. The construction noise control plan shall identify noise control measures to meet a performance target of</p>	<p>Project Sponsor Team, construction contractors, acoustical engineer</p>	<p>Prior to the issuance of construction permits; prior to the commencement of each construction stage; implementation of monitoring ongoing during construction</p>	<p>Environmental review officer or designee in Planning Department, Project Sponsor Team</p>	<p>Noise control plan approved by ERO/Planning Department prior to construction and considered complete upon submission of a noise monitoring report after each construction phase and completion of construction activities</p>

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>construction activities not resulting in a noise level greater than 90 dBA at noise-sensitive receptors and 10 dBA above the ambient noise level at noise-sensitive receptors. The project sponsor team shall ensure that requirements of the construction noise control plan are included in contract specifications. If nighttime construction is required, the plan shall include specific measures to reduce nighttime construction noise. The plan shall also include measures for notifying the public of construction activities, complaint procedures, and a plan for monitoring construction noise levels in the event complaints are received. The construction noise control plan shall include the following measures to the degree feasible, or other effective measures, to reduce construction noise levels:</p> <ul style="list-style-type: none"> <li>• Use construction equipment that is in good working order, and inspect mufflers for proper functionality;</li> <li>• Select “quiet” construction methods and equipment (e.g., improved mufflers, use of intake silencers, engine enclosures);</li> <li>• Use construction equipment with lower noise emission ratings whenever possible, particularly for air compressors;</li> <li>• Prohibit the idling of inactive construction equipment for more than five minutes;</li> <li>• Locate stationary noise sources (such as compressors) as far from nearby noise-sensitive receptors as possible (including future onsite noise-sensitive receptors at the Phase 2 Bryant Street Housing under the phased construction scenarios for the Refined Project), muffle such noise sources, and construct barriers around such sources and/or the construction site.</li> <li>• Avoid placing stationary noise-generating equipment (e.g., generators, compressors) within noise-sensitive buffer areas (as determined by the acoustical engineer) immediately adjacent to neighbors (including future onsite noise-</li> </ul>				

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>sensitive receptors at the Phase 2 Bryant Street Housing under the phased construction scenarios for the Refined Project).</p> <ul style="list-style-type: none"> <li>• Enclose or shield stationary noise sources from neighboring noise-sensitive properties (including the future onsite noise-sensitive receptors at the Phase 2 Bryant Street Housing under the phased construction scenarios for the Refined Project) with noise barriers to the extent feasible. To further reduce noise, locate stationary equipment in pit areas or excavated areas, if feasible; and</li> <li>• Install temporary barriers, barrier-backed sound curtains and/or acoustical panels around working powered impact equipment and, if necessary, around the perimeter of active construction areas or phases. When temporary barrier units are joined together, the mating surfaces shall be flush with each other. Gaps between barrier units, and between the bottom edge of the barrier panels and the ground, shall be closed with material that completely closes the gaps, and dense enough to attenuate noise.</li> <li>• Under the phased construction scenarios for the Refined Project, develop strategies to reduce exposure to construction noise in coordination with future onsite noise-sensitive receptors at the Phase 2 Bryant Street Housing. Some options to reduce noise include limiting noise to Phase 2 Bryant Street receptors by delaying or limiting occupancy in units closest to the construction zone or notifying receptors of loud construction periods. These options should be explored as part of the noise control plan prepared by a qualified noise consultant and the construction contractor.</li> </ul> <p>The construction noise control plan shall include the following measures for notifying the public of construction activities, complaint procedures, and monitoring construction noise levels:</p>				

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<ul style="list-style-type: none"> <li>• Designate an on-site construction noise manager for the project;</li> <li>• Notify neighboring noise-sensitive receptors within 300 feet of the project construction area at least 30 days in advance of high-intensity noise-generating activities (e.g., pier drilling, pile driving, and other activities that may generate noise levels greater than 90 dBA at noise-sensitive receptors) about the estimated duration of the activity (including future onsite noise-sensitive receptors at the Phase 2 Bryant Street Housing under the phased construction scenarios for the Refined Project);</li> <li>• Post a sign onsite describing noise complaint procedures and a complaint hotline number that shall always be answered during construction;</li> <li>• Implement a procedure for notifying the planning department of any noise complaints within one week of receiving a complaint;</li> <li>• Establish a list of measures for responding to and tracking complaints pertaining to construction noise. Such measures may include the evaluation and implementation of additional noise controls at sensitive receptors (residences, hospitals, convalescent homes, schools, churches, hotels and motels, and sensitive wildlife habitat); and</li> <li>• Conduct noise monitoring (measurements) at the beginning of major construction phases (e.g., demolition, grading, excavation) and during high-intensity construction activities to determine the effectiveness of noise attenuation measures and, if necessary, implement additional noise control measures.</li> </ul> <p>The construction noise control plan shall include the following additional measures in the event of pile-driving activities:</p>				

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<ul style="list-style-type: none"> <li>When pile driving is to occur within 600 feet of a noise-sensitive receptor, implement “quiet” pile-driving technology (such as pre-drilling of piles, sonic pile drivers, auger cast-in-place, or drilled-displacement, or the use of more than one pile driver to shorten the total pile-driving duration [only if such measure is preferable to reduce impacts to sensitive receptors]) where feasible, in consideration of geotechnical and structural requirements and conditions;</li> <li>Where the use of driven impact piles cannot be avoided, properly fit impact pile driving equipment with an intake and exhaust muffler and a sound-attenuating shroud, as specified by the manufacturer; and</li> <li>Conduct noise monitoring (measurements) before, during, and after the pile-driving activity.</li> </ul>				
<p><b>Mitigation Measure M-NO-2: Vibration-Sensitive Equipment at 2601 Mariposa Street (KQED Building)</b></p>				
<p>Prior to construction, the SFMTA and private project co-sponsor and/or its contractors on SFMTA’s behalf (referred to below as project sponsor team) shall designate and make available a community liaison to respond to vibration complaints from building occupants at the KQED building, located at 2601 Mariposa Street. Contact information for the community liaison shall be posted in a conspicuous location so that it is clearly visible to building occupants most likely to be disturbed. Through the community liaison, the project sponsor team shall provide notification to property owners and occupants of 2601 Mariposa Street at least 10 days prior to construction activities involving equipment that can generate vibration capable of interfering with vibration-sensitive equipment, informing them of the estimated start date and duration of vibration-generating construction activities. Equipment types capable of generating such vibration include an impact pile</p>	<p>Project Sponsor Team, and qualified consultant, at the direction of the ERO</p>	<p>Prior to the issuance building and construction permits</p>	<p>Project sponsor, project acoustical engineer and Planning Department</p>	<p>Considered complete after construction activities are completed and after buildings and/or structures are remediated to their pre-construction condition at the conclusion of vibration-generating activity on the site, should any damage occur</p>

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>driver, or similar equipment, operating within 250 feet of the building or a vibratory roller, or similar equipment, operating within 125 feet of the building. If feasible, the project sponsor team shall identify potential alternative equipment and techniques that could reduce construction vibration levels. Alternative equipment and techniques may include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• pre-drilled piles,</li> <li>• caisson drilling,</li> <li>• oscillating or rotating pile installation,</li> <li>• jetting piles into place using a water injection at the tip of the pile could be substituted for driven piles, if feasible, based on soil conditions,</li> <li>• static rollers could be substituted for vibratory rollers in some cases.</li> </ul> <p>If concerns prior to construction or complaints during construction related to equipment interference are identified, the community liaison shall work with the project sponsor team and the affected building occupants to resolve the concerns such that the vibration control measures would meet a performance target of the 65 VdB vibration level threshold for vibration sensitive equipment, as set forth by Federal Transit Authority (FTA). To resolve concerns raised by building occupants, the community liaison shall convey the details of the complaint(s) to the project sponsor team, such as who shall implement specific measures to ensure that the project construction meets the performance target of 65 VdB vibration level for vibration sensitive equipment. These measures may include evaluation by a qualified noise and vibration consultant, scheduling certain construction activities outside the hours of operation or recording periods of specific vibration-sensitive equipment if feasible, and/or conducting ground-borne vibration monitoring to document that the project can meet the performance target of 65 VdB at specific distances and/or locations. Ground-borne</p>				

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
vibration monitoring, if appropriate to resolve concerns, shall be conducted by a qualified noise and vibration consultant.				
<b>Mitigation Measure NO-3: Fixed Mechanical Equipment Noise Control for Building Operations</b>				
<p>The SFMTA and a private project co-sponsor and/or its contractors on SFMTA’s behalf (referred to below as project sponsor team) shall prepare operational noise control documentation as detailed below. Prior to approval of a building permit, the project sponsor team shall submit documentation to the Environmental Review Officer (ERO) or the officer’s designee, demonstrating with reasonable certainty that the building’s fixed mechanical equipment (such as heating, ventilation and air conditioning [HVAC] equipment) meets the noise limits specified in sections 2909 (b) and 2909 (d) of the noise ordinance (i.e., an 8-dB increase above the ambient noise level at the property plane for commercial or mixed-use properties; and interior noise limits of 55 dBA and 45 dBA for daytime and nighttime hours inside any sleeping or living room in a nearby dwelling unit on a residential property assuming windows open, respectively). Acoustical treatments required to meet the noise ordinance may include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Enclosing noise-generating mechanical equipment;</li> <li>• Installing relatively quiet models of air handlers, exhaust fans, and other mechanical equipment;</li> <li>• Using mufflers or silencers on equipment exhaust fans;</li> <li>• Orienting or shielding equipment to protect noise-sensitive receptors (residences, hospitals, convalescent homes, schools, churches, hotels and motels, and sensitive wildlife habitat) to the greatest extent feasible;</li> <li>• Increasing the distance between noise-generating equipment and noise-sensitive receptors; and/or</li> </ul>	Project Sponsor Team and qualified consultant, at the direction of the ERO	Prior to the issuance building permit	Environmental Review Officer (ERO) or designee	Considered complete after receipt and acceptance of the appropriate documentation to the ERO

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<ul style="list-style-type: none"> <li>Placing barriers around the equipment to facilitate the attenuation of noise.</li> </ul> <p>Compliance with this fixed-mechanical equipment noise control for building operations standard requirement does not obviate the need for the equipment to demonstrate compliance with the noise ordinance throughout the lifetime of the project.</p>				
<b>AIR QUALITY</b>				
<b>Mitigation Measure M-AQ-1: Off-Road Construction Equipment Emissions Minimization</b>				
<p>The SFMTA and private project co-sponsor and/or its contractors on SFMTA’s behalf (referred to below as project sponsor team) shall comply with the following:</p> <p>A. Engine Requirements.</p> <ol style="list-style-type: none"> <li>All off-road equipment greater than or equal to 25 horsepower shall have engines that meet U.S. EPA or California Air Resources Board Tier 4 Final off-road emission standards.</li> <li>Where access to alternative sources of power is available, portable diesel engines shall be prohibited. If access to alternative sources of power is infeasible, portable diesel engines shall meet the requirements of Subsection (A)(1).</li> <li>Diesel engines, whether for off-road or on-road equipment, shall not be left idling for more than two minutes, at any location, except as provided in exceptions to the applicable state regulations regarding idling for off-road and on-road equipment (e.g., traffic conditions, safe operating conditions). The project sponsor team shall post legible and visible signs in English, Spanish, and Chinese, in designated queuing</li> </ol>	Project Sponsor Team, construction contractors	Prior to issuance of a construction permit; implementation ongoing during construction	Environmental Review Officer (ERO) or designee/ project sponsor	Considered complete upon Planning Department review and approval of Construction Emissions Minimization Plan, ongoing review and approval of biannual reports, and review and approval of final construction report

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>areas and at the construction site to remind operators of the two-minute idling limit.</p> <p>4. The project sponsor team shall instruct construction workers and equipment operators on the maintenance and tuning of construction equipment and require that such workers and operators properly maintain and tune equipment in accordance with manufacturer specifications.</p> <p>B. Waivers.</p> <p>1. The San Francisco Planning Department Environmental Review Officer (ERO) may waive the equipment requirements of Subsection (A)(1) if: a particular piece of off-road Tier 4 Final equipment is not regionally available, not technically feasible, or would not produce desired emissions reduction due to expected operating modes. In granting the waiver, the project sponsor team must demonstrate with substantial evidence that the project construction does not exceed the BAAQMD threshold for NOx (54 lbs/day) by resulting in a net increase of average daily NOx emissions greater than 4 pounds per day. The project sponsor team must also demonstrate with substantial evidence that the overall combined construction and operational excess cancer risk does not exceed 7 per 1 million persons exposed at nearby sensitive receptors.</p> <p>C. Construction Emissions Minimization Plan.</p> <p>1. Before starting onsite construction activities, the project sponsor team shall submit a Construction Emissions Minimization Plan (Plan) to the ERO for review and approval. The Plan shall state, in reasonable detail, how the project sponsor team will meet the requirements of Section A.</p>				

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>2. The Plan shall include estimates of the construction timeline by phase, with a description of each piece of off-road equipment required for every construction phase. The description may include, but is not limited to: equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number, and expected fuel use and hours of operation.</p> <p>3. The project sponsor team shall ensure that all applicable requirements of the Plan have been incorporated into the contract specifications. The Plan shall include a certification statement that the project sponsor team agrees to comply fully with the Plan.</p> <p>4. The project sponsor team shall make the Plan available to the public for review onsite during working hours. The project sponsor team shall post at the construction site a legible and visible sign summarizing the Plan. The sign shall also state that the public may ask to inspect the Plan for the project at any time during working hours and shall explain how to request to inspect the Plan. The project sponsor team shall post at least one copy of the sign in a visible location on each side of the construction site facing a public right-of-way.</p> <p>D. Monitoring</p> <p>1. After start of construction activities, the project sponsor team shall submit biannual reports to the ERO documenting compliance with the Plan. After completion of construction activities and prior to receiving a final certificate of occupancy, the project sponsor team shall submit to the ERO a final report summarizing construction activities, including the start and end dates and duration of each construction phase, and the specific information required in the Plan.</p>				

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p><b>Mitigation Measure M-AQ-3: Emergency Diesel Generator Health Risk Reduction Plan</b></p> <p>The SFMTA and private project co-sponsor and/or its contractors on SFMTA’s behalf (referred to below as the project sponsor team) shall comply with the following:</p> <ol style="list-style-type: none"> <li>1. Require all emergency diesel generators to meet Tier 4 Final emission standards and reduce annual testing limit to 20 hours per year for each generator; or</li> <li>2. Require all emergency generators to be battery-powered; or</li> <li>3. The project sponsor team shall retain a qualified air quality consultant to develop an Emergency Diesel Generator Health Risk Reduction Plan. The project sponsor team shall submit the plan to the San Francisco Planning Department Environmental Review Officer (ERO) for review and approval prior to issuance of a permit for emergency diesel generators from the San Francisco Department of Building Inspection or the Bay Area Air Quality Management District. The plan must include, for each emergency diesel generator, a description of the anticipated venting location, engine specifications, and annual maintenance testing procedures. The plan must demonstrate with substantial evidence that annual maintenance testing will not result in the project’s overall construction and operational cancer risk exceeding 7 per one million persons exposed at nearby offsite sensitive receptors.</li> </ol> <p>Additionally, the operator of the facility at which the generators are located (including the private project co-sponsor as applicable) shall be required to maintain records of the testing schedule for each emergency diesel generator for the life of that generator and to</p>	<p>Project Sponsor Team and construction contractor</p>	<p>Prior to issuance of a permit for emergency diesel generator</p>	<p>Project Sponsor Team, facility maintenance contractor, and the Planning Department</p>	<p>Considered complete upon Planning Department review and approval of Emergency Diesel Generator Health Risk Reduction Plan</p>

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
provide this information for review to the planning department within three months of requesting such information.				
<b>WIND</b>				
<b>Mitigation Measure M-WI-1(a): Design Measures to Reduce Project-Specific Wind Impacts</b>				
<p>The project sponsor team shall retain a qualified wind consultant to prepare, in consultation with the San Francisco Planning Department (planning department), a wind impact mitigation report that identifies design measures to reduce the project’s wind impacts in the project scenario. Prior to certification of the Final Environmental Impact Report, the project sponsor team shall submit the wind impact mitigation report to the planning department for its final review and approval. The wind impact mitigation report shall incorporate updated information on the building design based on a list of potential wind reduction measures identified below, along with the estimated effectiveness of each measure to reduce the identified off-site wind hazards.</p> <ul style="list-style-type: none"> <li>• Porous façades on portions of the north, east and west sides for natural ventilation as part of the heating, ventilation, and air conditioning strategy for the new transit facility at the second and third levels</li> <li>• Recessed building corner up to 12 feet in height at the southwest corner of proposed building near Bryant/Mariposa intersection</li> <li>• Vertical elevated screens on portions of the second and third levels of the west façade (Bryant Street)</li> <li>• Vertical wind screens at grade level on the adjacent Bryant Street sidewalk near the Bryant/Mariposa intersection</li> </ul> <p>Such wind reduction design measures may include additional on-site landscaping, or equivalent wind-reducing features; and off-site wind reduction measures such as landscaping, streetscape</p>	Project Sponsor Team/qualified consultant	Prior to completion of the environmental review	Project Sponsor Team, and the Planning Department	Completion of and acceptance of the wind impact mitigation report by the Planning Department

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>improvements or other wind-reducing features, such as wind screens.</p> <p>The project sponsor team shall implement as many of the design measures identified in the wind impact mitigation report as needed to reduce the proposed project’s or project variants’ potential to create a new wind hazard or exacerbate an existing wind hazard in publicly accessible areas of substantial pedestrian use to less-than-significant levels. The final wind impact mitigation report should not find that the project produces a net increase of the already identified wind hazard exceedances. The planning department shall approve the final list of wind reduction measures that the project sponsor team shall implement.</p>				
<p><b>Mitigation Measure M-WI-1(b): Additional Wind Testing</b></p>				
<p>If changes to the building design or massing are proposed after certification of the Final Environmental Impact Report, additional wind analysis may be required to confirm the modified design does not result in any 9-hour wind hazard exceedances and to minimize 1-hour wind hazard exceedances.</p> <p>If the planning department determines that the modified design could result in wind hazard criterion exceedances (for example, due to the removal of one or more wind reducing features), the project sponsor team shall retain a qualified wind consultant to prepare a wind analysis under the direction of the planning department. The wind analysis may require a wind tunnel test and shall identify wind reduction measures needed to avoid 9-hour wind hazard exceedances and to minimize 1-hour wind hazard exceedances.</p>	<p>Project Sponsor Team /qualified consultant</p>	<p>Prior to completion of the environmental review</p>	<p>Project Sponsor Team, and the Planning Department</p>	<p>Completion of and acceptance of the wind impact mitigation report by the Planning Department</p>
<p><b>GEOLOGY AND SOILS</b></p>				
<p><b>Mitigation Measure M-GE-6a: Inadvertent Discovery of Paleontological Resources</b></p>				

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>Worker Awareness Training - Prior to commencing construction, and ongoing throughout ground disturbing activities (e.g., excavation, utility installation, the project sponsor and/or their designee shall ensure that all project construction workers are trained on the contents of the Paleontological Resources Alert Sheet, as provided by the Planning Department. The Paleontological Resources Alert Sheet shall be prominently displayed at the construction site during ground disturbing activities for reference regarding potential paleontological resources.</p> <p>In addition, the project sponsor shall inform the contractor and construction personnel of the immediate stop work procedures and other procedures to be followed if bones or other potential fossils are unearthed at the project site. Should new workers that will be involved in ground disturbing construction activities begin employment after the initial training has occurred, the construction supervisor shall ensure that they receive the worker awareness training as described above.</p> <p>The project sponsor shall complete the standard form/affidavit confirming the timing of the worker awareness training to the Environmental Review Officer (ERO). The affidavit shall confirm the project's location, the date of training, the location of the informational handout display, and the number of participants. The affidavit shall be transmitted to the ERO within five (5) business days of conducting the training.</p> <p>Paleontological Resource Discoveries - In the event of the discovery of an unanticipated paleontological resource during project construction, ground disturbing activities shall temporarily be halted within 25 feet of the find until the discovery is examined by a qualified paleontologist as recommended by the Society of</p>	<p>Project Sponsor Team, construction contractors, at the direction of the ERO</p>	<p>Prior to construction commencement</p>	<p>Project Sponsor Team and the Planning Department</p>	<p>Submission of evidence of worker awareness training and distribution of alert sheet to the satisfaction of the Planning Department, including proper adherence to procedures if a resource is encountered</p>

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>Vertebrate Paleontology standards (SVP 2010) and Best Practices in Mitigation Paleontology (Murphey et al. 2019). Work within the sensitive area shall resume only when deemed appropriate by the qualified paleontologist in consultation with the ERO.</p> <p>The qualified paleontologist shall determine: 1) if the discovery is scientifically significant; 2) the necessity for involving other responsible or resource agencies and stakeholders, if required or determined applicable; and 3) methods for resource recovery. If a paleontological resource assessment results in a determination that the resource is not scientifically important, this conclusion shall be documented in a Paleontological Evaluation Letter to demonstrate compliance with applicable statutory requirements (e.g., Federal Antiquities Act of 1906, CEQA Guidelines Section 15064.5, California Public Resources Code Chapter 17, Section 5097.5, Paleontological Resources Preservation Act 2009). The Paleontological Evaluation Letter shall be submitted to the ERO for review within 30 days of the discovery.</p> <p>If the qualified paleontologist determines that a paleontological resource is of scientific importance, and there are no feasible measures to avoid disturbing this paleontological resource, the qualified paleontologist shall prepare a Paleontological Mitigation Program. The mitigation program shall include measures to fully document and recover the resource of scientific importance. The qualified paleontologist shall submit the mitigation program to the ERO for review and approval within 10 business days of the discovery. Upon approval by the ERO, ground disturbing activities in the project area shall resume and be monitored as determined by the qualified paleontologist for the duration of such activities.</p> <p>The mitigation program shall include: 1) procedures for construction monitoring at the project site; 2) fossil preparation and</p>				

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>identification procedures; 3) curation of paleontological resources of scientific importance into an appropriate repository; and 4) preparation of a Paleontological Resources Report (report or paleontology report) at the conclusion of ground disturbing activities. The report shall include dates of field work, results of monitoring, fossil identifications to the lowest possible taxonomic level, analysis of the fossil collection, a discussion of the scientific significance of the fossil collection, conclusions, locality forms, an itemized list of specimens, and a repository receipt from the curation facility. The project sponsor shall be responsible for the preparation and implementation of the mitigation program, in addition to any costs necessary to prepare and identify collected fossils, and for any curation fees charged by the paleontological repository. The paleontology report shall be submitted to the ERO for review within 30 business days from conclusion of ground disturbing activities, or as negotiated following consultation with the ERO.</p>				
<p><b>Mitigation Measure M-GE-6b: Preconstruction Paleontological Evaluation and Monitoring Plan during Construction</b></p>				
<p>The project sponsor shall engage a qualified paleontologist to develop a site-specific monitoring plan prior to commencing soil-disturbing activities at the project site. The Preconstruction Paleontological Monitoring Plan would determine project construction activities requiring paleontological monitoring based on those may affect sediments with moderate sensitivity for paleontological resources. Prior to issuance of any demolition permit, the project sponsor shall submit the Preconstruction Paleontological Monitoring Plan to the ERO for approval.</p> <p>At a minimum, the plan shall include:</p> <ol style="list-style-type: none"> <li>1. Project Description</li> <li>2. Regulatory Environment – outline applicable federal, state and local regulations</li> </ol>	<p>Project Sponsor Team, construction contractors, and qualified consultant, at the direction of the ERO</p>	<p>Prior to construction commencement</p>	<p>Project Sponsor Team and the Planning Department</p>	<p>Completion of and acceptance of the Preconstruction Paleontological Evaluation by the Planning Department</p>

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>3. Summary of Sensitivity Classification(s)</p> <p>4. Research Methods, including but not limited to:</p> <p>4.a. Field studies conducted by the approved paleontologist to check for fossils at the surface and assess the exposed sediments.</p> <p>4.b. Literature Review to include an examination of geologic maps and a review of relevant geological and paleontological literature to determine the nature of geologic units in the project area.</p> <p>4.c. Locality Search to include outreach to the University of California Museum of Paleontology in Berkeley.</p> <p>5. Results: to include a summary of literature review and finding of potential site sensitivity for paleontological resources; and depth of potential resources if known.</p> <p>6. Recommendations for any additional measures that could be necessary to avoid or reduce any adverse impacts to recorded and/or inadvertently discovered paleontological resources of scientific importance. Such measures could include:</p> <p>6.a. Avoidance: If a known fossil locality appears to contain critical scientific information that should be left undisturbed for subsequent scientific evaluation.</p> <p>6.b. Fossil Recovery: If isolated small, medium- or large-sized fossils are discovered during field surveys or construction monitoring, and they are determined to be scientifically significant, they should be recovered. Fossil recovery may involve collecting a fully exposed fossil from the ground surface, or may involve a systematic excavation, depending upon the size and complexity of the fossil discovery.</p> <p>6.c. Monitoring: Monitoring involves systematic inspections of graded cut slopes, trench sidewalls, spoils piles, and other types of construction</p>				

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Mitigation Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>excavations for the presence of fossils, and the fossil recovery and documentation of these fossils before they are destroyed by further ground disturbing actions. Standard monitoring is typically used in the most paleontologically sensitive geographic areas/geologic units (moderate, high and very high potential); while spot-check monitoring is typically used in geographic areas/geologic units of moderate or unknown paleontological sensitivity (moderate or unknown potential).</p> <p>6.d. Data recovery and reporting: Fossil and associated data discovered during soils disturbing activities should be treated according to professional paleontological standards and documented in a data recovery report. The plan should define the scope of the data recovery report.</p> <p>The consultant shall document the monitoring conducted according to the monitoring plan and any data recovery completed for significant paleontological resource finds discovered, if any. Plans and reports prepared by the consultant shall be considered draft reports subject to revision until final approval by the ERO. The final monitoring report and any data recovery report shall be submitted to the ERO prior to the certificate of occupancy.</p>				

*Continues on the next page.*

Table 5: IMPROVEMENT MEASURES FOR THE POTRERO YARD MODERNIZATION PROJECT

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Improvement Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<b>IMPROVEMENT MEASURES AGREED TO BY PROJECT SPONSOR TEAM</b>				
<b>TRANSPORTATION</b>				
Improvement Measure I-TR-A: Construction Management Plan – Additional Measures				
<p>As part of the project’s construction management plan, the SFMTA and a private project co-sponsor and/or its contractors on SFMTA’s behalf (referred to as project sponsor team) will require additional measures to further minimize disruptions to people walking and bicycling, transit, and emergency vehicles during project construction: The additional measures include:</p> <p><b>Carpool, Bicycle, Walk, and Transit Access for Construction Workers</b>—Carpool, Bicycle, Walk, and Transit Access for Construction Workers—To minimize parking demand and vehicle trips associated with construction workers, the construction contractor will include as part of the Construction Management Plan methods to encourage carpooling, bicycle, walk, and transit access to the project site by construction workers. These methods could include providing secure bicycle parking spaces, participating in free-to-employee and employer ride matching program from www.511.org, participating in emergency ride home program through the City of San Francisco (www.sferh.org), and providing transit information to construction workers.</p> <p><b>Project Construction Updates for Adjacent Businesses and Residents</b>— To minimize construction impacts on access to nearby residences and businesses, the project sponsor team will provide nearby residences and adjacent businesses with regularly updated information regarding project construction, including construction activities, peak construction vehicle activities, travel lane closures,</p>	<p>Project Sponsor Team, including SFMTA regulatory teams, and construction contractor</p>	<p>Prior to the issuance of construction permits; implementation ongoing during construction with construction updates provided weekly; Active Monitoring of Detours as needed</p>	<p>Project Sponsor Team, SFMTA (in its regulatory capacity)</p>	<p>Considered complete upon the submittal and approval of the Construction Management Plan to the SFMTA (in its regulatory capacity)</p>

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Improvement Measures	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>and parking lane and sidewalk closures (e.g., via the project’s website). At regular intervals to be defined in the construction management plan, a regular email notice will be distributed by the project sponsor team that would provide current construction information of interest to neighbors, as well as contact information for specific construction inquiries or concerns.</p>				
<p><b>Improvement Measure I-TR-B: Driveway and Loading Operations Plan (DLOP)</b></p>				
<p>The project sponsor team (including joint development project sponsor as applicable) will be required to prepare and implement a Driveway and Loading Operations Plan (DLOP). The DLOP will be prepared by the private project co-sponsor, in coordination with the SFMTA, and submitted as part of the application for the first temporary occupancy permit. The DLOP will include provisions to manage loading activities and driveway operations associated with the below-grade onsite loading spaces; provisions for assessing on-street commercial and passenger loading supply and protocol for expanding on-street supply, if needed; provisions for trash/recycling/compost truck access and collection operations; provisions for residential move-in and move-out operations; provisions for scheduling Muni deliveries using the onsite loading facilities; and provisions for accommodating recurring deliveries such as UPS, Federal Express, and USPS within the onsite loading facilities.</p> <p>The intent of the DLOP is to reduce potential conflicts between passenger and freight loading and transit operations, and between passenger and freight loading activities and people walking and bicycling, and other vehicles in the project vicinity, as well as to maximize reliance on onsite facilities to accommodate freight loading demand.</p>	<p>Project Sponsor Team</p>	<p>Project Sponsor Team to submit Loading Management Plan to ERO prior to the issuance of any certificate of occupancy for the proposed project.</p>	<p>ERO, Project Sponsor Team or successor owner/ manager of residential building</p>	<p>Considered complete upon ERO approval of Loading Management Plan; Ongoing monitoring to continue indefinitely</p>

**Table 6: PUBLIC WORKS STANDARD CONSTRUCTION MEASURES FOR THE POTRERO YARD MODERNIZATION PROJECT**

Public Works’ Regulatory Affairs division will ensure the Standard Construction Measures are included in construction specifications and contracts. The planning department environmental monitoring team will confirm the public works standard construction measures have been incorporated into the final project agreement with the project sponsor team.

<b>MONITORING AND REPORTING PROGRAM<sup>1</sup></b>				
<b>Adopted Public Works Standard Construction Measure</b>	<b>Implementation Responsibility</b>	<b>Mitigation Schedule</b>	<b>Monitoring / Reporting Responsibility</b>	<b>Monitoring Actions / Completion Criteria</b>
<b>PUBLIC WORKS STANDARD CONSTRUCTION MEASURES AGREED TO BY PROJECT SPONSOR TEAM</b>				
<b>Public Works Standard Construction Measure #1, Seismic and Geotechnical Studies (Geology and Soils)</b>				
The project manager shall ensure that projects that may potentially be affected by existing soil, slope and/or geologic conditions at the project site will be screened for liquefaction, subsidence, landslide, fault displacement, and other geological hazards at the project site, and will be engineered and designed as necessary to minimize risks to safety and reliability due to such hazards. As necessary, geotechnical investigations will be performed.	Project Sponsor Team, construction contractors	Prior to construction	Project Sponsor Team, Planning Department, Public Works Regulatory Affairs	Considered complete upon submission of geotechnical investigations, if applicable
<b>Public Works Standard Construction Measure #2, Air Quality</b>				
All projects will comply with the Construction Dust Control Ordinance. Major construction projects that are estimated to require 20 or more days of cumulative work within the Air Pollutant Exposure Zone must comply with the additional clean construction requirements of the Clean Construction Ordinance.	Project Sponsor Team, construction contractors	Ongoing during construction	Project Sponsor Team, Planning Department, Public Works Regulatory Affairs	Considered complete upon submission of a Site-Specific Dust Control Plan for the review and approval of the Department of Public Health
<b>Public Works Standard Construction Measure #3, Water Quality</b>				
All projects will implement erosion and sedimentation controls to be tailored to the project site, such as fiber rolls and/or gravel bags around storm drain inlets, installation of silt fences, and other such measures sufficient to prevent discharges of sediment and other pollutants to storm drains and all surface waterways, such as San Francisco Bay, the Pacific Ocean, water supply reservoirs, wetlands, swales, and streams. As required based on project location and size,	Project Sponsor Team, construction contractors	Ongoing during construction	Project Sponsor Team, Planning Department, Public Works Regulatory Affairs	Considered complete upon Project Sponsor Team’s enforcement of water quality considerations

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Public Works Standard Construction Measure	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>a Stormwater Control Plan (in most areas of San Francisco) or a Stormwater Pollution Prevention Plan (SWPPP) (in certain areas of San Francisco) will be prepared. If uncontaminated groundwater is encountered during excavation activities, it will be discharged in compliance with applicable water quality standards and discharge permit requirements.</p>				
<p><b>Public Works Standard Construction Measure #4, Traffic</b></p>				
<p>All projects will implement traffic control measures sufficient to maintain traffic and pedestrian circulation on streets affected by construction of the project. The measures will also, at a minimum, be consistent with the requirements of San Francisco Municipal Transportation Agency (SFMTA)’s Blue Book. Traffic control measures may include, but not be limited to, flaggers and/or construction warning sign age of work ahead; scheduling truck trips during non-peak hours to the extent feasible; maintaining access to driveways, private roads, and off-street commercial loading facilities by using steel trench plates or other such method; and coordination with local emergency responders to maintain emergency access. Any temporary rerouting of transit vehicles or relocation of transit facilities would be coordinated with SFMTA Muni Operations.</p>	<p>Project Sponsor Team, construction contractors</p>	<p>Ongoing during construction</p>	<p>Project Sponsor Team; SFMTA Muni Operations, Public Works Regulatory Affairs</p>	<p>Considered complete upon the submittal and approval of the Construction Management Plan to the SFMTA</p>
<p><b>Public Works Standard Construction Measure #5, Noise</b></p>				
<p>All projects will comply with local noise ordinances resulting construction noise. Public Works shall undertake measures to minimize noise disruption to nearby neighbors and sensitive receptors during construction. These efforts could include using best available noise control technologies on equipment (i.e., mufflers, ducts, and acoustically attenuating shields), locating stationary noise sources (i.e., pumps and generators) away from sensitive receptors, erecting temporary noise barriers, and other such means.</p>	<p>Project Sponsor Team, construction contractors</p>	<p>Ongoing during construction</p>	<p>Project Sponsor Team, Planning Department, Public Works Regulatory Affairs</p>	<p>Considered complete upon Project Sponsor enforcement of local noise ordinances</p>

**MONITORING AND REPORTING PROGRAM<sup>1</sup>**

<b>Adopted Public Works Standard Construction Measure</b>	<b>Implementation Responsibility</b>	<b>Mitigation Schedule</b>	<b>Monitoring / Reporting Responsibility</b>	<b>Monitoring Actions / Completion Criteria</b>
<b>Public Works Standard Construction Measure #6, Hazardous Materials</b>				
Projects that involve excavation of 50 cubic yards of soil in the Maher Zone will comply with the Maher Ordinance. Projects on sites that are not currently located in the Maher Zone but have the potential to contain hazardous materials in soil and/or groundwater will be referred to the Department of Public Health as newly identified Maher sites.	Project Sponsor Team, construction contractors	Ongoing during construction	Project Sponsor Team, Planning Department, Public Works Regulatory Affairs	Considered complete upon Project Sponsor enforcement of Maher ordinance
<b>Public Works Standard Construction Measure #7, Biological Resources</b>				
Projects will comply with all local, state, and federal requirements for surveys, analysis, and protection of biological resources (e.g., Migratory Bird Treaty Act, Federal and State Endangered Species Acts, etc.). The project site and the immediately surrounding area will be screened to determine whether biological resources may be affected by construction. If biological resources are present, a qualified biologist will carry out a survey of the project site to note the presence of general biological resources and to identify whether habitat for special-status species and/or migratory birds is present. If necessary, measures will be implemented to protect biological resources, such as installing wildlife exclusion fencing, establishing work buffer zones, installing bird deterrents, having a qualified biologist conduct monitoring, and other such applicable measures. Tree removal will also comply with any applicable tree protection ordinance.	Project Sponsor Team, construction contractors	Ongoing during construction	Project Sponsor Team, Planning Department, Public Works Regulatory Affairs	Considered complete upon Project Sponsor enforcement of biological considerations
<b>Public Works Standard Construction Measure #8, Visual and Aesthetic Considerations, Project Site</b>				
All project sites will be maintained in a clean and orderly state. Construction staging areas will be sited away from public view, and on currently paved or previously disturbed areas, where possible.	Project Sponsor Team, construction contractors	Ongoing during construction	Project Sponsor Team, Planning Department, Public Works Regulatory Affairs	Considered complete upon Project Sponsor Team's enforcement of visual considerations

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Public Works Standard Construction Measure	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>Nighttime lighting will be directed away from residential areas and have shields to prevent light spillover effects. Upon project completion, project sites on City-owned lands will be returned to their general pre-project condition, including re-grading of the site and re-vegetation or re-paving of disturbed areas to the extent this is consistent with Public Works Bureau of Urban Forestry Policy and San Francisco Code. Project sites on non-City land will be restored to their general pre-project condition so that the owner may return them to their prior use, unless otherwise arranged with the property owner.</p>				
<p><b>Public Works Standard Construction Measure #9, Cultural Resources</b></p>				
<p>All projects that will alter a building or structure, produce vibrations, or include soil disturbance will be screened to assess whether cultural resources are or may be present and could be affected, as detailed below.</p> <p>Soil is defined as native earthen deposits or introduced earthen fill. Soil does not include materials that were previously introduced as part of roadway pavement section including asphalt concrete wearing roadway base and subbase.</p> <p><i>Archeological Resources.</i> The EP Archeologist has determined that Standard Archeological Measure III (Testing/Data Recovery) shall be implemented by Public Works to protect and/or treat significant archeological resources identified as being present within the site and potentially affected by the project (see Attachment H: Public Works Archeological Measure III (Testing / Data Recovery)).</p> <ol style="list-style-type: none"> <li>Public Works shall implement the EP Archeologist's recommendations prior to and/or during project construction consistent with Standard Archeological Measure III and shall consult with the EP Archeologist in</li> </ol>	<p>Project Sponsor Team, construction contractors</p>	<p>Prior to issuance of a construction permit</p>	<p>Project Sponsor Team, the EP Archeologist staff, Public Works and the ERO</p>	<p>Considered complete upon compliance with Standard Archeological Measure III (Testing/Data Recovery) requirements</p>

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Public Works Standard Construction Measure	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>selecting a qualified archeological consultant from the EP Archeological Resources Consultant Pool, as needed, to implement these measures.</p> <p>2. Soil-disturbing activities in archeologically sensitive areas, as identified through the above process, will not begin until preconstruction archeological measures required by the EP Archeologist (e.g., preparation of an Archeological Testing Plan, Archeological Treatment Plan, and/or an Archeological Data Recovery Plan) have been implemented.</p>				
<p><b>Public Works Standard Construction Measure #9, Cultural Resources</b></p>				
<p>All projects that will alter a building or structure, produce vibrations, or include soil will be screened to assess whether cultural resources are or may be present disturbance and could be affected, as detailed below.</p> <p><i>Historic (Built Environment) Resources.</i> Where construction will take place in proximity to a building or structure identified as a significant historical resource but would not otherwise directly affect it, Public Works will implement protective measures, such as but not limited to, the erection of temporary construction barriers to ensure that inadvertent impacts to such buildings or structures are avoided. These measures shall require the development of a Construction Best Practices for Historical Resources Plan and a plan outlining the Construction Monitoring for Historical Resources Program to be reviewed and approved by CCSF Planning Department Preservation staff.</p> <p>If a project includes or is directly adjacent to historic buildings or structures susceptible to vibration (such as but not limited to unreinforced masonry, earthen construction, lathe and plaster, or fragile architectural ornamentation) as determined in consultation with CCSF Planning Department Preservation staff, Public Works will determine if vibrations associated with proposed construction</p>	<p>Project Sponsor Team, construction contractors</p>	<p>Prior to issuance of a construction permit</p>	<p>Project Sponsor Team, the EP Preservation staff, Public Works and the ERO</p>	<p>Considered complete upon compliance with requirements</p>

MONITORING AND REPORTING PROGRAM<sup>1</sup>

Adopted Public Works Standard Construction Measure	Implementation Responsibility	Mitigation Schedule	Monitoring / Reporting Responsibility	Monitoring Actions / Completion Criteria
<p>activities has the potential to cause damage to such buildings or structures. Generally, vibration below 0.12 inches per second peak particle velocity does not have the potential to damage sensitive buildings or structures. A vibration study may be necessary to determine if such vibration levels will occur. If Public Works determines in consultation with CCSF Planning Department Preservation staff that vibration damage may occur, Public Works will engage a qualified historic architect or historic preservation professional to document and photograph the preconstruction condition of the building and prepare a plan for monitoring the building during construction. The monitoring plan will be submitted to and approved by CCSF Planning Department Preservation Planner prior to the beginning of construction and will be implemented during construction. The monitoring plan will identify how often monitoring will occur, who will undertake the monitoring, reporting requirements on vibration levels, reporting requirements on damage to adjacent historical resources during construction, reporting procedures to follow if such damage occurs, and the scope of the preconstruction survey and post-construction conditions assessment.</p> <p>If any damage to a historic building or structure occurs, Public Works will modify activities to minimize further vibration. If any damage occurs, the building will be repaired following the Secretary of the Interior's Standards for the Treatment of Historic Properties under the guidance of a qualified historic architect or historic preservation professional in consultation with CCSF Department Preservation Planner.</p>				

<sup>1</sup> Definitions of MMRP Column Headings:

Adopted Mitigation, Improvement or Public Works Standard Construction Measures: Full text of the mitigation measures, improvement measures or Public Works Standard Construction Measures copied verbatim from the final CEQA document.

Implementation Responsibility: Entity who is responsible for implementing the mitigation measures, improvement measures or Public Works Standard Construction Measures. In most cases this is the project sponsor and/or project's sponsor's contractor/consultant and at times under the direction of the planning department.

Mitigation Schedule: Identifies milestones for when the actions in the mitigation measure, improvement measure or Public Works Standard Construction Measure need to be implemented.

Monitoring/Reporting Responsibility: Identifies who is responsible for monitoring compliance with the mitigation measure, improvement measure or Public Works Standard Construction Measure and any reporting responsibilities. In most cases it is the Planning Department who is responsible for monitoring compliance. If a department or agency other than the planning department is identified as responsible for monitoring, there should be an expressed agreement between the planning department and that other department/agency. In most cases the project sponsor, their contractor, or consultant are responsible for any reporting requirements.

Monitoring Actions/Completion Criteria: Identifies the milestone at which the mitigation measure, improvement measure or Public Works Standard Construction Measure is considered complete. This may also identify requirements for verifying compliance.

## SECTION 01 35 44 - HAZARDOUS BUILDING MATERIALS SCOPE OF WORK

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Principal Project Company shall perform Hazardous Materials abatement, removal, and remediation before any demolition Work and for any disturbance of areas on the Project Site that contain Hazardous Materials.
- B. This Section 01 35 44 includes the scope of work for abatement and/or removal of Hazardous Materials, including Hazardous Waste and contaminated materials, environmental training requirements, minimum qualifications to perform Work related to Hazardous Materials, applicable Laws, Project requirements, and handling procedures required as part of the D&C Work.
- C. Many of the materials and items of equipment used to construct the improvements and facilities at the Project Site contain substances recognized by the State of California as being carcinogenic or reproductive toxins. Such hazardous, contaminated, and non-Hazardous Materials include, and are not limited to, Hazardous Materials, non-Hazardous Materials, soils, heavy metals, asbestos; serpentine rock (which may contain natural asbestos); soils with naturally-occurring asbestos; lead-containing paints and coatings; lead sheeting; mercury; debris, mold and fungi; bacterial/biological contamination. Materials that may be encountered include polychlorinated biphenyl (PCB) ballasts, mercury containing lamps; asbestos; lead and other Hazardous Materials.
- D. No environmental or Hazardous Materials sampling or analysis shall be conducted without written permission from the SAR group within City Public Works Department. This does not include Principal Project Company's obligation for any personnel air monitoring of its employees.
- E. ENVIRONMENTAL TRAINING REQUIREMENTS: Principal Project Company shall ensure all workers on the Project Site, including DB Contractors' workers, complete the environmental trainings listed below. Principal Project Company shall ensure that such workers have all necessary training certifications, and personal protective equipment (PPE) as required by applicable Law. Principal Project Company shall submit to The SAR group within City Public Works Department certifications or proof of the trainings, listed below, as a Submittal as per Section 02 80 13 Hazardous Building Materials Remediation.
  - 1. Health and Safety training
  - 2. HAZWOPER training
  - 3. Cal/OSHA Competent Person training for the field supervisor overseeing activities that disturb asbestos, or naturally occurring asbestos (NOA) as per Title 8 CCR 1529.
  - 4. Cal/OSHA asbestos training (for all trades who will come in contact and disturb asbestos or NOA.
  - 5. Lead training (for all trades that will come in contact and disturb lead containing paints as per Cal/OSHA 1532.1 Lead in Construction standard)
  - 6. Medical examination and blood tests (as warranted)
  - 7. Respiratory protection (including current respirator fit test records)

8. Storm water pollution prevention awareness training to enable the Principal Project Company's personnel to comply with the Erosion and Sediment Control Plan.
9. Other training pertaining to the Work being conducted.

## **1.2 RELATED DOCUMENTS AND SECTIONS**

- A. Section 02 80 13 Hazardous Building Materials Remediation

## **1.3 SCOPE OF WORK – HAZARDOUS BUILDING MATERIALS**

- A. Principal Project Company is hereby notified that Hazardous Materials, including Hazardous Waste and contaminated materials, are present on the Project Site. Principal Project Company shall perform a survey of all Hazardous Materials on the Project Site.
- B. Principal Project Company shall verify existing conditions and quantities of Hazardous Materials and shall comply with all applicable Laws when handling these materials.
- C. Principal Project Company shall ensure that all abatement, removal, and remediation of Hazardous Materials is performed by a licensed abatement contractor under proper Cal-OSHA work procedures. The waste stream generated by abatement Work shall be classified, handled, containerized, labeled, manifested, transported, and disposed in compliance with applicable Laws.
- D. In performing the Work, Principal Project Company shall verify if the Work will involve the disturbance, removal, abatement, remediation, clean up, transportation and disposal of Hazardous Materials. Principal Project Company is responsible for the removal, abatement, remediation, clean up, transportation, and disposal of any such environmentally-regulated Hazardous Materials.
- E. Principal Project Company is responsible for verifying existing site conditions and quantities of Hazardous Materials. Principal Project Company shall comply with applicable Laws when handling these materials.
- F. Lead-Related Removal: lead-containing and lead-based paint are present throughout the Project Site in buildings and on interior and exterior finishes. Principal Project Company shall ensure that all painted surfaces affected by the Work are removed in accordance with Cal/OSHA 1532.1 Lead in Construction standard. The lead-related D&C Work shall be coordinated with all demolition work.
- G. The City has not verified that any paints, coatings, dusts, or other materials are not lead containing, therefore Principal Project Company shall ensure that all "trigger 1" construction activities, such as demolition of painted surfaces, manual scraping or sanding of painted surfaces, or renovations impacting painted surfaces and primed structural steel are completed using dust controls and personal protective measures in compliance with the Cal/OSHA Construction Lead Standard, 8 CCR 1532.1. All settled dust within ductwork, ceiling plenums, crawl spaces, attics, chases and non-regular housekeeping areas shall be treated as having measurable lead content requiring compliance with Cal OSHA 1532.1.
- H. Other Regulated Materials: Principal Project Company shall remove or recycle the following materials:
  1. PCB-containing Light Ballasts: Fluorescent fixtures and high intensity discharge lamps shall be treated as having a mix of PCB and non-PCB ballasts, requiring disposal of impacted suspect units as Hazardous Waste.
  2. PCB-containing building materials.

3. Mercury, Cadmium, and/or Sodium-Containing Fluorescent Light Tubes/Bulbs: Fluorescent and mercury vapor lamps on the Project Site shall be treated as having mercury content requiring removal and recycling of quantities greater than 25 fixtures per day impacted by the Project's demolition or renovation activities.
4. Mercury-containing Materials: All mercury-containing thermometers, thermostats, and all mercooid switches shall be treated as mercury-containing, requiring removal, disposal as Hazardous Waste .
5. Tritium Exit Signs/emergency lighting: Principal Project Company shall ensure that tritium exit signs/emergency lighting are properly recycled or disposed per Federal and State Law.
6. Sewage, Sludge, and Bacterial Hazards Associated from Untreated Sewage: Principal Project Company shall ensure that pigeon wastes and leaking sewage lines are treated as a biohazard and Principal Project Company shall comply with Cal/OSHA blood borne pathogen safety requirements.
7. Mold: Surfaces affected by mold growth shall be removed or treated as recommended in guidance documents, such as "Guidelines on Assessment and Remediation of Fungi in Indoor Environments" (New York City Department of Health, April 2000), guidelines established in Bio aerosols Assessment and Control (J. Macher, Editor, ACGIH, 1999) and "Mold Remediation in Schools and Commercial Buildings" (U.S. Environmental Protection Agency, March 2001) and as otherwise noted in the Contract Documents.
8. Lead Sheeting:
9. Arsenic: Principal Project Company shall assume the following conditions exist on the Project Site:
  - a. Treated timbers:
    - 1) Contain up to 3.9% of arsenic;
    - 2) Have a surface density measured at about 2,000 microgram/cm<sup>2</sup> of arsenic;
    - 3) Show 4 - 25 microgram/cm<sup>2</sup> loose arsenic based on wipe samples.
    - 4) Are considered Hazardous Waste.

#### **1.4 ABATEMENT CONTRACTOR'S QUALIFICATIONS**

- A. Principal Project Company may perform abatement Work itself, if it possesses the necessary qualifications and licenses, or it may subcontract the abatement Work. In either case, Principal Project Company shall ensure that any entity that performs the abatement Work:
  1. Submits to the SAR group within City Public Works Department current licenses and certifications for the specific type of abatement Work to be performed. Submits to the SAR group within City Public Works Department a letter confirming compliance with current Laws, as outlined in the specifications listed in the paragraph below.
  2. Submits to SAR group within City Public Works Department copies of any notices regarding safety and environmental violations received from regulatory agencies in the last 20 years.
  3. Meets the following minimum qualifications

- a. Is a legally recognized entity capable of entering into contracts and holding a valid license in good standing with the State of California and the City and County of San Francisco. Complies with all City contracting requirements and possesses the necessary qualifications to conduct business in San Francisco.
- b. Holds a valid **Class B**, General Building Contractor's license issued by the Contractors State License Board (CSLB) of the State of California.
- c. Holds a valid **Class C-22**, Asbestos Abatement Contractor license issued by the CSLB of the State of California, in accordance with Title 16, Division 8, Article 3 of the Business and Professions Code.
- d. Possesses a valid State of California Contractors State License Board (CLSB) Certification **ASB (Asbestos Certification)** in accordance with the provisions of Division 3, Chapter 9 of the Business and Professions Code.
- e. Is a current **Asbestos Registrant** with the California Department of Industrial Relations, Division of Occupational Safety and Health (DOSH), as required by Title 8 of the California Code of Regulations, Article 2.5.
- f. Possesses a valid **USEPA Lead Safe** Certificate to conduct lead-based paint renovation, repair and painting activities pursuant to 40 CFR Part 745.89 and fulfilling the requirements of the Toxic Substance Control Act (TSCA) Section 402.
- g. Possesses workers' documentation, medical records, and training required to perform the abatement Work.
- h. Has no less than five years of experience in abatement and/or removal of Hazardous Materials

B. Other Abatement Principal Project Company's Qualifications

- 1. Before commencing any abatement Work, Principal Project Company shall submit to the City's Authorized Representative and SAR group within City Public Works Department a Hazardous Materials Management Plan (HMMP) in accordance to the requirements of this Section, and Section 02 80 13 Building Related Hazardous Materials Remediation.
- 2. Principal Project Company shall submit to The SAR group within City Public Works Department current licenses and certifications for the specific type of abatement Work to be performed; copies of regulatory agencies notifications, abatement work plans, workers and competent person's documentation, waste disposal plan and documentation as required for the removal of the Hazardous Materials.

C. Project Safety Representative: In accordance with the requirements specific to this Section, listed below, and in Section 01 35 45- Health and Safety Criteria, Principal Project Company shall provide a qualified Project safety representative that reports to the Principal Project Company's superintendent. The Project safety representative shall be trained to identify, control, and manage the Hazardous Materials on the Project Site. The Project safety representative shall:

- 1. Enforce safe work and hygiene practices in compliance with Principal Project Company's Health and Safety Program and Hazardous Materials Management Plan (HMMP)
- 2. Advise Principal Project Companies, vendors, and visitors to the Project Site of potential hazards and minimum general requirements of the Principal Project Company's Health and Safety Program

3. Coordinate Principal Project Company's Work regarding Hazardous Material procedures and controls.
  4. Establish and maintain restricted work areas.
  5. Enforce proper use of personal protective equipment.
  6. Communicate approved modified safety requirements to Project Site personnel as well as visitors to the Project Site.
  7. Notify and coordinate with the City's Authorized Representative and The SAR group within City Public Works Department for the immediate assessment and remediation Work for unforeseen Hazardous Materials conditions discovered in the course of the Work.
  8. Notify and coordinate signing of waste manifests with the City's Authorized Representative and Site Assessment and Remediation (SAR) group within City Public Works in a timely manner
  9. Ensure Principal Project Company's personnel have proper training to perform the Work
- D. Hazardous Materials Handlers: Only qualified persons may perform Hazardous Material- related Work. Principal Project Company shall ensure that all personnel who come into contact with, are exposed to, disturb, operate equipment or otherwise handle Hazardous Materials have appropriate hazard communication and required training, personal and medical monitoring, and are certified to wear appropriate personal protective equipment as required by applicable Laws. Special qualifications may be required depending on the Principal Project Company's means and methods.
- E. For asbestos-related Work involving asbestos-containing material (ACM) equal to or greater than 100 square feet or 100 linear feet or affecting friable asbestos surfacing materials, thermal system insulation (TSI) and regulated asbestos-containing material (RACM), Principal Project Company or its Hazardous Materials abatement Principal Project Company shall:
1. Possess a valid asbestos handling license issued by the California State Contractors Licensing Board and a valid current certificate of registration for asbestos-related Work as issued by the California Department of Industrial Relations – Division of Occupational Safety and Health.
  2. Ensure that all Work is completed under the on-site supervision of a "competent person" as defined by Federal OSHA under Regulation 29 CFR Part 1926.1101 and Cal/OSHA under 8 CCR 1529.
  3. Ensure that all abatement workers have AHERA training with current annual eight-hour refresher training, annual medical exams for the use of respiratory protection, and a fit test of appropriate respirators every six months.
- F. Lead Hazard Control Work: Principal Project Company shall ensure that only qualified persons with California Department of Public Health (CDPH) approved lead workers training, annual medical examinations and approval for the use of respiratory protection, and semi-annual fit testing of respirators under the direct supervision of a CDPH approved lead supervisor engage in Work defined under Cal/OSHA regulation 8 CCR 1532.1 affecting lead-based paints and lead construction hazards, including but not limited to:
1. Working in an environment where lead exposures exceed 30 micrograms per cubic meter (mg/m<sup>3</sup>).

2. Controlling lead hazards, but not limited to, removal of loose and peeling lead-based paints, demolition and disposal of concrete-encased primed structural steel, removal of lead jacketed telephone cables and stripping of lead coatings from structural steel prior to torching or welding.
- G. As required by Title 17, California Code of Regulations (CCR), Division 1, Chapter 8 "Accreditation, Certification and Work Practices in Lead-Related Construction," Article 1, Sections 35001 et al, and Article 16, Sections 36000 and 36100. Lead Hazard Work, Principal Project Company shall ensure that: all affected workers have lead awareness training, current medical examinations and approval for the use of respiratory protection, and current fit testing of respirators complying with Cal/OSHA regulation 8 CCR 1532.1 when affecting lead paints and lead construction hazards including:
1. Demolishing or salvaging structural items where lead or materials containing lead are present.
  2. Removing or encapsulating materials containing lead.
  3. Constructing, altering, repairing or renovating structures, substrates, or portions thereof, that contain lead or materials containing lead.
  4. Installing of products containing lead.
  5. Cleaning-up of lead contamination.
  6. Transporting, disposing, storing, or containing lead or lead-containing materials on the site or other locations where construction and renovation activities are performed.
- H. Polychlorinated Biphenyls (PCB) Related Work: Principal Project Company shall ensure that removal of non-leaking PSB-containing ballasts and transformers is completed by workers with PCB hazard-awareness training as verified by the Principal Project Company's Project Safety Representative. Removal of leaking or damaged PCB-containing ballasts, transformers, and oils shall be completed only by trained workers, wearing protective gloves and following safety procedures as outlined in the HMMP. Hazardous Waste shall be handled according to the U.S. Environmental Protection Agency's Standards 40 CFR 761.60 and 761.65, and 22 CCR Section 66699(b).
- I. Mercury-Containing-Lamp-Related Work may be completed by workers with mercury hazard awareness training as verified by Principal Project Company's health and safety officer or superintendent.
- J. Other Hazardous Materials-Related Work may be completed by workers with specific hazard-awareness training of the Hazardous Material in question as verified by the Principal Project Company's Project Safety Officer.
- K. Contaminated Soils-Related Work including Underground Storage Tanks and CCA treated Wood: Principal Project Company shall ensure that workers have current 40-hour HAZWOPER training and 8-hour annual refresher training per regulation 29 CFR 1910.120, and 8 CCR 5192. Principal Project Company shall comply with the health and safety requirements, and the approved Site-Specific Hazardous Materials Management Plan (HMMP).
- L. Bio-hazard Work: Principal Project Company shall ensure that Work areas contaminated with fecal matter and human excretions, along with needles and syringes and other materials potentially contaminated with infectious blood borne pathogens or other biohazards comply with the health and safety requirements and the approved in a Site-Specific Hazardous Materials Management Plan.

- M. Mold and Fungi Remediation Work may be completed by workers with mold hazard awareness training as verified by the Principal Project Company's Project Safety representative.
- N. Principal Project Company shall ensure that:
  - 1. Hazardous Materials Haulers possess during the hauling of hazardous material, applicable federal, state, and local vehicle insurance requirements, valid driver's license, vehicle registration and licenses, and a current Class 1 Certification of Compliance from the California Highway Patrol affixed to each vehicle or container.
  - 2. Hazardous Materials Haulers possess a Hazardous Substance Removal Certification granted by the State of California Department of Toxic Substances Control (510-540-3802) and other required certifications and insurance.
  - 3. Drivers of Hazardous Materials hauling vehicles are informed about:
    - a. The nature of the material hauled.
    - b. Any recommended or required routes to and from the Project Site.
    - c. Applicable city street use regulations and requirements, and State of California Department of Transportation (Caltrans) codes, regulations and requirements.
    - d. The SAR group within City Public Works Department's requirements for proper handling and transportation of Hazardous Waste including mitigation controls and manifesting procedures.
    - e. The legal maximum loads for each vehicle.

## 1.5 REGULATORY REQUIREMENTS

- A. Principal Project Company shall comply with the procedures of this Section, and applicable Law regarding the generation, management, characterization, removal, abatement, remediation, transportation and disposal of Hazardous Materials. Principal Project Company is solely responsible for identifying which apply. Examples of regulations that may apply include:
  - 1. Resources Conservation and Recovery Act, 42 U.S.C. Section 6901 et seq.
  - 2. Regulations 40 CFR Part 260 et seq.
  - 3. California Health and Safety Code, Division 20.
  - 4. Regulations, and 22 CCR Section 66000 et seq.
- B. For asbestos (building materials) hazards, comply with the applicable requirements of the following federal, State and local regulations and requirements:
  - 1. For asbestos hazards: Principal Project Company shall comply with the applicable requirements of:
    - a. Cal/OSHA Construction Asbestos Standard, 8 CCR Section 1529.
    - b. BAAQMD Regulation 11, Rule 2 and Regulation 11 Rule 14.
    - c. Environmental Protection Agency NESHAP and AHERA regulations (40 CFR Part 763, as applicable).
    - d. Occupational Safety and Health Administration (inclusive of OSHA 29 CFR 1926.1101).

- e. California Environmental Protection Agency (Cal/EPA) Title 22.
  - f. Other applicable federal, State, and local governmental Laws pertaining to asbestos-containing materials (ACM) and asbestos waste.
  - g. The Final Regulation Order of the California Code of Regulations (CCR) Title 17, Public Health, Section 93105, on Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations.
  - h. All other applicable Laws, regulations, rules, ordinances, guidance documents and regulatory clarification letters and memos related to asbestos, Asbestos-Containing Materials (ACM), Asbestos Containing Building Materials (ACBM), Asbestos Containing Construction Materials (ACCM), and asbestos-containing waste.
2. For Naturally Occurring Asbestos (NOA) in on-site soil and fill, refer to Section 02 81 10 – Management of Excavated Materials, and Principal Project Company shall comply with the applicable requirements of:
- a. Cal/OSHA Construction Asbestos Standard, 8 CCR Section 1529.
  - b. Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (CCR 17, Section 93105).
  - c. Bay Area Air Quality Management District (BAAQMD) rules, permits, notification forms, and regulatory information regarding Naturally Occurring Asbestos (NOA). (<http://www.baaqmd.gov/permits/asbestos/naturally-occurring-asbestos>)
  - d. Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California, Special Publication 124, California Geologic Survey (<http://www.capcoa.org/Docs/noa/%5B24%5D%20CA%20Geol%20Survey%20Asbestos%20Guidelines.pdf>).
  - e. Determination of Asbestos Content of Serpentine Aggregate, Method 435”, California Air Resources Board (<https://www.arb.ca.gov/toxics/asbestos/tm435/workshops/m435-asbestosguidance-appacd2017.pdf>).
  - f. Implementation Guidance Document, Air Resource Board Test Method 435, Determination of asbestos Content of Serpentine Aggregate- Field and Laboratory Practices: CARB Monitoring and Laboratory Division, Quality Management Branch, Quality Management Section (<https://www.arb.ca.gov/toxics/asbestos/tm435/guidancedocument.pdf>).
  - g. Asbestos and Other Fibers by Phase Contrast Microscopy (PCM), NIOSH Method 7400 (<https://www.cdc.gov/niosh/docs/2003-154/pdfs/7400.pdf>).
  - h. Asbestos by Transmission Electron Microscopy (TEM), NIOSH Method 7402 (<https://www.cdc.gov/niosh/docs/2003-154/pdfs/7402.pdf>).
  - i. All other applicable Laws, regulations, rules, ordinances, guidance documents and regulatory clarification letters and memos related to Naturally Occurring Asbestos, asbestos, and Asbestos-Containing Materials (ACM), and asbestos-containing waste.
- C. For lead hazards, Principal Project Company shall comply with the applicable requirements of the following federal, State and local Laws:

1. Cal/OSHA Lead in Construction Standard, 8 CCR Section 1532.1 ([https://www.dir.ca.gov/title8/1532\\_1.html](https://www.dir.ca.gov/title8/1532_1.html)), and Cal/OSHA Lead in Construction Standard (Fact Sheet) ([https://www.dir.ca.gov/dosh/dosh\\_publications/lead-fct-sheet-rev.pdf](https://www.dir.ca.gov/dosh/dosh_publications/lead-fct-sheet-rev.pdf)).
  2. Cal/EPA Regulation 22 CCR Section 66000 (<https://www.dtsc.ca.gov/LawsRegsPolicies/Title22/>).
  3. Federal Lead Standard for the Construction Industry, 29 Code of Federal Regulations (CFR) part 1926.62
  4. California Department of Health Services (17 CCR Sections 35001 -35099).
  5. Title 17, California Code of Regulations, Division 1, Chapter 8 Accreditation, Certification and Work Practices in Lead Related Construction.
  6. Lead as a water pollutant:
    - a. Federal Clean Water Act (CWA), 40 CFR part 427.
    - b. California's Porter Cologne Water Quality Control Act.
  7. Federal Safe Drinking Water Act (SDWA), 40 CFR parts 141-143.
  8. Lead as a hazard to children: California's Childhood Poisoning Prevention Act, 17 CCR section 33001 et seq.
  9. Lead as a waste:
    - a. Federal Resource Conservation and Recovery Act (RCRA) of 1976,
    - b. 40 CFR part 240 et seq.
    - c. California's Hazardous Waste Control Law (HWCL), 22 CCR section 66260.1 et seq.
  10. San Francisco Building Code (SFBC), Chapter 34, as required where there is disturbance to painted surfaces on the exterior of buildings or structures within the City and County of San Francisco.
  11. Society for Protective Coatings Paintings Principal Project Companys' Certification Program (SSPC/PCCP) for the QP1 and QP2 Certifications.
- D. Respiratory Protection: Principal Project Company shall assess potential exposures to Hazardous Materials and conditions and comply with Cal/OSHA Regulations included in 8 CCR Sections 1529, 1532.1, and 5144, ANSI Standard Z88.2 - "Practices for Respiratory Protection", and 29 CFR 1926.62 (f). Principal Project Company shall ensure that workers wear appropriate respiratory protection during lead, asbestos and any other hazardous Work, unless negative exposure assessment testing verifies that worker exposures are below the PEL or Action levels.
- E. For PCB work: Principal Project Company shall comply with Cal/EPA Regulation 22 CCR Sections 66268.110 and 66508, and 40 CFR 761.
1. <https://www.epa.gov/pcbs/polychlorinated-biphenyls-pcbs-building-materials#Information-Contractors>
- F. For universal waste, Principal Project Company shall comply with Cal/EPA Regulation 22 CCR Sections 66261.50 and 66273.8 (CCR Title 22, Division 4.5, Chapter 34). Examples of universal waste: batteries, fluorescent tubes (lamps), electronic devices (cell phones,

computers, televisions), cathode ray tubes (CRTs), mercury wastes (thermometers and toys), and non-empty aerosol cans.

- G. For wood treated with chemical preservatives, such as chromate copper arsenate (CCA) treated wood: Principal Project Company shall comply with the federal insecticide, fungicide, rodenticide Act (FIFRA) and by the California Department of Pesticide Regulation (DPR) and Department of Toxic Substances Controls (DTSC) Regulations or for the treated wood waste as per the Health and Safety Code (HSC) 25150.7 and 25150.

## 1.6 DEFINITIONS

- A. Lead Abatement: as defined by the Department of Public Health for lead hazard work, includes any set of measures designed to reduce or eliminate lead hazards or lead-based paint, but excludes containment or cleanup. Abatement for lead is designed to permanently reduce or eliminate lead hazards for public (non-industrial) buildings or to last more than 20 years.
- B. Asbestos-Containing Material (ACM) for the purpose of Cal/OSHA compliance: Any material that contains more than 1% asbestos by weight for the purposes of abatement, waste disposal and fiber controls specified under this Agreement.
- C. Asbestos-Containing Material (ACM) for the purposes of CARB compliance under the ATCM: Any material that has an asbestos content of 0.25% or greater.
- D. Asbestos Containing Construction Materials (ACCM): Defined by Cal OSHA 8CCR§341.6 as any manufactured construction material which contains more than 0.10 % asbestos by weight.
- E. Asbestos Regulated Area: An area established where asbestos disturbance work is conducted and any adjoining area where disturbed material, debris and waste from such asbestos work occurs or is accumulated; and a work area within which airborne concentrations of asbestos exceed, or there is reasonable possibility that may exceed the permissible exposure limit (PEL).
- F. Asbestos-Related Construction Work: Defined by Cal OSHA 8CCR§1529 as construction work that includes the following:
  - 1. Demolition or salvage of structures where asbestos is present;
  - 2. Removal or encapsulation of materials containing asbestos;
  - 3. Construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof, that contain asbestos;
  - 4. Installation of products containing asbestos;
  - 5. Asbestos spill/emergency cleanup;
  - 6. Transportation, disposal, storage, containment of and housekeeping activities involving asbestos or products containing asbestos, on the site or location where construction activities are performed;
  - 7. Excavation and any disturbance of rock, soil, alluvium, or fill that may involve exposure to asbestos as a natural constituent that is not related to asbestos mining and milling activities;
  - 8. Erection of new electric transmission and distribution lines and equipment, and alteration, conversion and improvement of the existing transmission and distribution lines and equipment; and
  - 9. Routine facility maintenance.

- G. BAAQMD: Bay Area Air Quality Management District (Air District) is a regional agency with jurisdiction over the demolition and renovation of buildings and structures that may contain asbestos, and the manufacture of materials known to contain asbestos. BAAQMD regulations must always be followed when removing asbestos or demolishing buildings. The Air District has been delegated the authority to enforce federal asbestos regulation. The Air District developed its own asbestos rule in 1976 that is more stringent than the federal rule.
- H. Cumulative Renovations: A series of small (less than 30.8 m [100 feet] linear, 9.4 m<sup>2</sup> [100 ft<sup>2</sup>] or 1 m<sup>3</sup> [35 ft<sup>3</sup>]) renovations or removals of RACM performed during a calendar year at a single plant or facility which, taken together, would add up to a reportable amount under the provisions of BAAQMD Regulation 11, Rule 2.
- I. Demolition: Defined by BAAQMD as wrecking, intentional burning, moving or dismantling of any load supporting structural member, or portion thereof, of a building, facility or ship. This includes, but is not limited to, any related cutting, disjointing, stripping or removal of structural elements.
- J. Deteriorated Lead-Based Paint Hazard: painted areas with any of the following characteristics:
1. More than two square feet of deteriorated lead paint on interior components with large surfaces such as walls, ceilings, floors, and doors.
  2. More than ten square feet of deteriorated lead paint on exterior components with large surfaces such as outside walls.
  3. Deteriorated lead paint on more than ten percent of the total surface area of interior or exterior components with small surface areas such as windowsills, baseboards, trim, etc.
- K. Lead Activities: Lead hazard evaluation, lead-related construction work, or any activity which disturbs lead-based paint, presumed lead-based paint, or creates a lead hazard
- L. Lead Action Level: 30 micrograms per cubic meter based on an eight-hour time-weighted average (8 hr. TWA).
- M. Lead-Based Paint (LBP): LBP is defined in Title 17, CCR Division1, Chapter 8, Section 35033 as any paint, varnish, shellac, or other surface coating that contains lead equal to or greater than 1.0 mg/cm<sup>2</sup> as measured by X-ray Fluorescence (XRF) or laboratory analysis, or 0.5 percent by weight (5,000 µg/g, 5,000 ppm, or 5,000 mg/kg) as measured by laboratory analysis.
- N. Lead-Based Paint Activities: EPA's Title IV of the Toxic Substances Control Act defines Lead-Based Paint Activities as the following, among others:
- O. In any public building constructed before 1978, commercial building, bridge, or other structure or superstructure:
1. Identification of lead-based paint and materials containing lead-based paint
  2. De-leading
  3. Demolition
- P. Lead-Based Paint Debris: Any component, fixture, or portion of a building coated wholly or partly with LBP. LBP debris can also be any solid material coated wholly or partly with LBP resulting from a demolition. Examples among many others include ceilings, crown molding, walls, chair rails, doors, door trim, floors, fireplaces, shelves, and radiators, jacketed telephone cables and other heating units.

- Q. Lead-Based Paint Hazard: A condition in which exposure to lead from lead-contaminated dust, lead-contaminated soil, or deteriorated lead-based paint would have an adverse effect on human health (as established by the EPA Administrator under Title IV of the Toxic Substances Control Act). Lead-Based paint hazards include for example, deteriorated lead-based paint, leaded dust levels above applicable standards, and bare leaded soil above applicable standards.
- R. In Title 17, California Code of Regulations (CCR), Division 1, Chapter 8, Section 35037, the California Department of Public Health (CDPH) adds to this definition by stating “disturbing lead-based paint or presumed lead-based paint without containment, or any other nuisance which may result in persistent and quantifiable lead exposure.”
- S. Lead-Based Paint Hazard Abatement: Any set of measures designed to permanently eliminate lead-based paint hazards according to standards established by the appropriate federal agencies. Abatement measures include the following activities:
1. Removal of lead-based paint and lead-contaminated dust,
  2. Permanent containment or encapsulation of lead-based paint,
  3. Replacement of lead-painted surfaces or fixtures, and
  4. Removal or covering of lead-contaminated soil.
  5. Removal also includes all associated preparation, cleanup, disposal, and post-abatement clearance testing activities, record keeping, and monitoring.
- T. Lead-Based Paint Hazard Control: Activities to control and eliminate lead-based paint hazards, including interim controls, abatement, and complete abatement.
- U. Lead-Contaminated Dust: Surface dust containing an area or mass concentration of lead in excess of the standard established by the EPA Administrator, pursuant to Title IV of the Toxic Substances Control Act. CDPH’s threshold limits are as follows: 10 µg/ft<sup>2</sup> on interior floors, 100 µg/ft<sup>2</sup> on interior horizontal window surfaces, and 100 µg/ft<sup>2</sup> on exterior floors and exterior horizontal window surfaces. The most stringent criteria set forth by CDPH and/or the EPA shall apply to the work on this project
- V. Lead-Containing Material: Any material, coating, substrate or product, which contains any measurable amount of lead, with the definition of lead being in accordance to OSHA’s definition.
- W. Lead Hazard: Title 17, California Code of Regulations (CCR), Division 1, Chapter 8, sections 35000 -36100, the California Department of Public Health (CDPH) defines: lead hazard as deteriorated lead-based paint, lead contaminated dust, lead contaminated soil, disturbing lead-based paint or presumed lead-based paint without containment, or any other nuisance which may result in persistent and quantifiable lead exposure.
- X. Lead Permissible Exposure Limit (PEL): 50 micrograms per cubic meter based on an eight-hour time-weighted average (8hr. TWA).
- Y. Lead Related Construction Work: Any construction, alteration, painting, demolition, salvage, renovation, repair, or maintenance of any residential or public building, including preparation and cleanup that, by using or disturbing lead-containing materials or soil, may result in significant exposure of adults and children to lead.
- Z. Presumed Asbestos Containing Material (PACM) is thermal system insulation and surfacing material found in buildings constructed no later than 1980. PACM can be sampled to confirm whether it is ACM or not.

- AA. Project Safety Representative (PSR): Qualified person directly responsible under Principal Project Company's Superintendent having the necessary training to be knowledgeable in the identification, control, and management of the hazardous materials/waste on site, and health and safety. See Section 1.4(C) above for further definition.

## 1.7 PROJECT REQUIREMENTS

- A. Principal Project Company shall ensure that all Project personnel, including Principal Project Company's personnel, receive awareness training and orientation suitable to prevent inadvertent or unauthorized disturbance of Hazardous Materials that are present at the Project Site.
- B. If Hazardous Material, including Naturally Occurring Asbestos (NOA), not identified on the survey report is discovered, Principal Project Company shall immediately notify the City's Authorized Representative and the SAR group within City Public Works Department both verbally and in writing.
- C. Lead Hazards: All Construction Work that disturbs or affects intact paint and materials containing any detectable level of lead shall be performed by Principal Project Company under the Cal/OSHA Lead in Construction Standard 8 CCR 1532.1, Federal/OSHA's Lead Standard for the Construction Industry, Title 29 Code of Federal Regulations 1926.62, as well as all applicable Federal, State, and Local regulations. OSHA Lead in Construction Standard (29 C.F.R. part 1926.62 and title 8 CCR section 1532.1) requires awareness training and compliance on the part of an employer when there is any possibility that an employee could be exposed to lead as a result of his or her activities.
- D. Principal Project Company is prohibited from starting Hazardous Material removal Work without approved Hazardous Materials Submittals as described in Section 02 80 13. Principal Project Company shall not conduct any sampling or analysis of suspected building materials without prior permission from the City as Regulator. Principal Project Company shall ensure that only qualified AHERA certified building inspectors for asbestos sampling and the California Department of Public Health (CDPH) certified Project monitors for lead assessment are allowed to conduct the sampling.
- E. Pursuant to 29 CFR 1926.1101, Principal Project Company shall be deemed to exercise general supervisory authority over the Work covered by the standard, even though the Principal Project Company is not qualified to serve as the asbestos "Competent Person," as defined by the standard. As supervisor of the entire Project, the Principal Project Company shall ascertain whether any Principal Project Company is in compliance with the standard and shall require such contractor to come into compliance with the standard when necessary. Principal Project Company shall provide competent supervision by a designated Project Safety Representative (PSR) who can identify potential hazards at the Project Site and oversee implementation of appropriate protective measures to comply with all Cal/OSHA requirements applicable for Hazardous Materials.
- F. Principal Project Company is responsible for the general supervisory authority over all Hazardous Materials activities, both incidental and primary, for the demolition, renovation and Construction Work under this Agreement.
- G. Principal Project Company shall coordinate the activities that may have the potential to directly or indirectly impact Hazardous Materials. Work that may typically impact Hazardous Materials includes, as applicable and is not limited to:
  - 1. Demolition.
  - 2. Disturbance to any paints or coatings.

3. Torch cutting.
  4. Welding.
  5. Excavation.
  6. Dewatering.
  7. Shoring and Underpinning Work.
- H. Principal Project Company shall not create any condition that may endanger the health and safety of City employee's and its representatives, facility staff, construction workers, site visitors, outside consultants, and the general public, including exposure to hazardous materials. If the City's Authorized Representative or City as Regulator observes such conditions, then the City' has the authority to suspend Work until Principal Project Company corrects the condition as provided.
- I. Principal Project Company and its personnel shall have all the applicable hazard determination, exposure assessment, medical surveillance, engineering and work practice controls, respiratory protection, protective clothing and equipment, employee information and training, certifications, and monitoring program necessary to perform the Work and as required by Law and the Codes.
- J. Clean up, remediation and disposal of any Hazardous Materials disturbed during this Work shall be the responsibility of Principal Project Company. The level of engineering control and medical monitoring required shall be based on the governing regulations of Cal/OSHA that are effective for the Project Term for the level and extent of hazards exposure at the site.
- K. Principal Project Company shall maintain all Work areas within and outside the Project boundaries free from environmental pollution, which would be in violation of any federal, State or local Laws. Principal Project Company shall conduct Construction Work in strict compliance with the Contract Documents, including this Section and other related Sections.
1. The Project Schedule shall include work shifts for asbestos, lead-based paint, PCB ballast, PCB Building Materials, and other abatement as indicated.
- L. As per Health and Safety requirements specified under Section 01 35 45, Principal Project Company is responsible for monitoring its employees and Contractors' and Sucontractors' employees for exposure to Hazardous Materials, either used in construction or otherwise uncovered or intrinsically present at the Project Site.
- M. Principal Project Company shall not remove Hazardous Materials unless properly trained and certified for the handling of the Hazardous Materials encountered. (For example: workers trained and certified for Class I Asbestos Work with accordance to Title 8 CCR Section 1529).

## **1.8 WASTE HANDLING AND CHARACTERIZATION**

- A. Principal Project Company shall submit to the City as Regulator a Waste Management Plan (WMP) as specified under Section 02 80 13 Building Related Hazardous Materials Remediation.
- B. Principal Project Company shall characterize and profile the waste to ensure proper handling, transportation and disposal. Principal Project Company shall handle, transport and dispose of the waste.
- C. Principal Project Company shall segregate all waste streams. Principal Project Company shall accurately identify waste in accordance with all applicable Law and Codes. Individual waste containers must be labeled in accordance with Cal/OSHA labeling requirements.

- D. Principal Project Company shall obtain and pay for all sampling and profiling analyses required for waste disposal. Principal Project Company shall ensure that California CDPH-accredited laboratories perform analyses. Principal Project Company shall submit results of such analyses to the City as Regulator prior to scheduling the waste off haul.
- E. Principal Project Company shall ensure that all waste remains stored on the Project Site in a secured and designated waste storage area until results of waste characterization tests are available. Due to the time required to perform some analytical tests, this may require storage for up to 10 Working Days or more.
- F. Principal Project Company shall ensure that all contaminated and non-friable waste is hauled off the Project Site using a bill of lading approved by the City as Regulator, to an approved treatment/disposal facility, in accordance with all applicable Federal, State and local regulations.
- G. Principal Project Company shall provide and prepare a bill of lading and the non-hazardous waste manifest form for each shipment of material from the site. The bill of lading shall describe the contents of each truck carrying materials to the waste disposal site, including the name, address and phone number of the ultimate disposal site, the weight or yardage of the waste materials (as applicable), original location of the material, and an emergency phone number. Principal Project Company shall ensure that the hauler signs and dates the bill of lading indicating that he/she has accepted the load described in the manifest on that day. The City will sign the bill of lading before off haul and will retain the generator's copy. Principal Project Company shall provide copies of bills of lading accepted by the treatment/disposal sites to the City's Authorized Representative and City as Regulator. Principal Project Company shall follow manifesting procedures for the transportation and disposal of Class II material or lesser as specified this Section.
- H. Principal Project Company shall provide and prepare a Hazardous Waste manifest for each shipment of Hazardous Material determined from the Project Site. The manifest shall describe the contents of each truck carrying materials to the waste disposal site, including the name, address, and phone number of the ultimate disposal site, the weight or yardage of the waste materials (as applicable), original location of the material, and an emergency phone number. Principal Project Company shall ensure that the hauler signs and dates the manifest indicating that it has accepted the load described in the manifest on that day. The Site Assessment and Remediation (SAR) group within City Public Works Department will sign the manifest before off haul and retain the generator's copy. Principal Project Company shall provide copies of manifests accepted by the treatment/disposal sites to the City. Principal Project Company shall follow Hazardous Waste manifesting procedures for the transportation and disposal of Hazardous Material.
- I. Principal Project Company shall package, label, transport, and dispose of Hazardous Waste in accordance with applicable Cal/EPA regulations under Title 22 CCR and the California Health and Safety Code, including completion of the Uniform Hazardous Waste Manifest (UHWM). Information on the UHWM must include the quantity of waste in cubic yards and the name and address of the BAAQMD to comply with EPA Waste Shipment Record requirements. Principal Project Company shall follow the waste disposal; and manifesting requirements as specified this Section.
- J. Principal Project Company shall provide and prepare the bill of lading, the non-hazardous waste manifest form, and the Hazardous Waste manifests forms by typing in a neat, correct, and legible fashion for signing by the generator. Principal Project Company shall notify the City's Authorized Representative and the SAR team within City Public Works Department at least 48 hours in advance of the time at which the manifest is ready to be signed.
- K. Principal Project Company shall ensure that all lead-containing waste or debris, including, but not limited to, painted building components, ceramic tile glazes, jacketed telephone cables, respirator cartridges, disposable suits, and other associated debris generated during this work,

is packaged for disposal as Hazardous Waste until waste characterization has been completed and analytical results are available. Waste shall be segregated into distinct waste streams according to the waste categories suggested in the Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, (a.k.a. "the HUD Guidelines"), dated June 1995 (Revised July 2012), which include the following:

1. Category I: Low Lead Waste – typically non-hazardous construction materials, filtered wash water, cleaned plastic sheeting, and other items that test as non-hazardous;
  2. Category II: Architectural components, such as painted finished items like siding, doors, windows, trim, etc. which demonstrate intact or stabilized surface coatings;
  3. Category III: Concentrated Lead Waste - typically hazardous materials such as paint sludge, paint chips vacuum debris, vacuum filters, and any waste testing hazardous; and
  4. Category IV: Other lead-containing waste requiring characterization testing.
- L. Disposal of intact lead-coated architectural or structural elements may occur as non-hazardous waste in accordance with Cal/EPA's and the Department of Toxic Substance Control's requirements.
- M. Principal Project Company shall ensure that waste characterization for lead hazard content is performed in accordance with 22 CCR §66262, ET. seq., including using one or more of the following testing procedures, as required, and is manifested and properly disposed:
1. Total Threshold Limit Concentration (TTLC)
  2. Waste Extraction Test (WET)
  3. Toxicity Characteristic Leaching Procedure (TCLP)
  4. SW 846
- N. Miscellaneous Hazardous Waste Disposal. Principal Project Company shall comply with the following:
1. Disposing of PCB-containing ballasts in landfills is prohibited by Federal and State Law. Drums containing PCB ballasts and other PCB-contaminated materials must be disposed of, or otherwise treated, at an EPA-approved facility.
  2. Ballasts with "Non-PCB" fluids, must be disposed of at a legally permitted disposal/recycling facility as assumed DEHP-containing ballasts.
  3. Fluorescent lamps must be stored in packaging or containers that are designed to minimize breakage/damage during both storage and shipping. Containers shall be labeled as "Universal Waste – Spent Fluorescent Lamps" or "Universal Waste," as appropriate, and each container shall be marked with the date on which storage of said waste began.
  4. Principal Project Company shall use a bill of lading or non-hazardous waste form that contains the following information when shipping fluorescent lamps to a recycler: name and address of generator, transporter, and recycler; number of lamps shipped; date of shipment and date of receipt by recycler; and obtain a dated signature of the receiving recycler. A copy of the bill of lading shall be submitted to the City's Authorized Representative and SAR group within City Public Works Department at abatement completion.

O. Universal Waste Disposal

1. Principal Project Company shall comply with the following universal wastes specific disposal procedures under 22 CCR 66273.10 through 66273.21:
  - a. Batteries, as described in section 66273.2, subsection (a);
  - b. Electronic devices, as described in section 66273.3, subsection (a);
  - c. Mercury-containing equipment, as described in section 66273.4, subsection (a);
  - d. Lamps, as described in section 66273.5, subsection (a) (including, but not limited to, M003 wastes);
  - e. Cathode ray tubes, as described in section 66273.6, subsection (a);
  - f. Cathode ray tube glass, as described in section 66273.7, subsection (a); and
  - g. Aerosol cans, as specified in Health and Safety Code section 25201.16.
2. Principal Project Company shall ensure that universal wastes are segregated and shipped for disposal following DOT shipping requirements in 49 CFR 171 through 180.
3. Universal Wastes can be shipped using a bill of lading to a Universal Waste Handler licensed under the requirements of 22 CCR 66273.

P. Asbestos Waste Disposal

1. A waste that is friable and contains asbestos over 1 percent is regulated as a California (Non-RCRA) hazardous waste under 22 CCR 66261.24. Principal Project Company shall characterize and profile asbestos-containing waste to determine its correct waste disposal classification.
2. Principal Project Company shall comply with the following requirements that apply to transportation and disposal of asbestos Hazardous Waste:
  - a. Packaging in sealed, leak-tight, non-returnable containers from which the fibers cannot escape following 40 CFR 61.150 or, in order to prevent breakage of larger items, in bulk containers lined with plastic sheeting and covered it with a tarp following 22 CCR 66263.23.
  - b. Labeling of the asbestos Hazardous Wastes shall follow 29 CFR 1910.1001, 29 CFR 1926.1101, and 8 CCR 5208.
  - c. Asbestos Hazardous Wastes shall be shipped using a registered hazardous waste hauler to landfills permitted to accept asbestos wastes.
  - d. d) Principal Project Company shall provide, prepare and submit to the City's Authorized Representative and SAR group within City Public Works Department a Uniform Hazardous Waste Manifest Form for asbestos Hazardous Waste shipments.

**1.9 USE OF NON-HAZARDOUS WASTE MANIFEST FOR CLASS II MATERIAL OR LESSER** For the profiling of each waste stream, Principal Project Company shall fill out the waste acceptance profile form, set up an account, and obtain the waste profile number from the landfill provider.

- B. For transportation and disposal of the waste, Principal Project Company shall provide and prepare for the City's Authorized Representative and City as Regulator a non-hazardous waste

manifest form obtained from the landfill provider. The non-hazardous waste manifest form shall be completed for each vehicle carrying excavated material classified as California Class II non-RCRA waste, or of a lesser waste classification. Principal Project Company shall submit each non-hazardous waste manifest form to the SAR group within City Public Works Department for the generator's signature at least 72 hours in advance of the day of the off-haul with an estimate of the number of loads scheduled for off-haul. The non-hazardous waste manifest form shall contain the following information before providing the final copy for the City as Regulator to sign:

1. Name, address and phone number of the generator, Project name, and Specification Section number.
  2. Principal Project Company's billing information
  3. Name, address and phone number of the transport company.
  4. The Name, address, and telephone number of the receiving facility i.e., disposal facility.
- C. The City will not be responsible for off haul delays if Principal Project Company does not notify the City in a timely manner to sign the non-hazardous waste manifest forms.
- D. Within 30 days of the off haul, Principal Project Company shall submit to the City's Authorized Representative and SAR group within City Public Works Department with copies of each completed non-hazardous waste manifest Form (with the landfills signature).
- E. Principal Project Company shall furnish all labor, materials, equipment, and incidentals required to transport those materials identified as non-hazardous waste for the purpose of disposal.
- F. Principal Project Company shall prepare waste characterization and profiling information documenting the non-hazardous nature of the category of waste.
- G. By the end of the workday, Principal Project Company shall prepare bills of lading for each vehicle for all excavated material loads classified as non-hazardous waste (California Class II or lesser), for the purpose of off-site transportation and disposal purposes. The bill of lading shall be designed to contain the following information:
1. Name, address and phone number of the transport company
  2. Name of the driver, a dated signature from the driver, vehicle license number, trip number.
  3. Weight as recorded at the landfill of waste excavated material.
  4. Date of transport.
  5. Name, address and phone number of the receiving facility i.e., disposal facility. A dated signature from the receiving facility.
  6. Name, address and phone number of the generator, along with the Contract No. and Project name.
- H. A copy of each bill of lading and a certified weight ticket is an indication of the weight of the shipment, which has been received at the disposal facility. Principal Project Company shall maintain files of all bills of lading and furnish such information to the City if requested.
- I. Principal Project Company shall ensure that the transporter signs and dates the bill of lading indicating that the transporter accepted the load described in the bill of lading on that day for that particular trip.

## 1.10 HAZARDOUS WASTE MANIFESTING PROCEDURES FOR CLASS I MATERIAL

- A. Principal Project Company shall furnish all labor, materials, equipment, and incidentals required to transport those materials identified as Hazardous Waste for the purpose of disposal.
- B. Principal Project Company shall comply with all applicable regulatory requirements listed as well as other applicable federal, State, and local laws, codes, and ordinances, which govern or regulate transportation of wastes (including DOT-HM 181 in accordance with 49 CFR 172).
- C. Principal Project Company shall ensure that all packing, labeling, transporting, and disposing of Hazardous Waste complies with regulations under 22 CCR, including providing and completing the Uniform Hazardous Waste Manifest Form.
- D. Principal Project Company shall follow applicable regulations under 40 CFR Part 263, and 22 CCR Section 66263, "Standards Applicable to Transporters of Hazardous Waste," including licensing, manifest system, record keeping, and discharges.
- E. Principal Project Company shall ensure that all material classified as Hazardous Waste (Federal Class 1 RCRA and California Class 1 non-RCRA wastes only) is hauled off using a licensed Hazardous Waste transporter and the uniform Hazardous Waste manifest form (DTSC Form 8022A and/or EPA Form 8700-22 a.k.a. the manifest).
- F. Preparation and handling of waste manifests
  - 1. Principal Project Company shall provide and prepare the waste manifests and landfill profiles for each shipment of Hazardous Wastes from the site. Principal Project Company is hereby notified that Hazardous Waste manifest, waste profiling, and landfill service agreements have to be prepared and have to be approved by the landfill in advance of the off-haul. Principal Project Company shall consult with the SAR group within City Public Works Department for local requirements in filling out the forms.
    - a. The manifest prepared by the Principal Project Company shall describe the contents of each truck carrying materials to the waste disposal site, including the weight of the waste materials.
    - b. The City as Regulator will provide a hazardous waste generator identification number for use on the manifest. Principal Project Company shall provide the State Transporter identification number and telephone number.
    - c. Principal Project Company shall ensure that the licensed transporter also signs and dates the manifest indicating that it has accepted the load described in the manifest on that particular day.
    - d. Only a DOT Certified City employee (and not Principal Project Company) will sign the manifest for the "generator" of the waste.
  - 2. Principal Project Company shall notify the SAR group within City Public Works Department and the City's Authorized Representative 72 hours prior to off-haul of all excavated material. Off-haul shall occur between the hours of 8:00 a.m. and 4:30 p.m. Monday through Friday (excluding City holidays).
  - 3. The SAR group within City Public Works Department will sign and keep the generator's copy of the manifest and give the remaining copies to the licensed transporter.
  - 4. The licensed transporter shall carry the hazardous waste manifest with each truckload using the traffic control approved routes for off haul.

5. Within 2 days of its return, Principal Project Company shall provide the SAR group within City Public Works Department with the completed waste manifest. The completed waste manifest shall be certified by the receiver of the waste shipment, confirming that the shipment was received at the waste treatment or disposal facility designated in Principal Project Company's bid, and certifying the weight of the shipment.
6. Should any waste manifest not be returned within 35 days of shipment, Principal Project Company shall initiate follow-up, shall document such follow-up effort in writing with an Exception Report in accordance with 40 CFR 262.42 and/or 22 CFR 66262.42, and shall provide a copy to the SAR group within City Public Works Department and the City's Authorized Representative.

G. Mandatory City Information for the Manifest

1. Principal Project Company shall use the following information for preparing a manifest form:
  - a. Manifest Item 1: Generator's US EPA ID Number for Project: CAD982008120
  - b. Manifest Item 3: Emergency response Phone: A 24 hour phone line shall be provided by Principal Project Company
  - c. Manifest Item 5:
    - 1) Generator's Name and Mailing Address:  
City and County of San Francisco  
Department of Public Health/BEHM  
1390 Market St., Suite 210  
San Francisco, CA. 94102  
  
*Generator's Site Address:*  
City and County of San Francisco  
To be provided by the City
  - d. Manifest Item 14: The following information is mandatory:
    - 1) Name of Project
    - 2) Project Manager
    - 3) Project Manager Phone Number #

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01 35 45 - HEALTH AND SAFETY CRITERIA

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Comply with legal and regulatory requirements applicable to the health and safety of persons during the performance of the Work and at the Project Site.
- B. **Work on the Project Site may commence only after the City accepts the Project's Health and Safety Plan (HASP).**
- C. Principal Project Company shall be solely responsible for:
  - 1. Complying with the terms of this Section.
  - 2. Developing, submitting, implementing, maintaining, and enforcing a site-specific Health and Safety Plan (HASP).
  - 3. Posting all OSHA-required notices and establishing a safety program for the Work.
  - 4. Complying with all applicable Cal/OSHA training, safety device, reporting, Work performance requirements.
  - 5. Determining and complying with all applicable health and safety requirements, in accordance with applicable Laws.
  - 6. Determination and implementation of construction means, methods, techniques, sequences, and procedures, including all safety precautions, training and programs taken in connection with the Work, as well as coordinating all portions of the Work.
  - 7. The health and safety of Principal Project Company's employees, Principal Project Companys, and visitors as set forth in applicable Laws.
  - 8. Implementing, maintaining, and enforcing all safety precautions and programs concerning the Work.
  - 9. Conducting air monitoring at the Project Site for Principal Project Company's personnel and Principal Project Companys' personnel, as required by applicable Laws. The City as Regulator may conduct ambient air monitoring as it deems necessary.
  - 10. Payment of all fines, penalties or damages that result from Principal Project Company's failure to comply with applicable health and safety Laws.
- D. The health and safety requirements set forth in this Section are not a comprehensive list of safety requirements that may apply to Work. And, some of the specified requirements may not apply to the Work, depending on the type and scope of the Work.
- E. The City as Regulator will neither assume the administration of nor direct, control or otherwise assume any responsibility for the implementation and enforcement of the Principal Project Company's health and safety program.
- F. Principal Project Company shall be solely responsible and shall assume all liability for compliance with the safety orders, regulations, and requirements of:
  - 1. Work Hours and Safety Standards Act (40 U.S.C. 327 et seq.)

2. Construction Safety Orders (8 CCR, subchapter 4 et seq.)
  3. Federal OSHA.
  4. Cal/OSHA.
  5. California Public Utilities Commission (CPUC).
  6. State of California Public Utilities Commission, General Order No. 172, Rules and Regulations Governing the Use of Personal Electronic Devices by Employees of Rail Transit Agencies and Fixed Guideway Systems.
  7. The State of California Wireless Communications Device Law (effective January 1, 2009) makes it an infraction to write, send, or read text-based communication on an electronic wireless communications device, such as a cell phone, while driving a motor vehicle.
  8. California Vehicle Code.
  9. Local regulations pertaining to Work practices, protection of workers and visitors to the site.
- G. Nothing contained in this Agreement shall relieve Principal Project Company, or any Principal Project Company or Supplier, from the obligations set forth above and obligations as required by applicable Laws. If a provision of this Section conflicts with any applicable provision of this Agreement or any federal, state, or local safety regulations, the more stringent requirements that maintain a greater level of safety shall apply.
- H. Ensure all tiers of field personnel, employees, agents, visitors and Principal Project Companies:
1. Are provided the proper notifications, training, and procedures as required by the Project's Health & Safety Plan, including but not limited to the handling of unidentified Hazardous Materials.
  2. Follow safe practices and minimize exposure when dealing with unanticipated and unidentified Hazardous Materials.
  3. Minimize potential risks during Project construction by having all construction personnel follow the Project's Health & Safety Plan.
  4. Provide and maintain personnel safety training and medical examinations in accordance with all applicable Law.
- I. Conduct any required personal air monitoring of its workers, at its own expense Principal Project Company shall be responsible for providing its employees and visitors with all levels of personal protective equipment (PPE). Principal Project Company shall be responsible for providing its employees and visitors with all levels of training and PPE, including personal air monitoring if required. This includes areas where hazardous and contaminated soils and waste is encountered.
- J. Principal Project Company shall have considered the productivity losses, if any, arising from the use of respirators and PPE.

## 1.2 JOB CONDITIONS

- A. Performance of the Work involves working in environments that may be hazardous, contaminated, and non-hazardous. Serpentinite and other ultramafic rocks that contain naturally occurring asbestos may be present within earthen materials at the Project Site. Work that disturbs on-site rock and soil shall be performed under Cal/OSHA Class II procedures, as required by Cal/OSHA regulations (CCR Title 8 § 1529, asbestos in construction).
- B. Such hazardous, contaminated, and non-hazardous environments include, but are not limited to; Hazardous Materials, non-hazardous materials, soils, groundwater and storm water, heavy metals (including lead), asbestos, serpentinite and other ultramafic rock that contains naturally occurring asbestos, respirable crystalline silica, lead containing paint and building materials, petroleum hydrocarbons, polynuclear aromatic hydrocarbons, organic compounds, railroad ties, sewage, sludge, debris, grit, sewer gases, oxygen deficiency, bacterial/biological contamination, odors from petroleum hydrocarbons, and other volatile/semi-volatile organic compounds and confined spaces.
- C. Construct/finish, and at all times maintain satisfactory and substantial ramping, guard rails, warning flags, and signs at appropriate heights, temporary chain link fencing, solid fencing, railings, barricades, steel plates or bridging as applicable at all openings, obstructions, or other hazards in streets, sidewalks, pedestrian pathways affected by construction. All such barriers shall have adequate warning lights as necessary or required for public safety. Divert traffic by use of traffic cones, barriers, flagmen, flags, and signs adequate to conditions at the Project Site and task at hand. All temporary and permanent safety features shall be installed before beginning commencing Work at the Project Site.
- D. Lead Hazards: Perform all Work that affects intact paint with any level of lead , at minimum, in accordance with the Cal/OSHA Lead in Construction Standard 8 CCR 1532.1 and other applicable Laws.
- E. Work in this Agreement may include, but is not limited to, the following activities that may pose safety and health hazards to Principal Project Company:
  - 1. Working around live, high voltage lines and wires, switches, moving vehicles and other potential hazards specific to a City yard, facility, or operating rail line.
  - 2. Working around live utilities.
  - 3. Entering or working in confined spaces.
  - 4. Working around and inside shafts.
  - 5. Working within an underground excavation and construction environment using mechanized equipment and structural temporary shoring support equipment.
  - 6. Working within an underground tunnel environment using mechanized equipment.
  - 7. Working with soils that may be hazardous or contaminated, or both.
  - 8. Working around and in open trenches.
  - 9. Working in spaces or areas where employees may be exposed to asbestos and lead.
  - 10. Welding, painting, or other potentially hazardous Work, or working in the vicinity of such activities.
  - 11. Working in a public right-of-way with vehicular traffic moving around or through the Project Site.

12. Working in rail right of way with light rail vehicles moving around and through the Project Site.
- F. Protect the public from hazards including surface irregularities, un-ramped grade changes in pedestrian sidewalks or walkways, and trenches or excavation in roadways. Ensure safe routing of vehicular and pedestrian traffic around the Project Site, in compliance with American's with Disabilities Act (ADA) requirements.

### 1.3 SUBMITTALS

- A. Principal Project Company shall submit to the City the following Submittals no later than ten Days before start of Work at the Project Site or NTP2, whichever is earlier. No construction Work shall start prior to City acceptance of the submittals listed below. Each Submittal listed below shall be a separate document and shall not combined within one another.
1. Site-specific Health and Safety Plan (HASP) prepared, signed and stamped by a Certified Industrial Hygienist (CIH).
  2. Principal Project Company's Injury and Illness Prevention Programs (IIPP) and Code of Safe Practices (CSP), in accordance with the California Code of Regulations (CCR), Title 8.
  3. Templates for all safety forms and reports:
    - a. The Project Safety Representative's (PSR) daily inspection form shall accommodate twice daily inspections of their field work area(s) covering date, work area checked, employees present in the work area, PPE, work equipment being used in each area, workplace conditions, physical facility safety, and employee work practices. The form shall also accommodate any deficiencies and corrective actions.
    - b. The Safety Meeting Attendance sheet of the "toolbox" safety meetings conducted per CAL/OSHA standards.
    - c. Activity Hazard Analysis (AHA) or Job Hazard Analysis (JHA).
    - d. Incident or Near-Miss Incident Investigation Reports.
    - e. Corrective Actions Report.
    - f. Project Site Visitor Policy Form
  4. Completed Activity Hazard Analysis (AHA) or Job Hazard Analysis (JHA) submitted with the HASP using the AHA/JHA template for all significant activities and tasks with a high-risk potential, describing the job steps, hazards associated with each job step, and the controls used to remove or minimize the associated hazards
  5. SDS (Safety Data Sheet) for all chemicals and other hazardous materials used in the Work.
  6. If Serpentine is present Principal Project Company shall have Cal/OSHA 40-hour asbestos training for the competent person overseeing Serpentine/ Naturally Occurring Asbestos (NOA) disturbance activities and managing personal air monitoring for asbestos.
- B. Experience Statement. Principal Project Company shall submit to the City no later than 10 days prior to the start of construction Work the qualifications and experience of the it's Project Safety Representative (PSR) as specified in this Section 01 35 45 – Health and Safety Criteria.

1. Documentation and Certification (current and valid) of the Project Safety Representative (PSR):
    - a. The name of the designated Project Safety Representative (PSR).
    - b. OSHA Certified 30-Hour Construction Training.
    - c. The 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training Program.
    - d. First Aid/CPR certification/training within the past two years
    - e. Cal/OSHA 40-hour asbestos training for the Competent Person overseeing NOA disturbance activities and managing personal air monitoring for asbestos.
    - f. Documentation demonstrating a minimum of three (3) years recent experience in conducting and supervising safety and health programs on construction projects similar to the Work of this Contract.
- C. Principal Project Company shall maintain the following throughout the course of construction and provide to the City immediately upon request.
1. Daily inspection reports (as per Part 1.7 of this Section) signed by the PSR documenting twice daily inspections of their field work area(s) covering date, time visited, work area checked, employees present in the work area, PPE, work equipment being used in each area, workplace conditions, physical facility safety, and employee work practices. Any deficiencies and corrective actions shall also be documented.
  2. Records of topics and safety meeting attendance sheet of the “toolbox” safety meetings conducted per CAL/OSHA standards.
  3. Incident or Near-Miss Incident Investigation Reports and Corrective Action Reports – Submitted to the City’s Authorized Representative within 24 hours of the Project Incident or Near-Miss Incident.
  4. Final Incident or Near-Miss Incident Investigation Reports and Final Corrective Action Reports – Submitted to the City’s Authorized Representative within 48 hours of the Project Incident or Near-Miss Incident.
  5. HASP modification requests, and approved modifications to the appended HASP – Submitted to the City for review (if applicable).
  6. Respiratory Protection Program, records and documentation (if applicable to the Work).
  7. Hot Work permit (if applicable to the Work).
  8. IIPP and CSP modification requests and approved modifications to the appended IIPP and CSP.
  9. OSHA’s Form 300A “Summary of Work-Related Injuries and Illnesses” annual form. (Principal Project Company shall submit the Form 300A each year and whenever it is updated).
- D. Upon receiving a written request from the City, Principal Project Company shall submit to the City any document relating to health and safety within five (5) Days from the date of such request.

## 1.4 REFERENCES

Work performed shall be consistent with the following guidelines and references and in compliance with all applicable regulations and standards, including those listed below. In the case that these requirements are conflicting, the one which offers the greatest level of safety shall be followed.

- A. California Code of Regulations (CCR), Title 8
  - 1. Industrials Relations
  - 2. Construction Safety Orders
  - 3. General Industry Safety Orders
- B. Cal/OSHA Occupational Safety and Health Administration (OSHA) Regulations.
  - 1. CCR Title 8 Standards (All)
  - 2. CCR Title 8 Tunnel Safety Orders (8403-8552)
- C. National Institute for Occupational Safety and Health (NIOSH) Publications.
- D. U.S. Environmental Protection Agency (USEPA) Publications.
- E. American Conference of Governmental Industrial Hygienists (ACGIH) Publications.
- F. Work Hours and Safety Standards Act (40 U.S.C. 327 et seq.).
- G. Code of Federal Regulations (CFR), Title 29 – Labor.
- H. Federal Railroad Administration Roadway Protection Rule (49 CFR Part 214C).
- I. State of California, Health and Safety Code.
- J. California Department of Industrial Relations, DOSH Mining and Tunneling Unit, Underground Classification dated March 16, 2009.
- K. State of California, Public Utilities Commission, General Order No. 95, “Rules for Electric Line Construction”.
- L. State of California, Public Utilities Commission, General Order No. 128, “Construction of Underground Electric Supply and Communication System”.
- M. State of California, Public Utilities Commission, General Order No. 172, “Rules and Regulations Governing the Use of Personal Electronic Devices by Employees of Rail Transit Agencies and Fixed Guideway Systems”.
- N. State of California, Public Utilities Commission, General Order No. 175-A, “Rules and Regulations Governing Roadway Worker Protection Provided by Rail Transit Agencies and Fixed Guideway Systems”.
- O. Bay Area Air Quality Management District (BAAQMD) Regulations.
- P. California Air Quality Board (CARB) Regulations.
- Q. San Francisco Health Code.

## 1.5 HEALTH AND SAFETY PLAN (HASP)

- A. Principal Project Company shall submit a Site-specific Health and Safety Plan (HASP) in accordance with this Specification, CFR Title 29, CCR Title 8 and other applicable regulations, which shall cover all aspects and scope of Work. The HASP shall remain in effect for the term of this Agreement and a copy of the HASP must always be on-Site.
- B. Principal Project Company's Site-specific HASP shall set forth the policies and procedures to be followed by all Principal Project Company personnel at the Site. The HASP shall describe the safety requirements for the Work, and the means and methods by which Principal Project Company will implement and enforce those safety requirements. The HASP shall describe, in detail, the protocols necessary for the identification, evaluation, mitigation and control of all hazards associated with the Work and each task performed by Principal Project Company and all Principal Project Companies. The HASP shall identify Principal Project Company's Project Safety Representative (PSR) responsible for Project Site safety and enforcing safe practices in performing the Work. Principal Project Company's site-specific HASP shall describe the responsibility for employee and public safety of Principal Project Company's representatives who control each phase of the operations and shall set forth in writing the policies and procedures to be followed by all Principal Project Company personnel. Principal Project Company HASP shall establish, in detail, the protocols necessary for the recognition, evaluation, and control of all hazards associated with each task performed by Principal Project Company and lower tier Principal Project Companies.
- C. The HASP shall be prepared, signed, and stamped by a Certified Industrial Hygienist (CIH). The HASP shall also be reviewed and signed by the Project Safety Representative (PSR), whose review shall be limited to general scope and completeness. Principal Project Company shall always be solely and entirely responsible for the safety of the Project Site and its personnel, Principal Project Company's personnel, persons working at or visiting the Project Site (including City representatives, employees and consultants), and persons passing through the Construction Area. Principal Project Company shall be solely responsible for the content, implementation and enforcement of its HASP. Principal Project Company shall not perform any Work at the Project Site until the HASP has been submitted to and accepted by the City.
- D. The City will not review the HASP for its content, nor will the City be liable for Principal Project Company's failure to have an adequate HASP or implement it. Submission to and receipt of the HASP to the City and regulatory agencies neither constitutes to the legality of the HASP nor does it incur liability. Submission, acceptance, and receipt of the HASP to the City, or any review of the HASP by the City, shall not be construed as approval of the adequacy of Principal Project Company's PSR, Principal Project Company's HASP or any safety measures taken in or near the construction site.
- E. Any changes or modifications to Principal Project Company's HASP must be signed by Principal Project Company's PSR and submitted to the City. The modification shall be appended to Principal Project Company HASP. All personnel working on the Project Site shall be fully informed of the modifications of the HASP and any required actions arising from those HASP modifications before performing any of the Work that may be impacted by those modifications.
- F. The HASP shall be divided into two parts. Part One shall address the Environmental Health aspect of safety. Part Two shall address Construction Safety.
- G. Part One of HASP - Environmental Health:
  - 1. Identification and description of the responsibility of those individuals who control each phase of operations and are responsible for employee and public safety. The HASP shall set forth in writing the policies and procedures to be followed by all personnel. The HASP shall include the designation and resume of an overall Project Safety Representative (also referenced as health/safety officer). The PSR shall have full authority to correct any

unsafe conditions at the Project Site or unsafe means or methods of performing the Work. The PSR shall have the authority to stop any construction activity or modify Work practices, means or methods that do not accord with the HASP or that are necessary to protect workers, property, and the surrounding community. This requirement shall apply throughout the term of this Agreement and is not limited to working hours.

2. Hazard Communication Plan: Information identifying and delineating all workplace hazards that has been identified or is generally associated with the proposed Work phases and how this information is communicated to employees (e.g., tailgate/toolbox safety meetings, monthly safety meetings, and daily job briefings). Hazardous material communication standards can be found in 29 CFR 1910.120 & 8 CCR 5194. Hazardous waste information can be found in 29 CFR 1910.1200 & 8 CCR 5192. Local hazardous material/waste information can be found in Articles 21, 21A, 22 and 22A of the San Francisco Health Code.
3. Mitigation measures to identify, monitor, and control worker and general public exposure to any identified hazard. Principal Project Company shall determine the need to conduct and monitor its personnel for contaminant exposure to maintain the proper level of personal protection, including the action level.
4. Personnel: Provision of enough personnel properly trained to handle, remove, excavate and dispose of hazardous waste and contaminated waste that may be encountered or generated by the Work. The HASP shall specify the general training required for all Principal Project Company personnel, and any specialized training required for personnel identified to manage and/or handle hazardous materials, including but not limited to:
  - a. Asbestos training that meets the Cal/OSHA Work Activity Level for naturally occurring asbestos (NOA) as per the Cal/OSHA Construction Asbestos Standard, 8 CCR 1529, all applicable Sections and Section 1529.
  - b. Lead, petroleum hydrocarbons, volatile and semi-volatile organic compounds (VOC's and SVOC's) awareness training.
  - c. The 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training Program.
  - d. It's associated 8-hour refresher training in accordance with 29 CFR 1910.120, and 8 CCR 5192.
  - e. Respiratory program in accordance with 29 CFR 1910.134 and 8 CCR 5144.
  - f. Respirable Crystalline Silica OSHA Regulation in accordance with 29 CFR 1926.1153
  - g. Other Site-specific or Project specific hazards requiring safety training.
5. This training shall be required for all Principal Project Company and Principal Project Company personnel who will encounter or operate equipment that handles contaminated materials. The HASP shall include records establishing the subject matter, dates, times, and attendees of all safety trainings. Principal Project Company shall maintain training records as required by Cal-OSHA and applicable regulations.
6. NOTE: Cal/OSHA regulations are triggered when asbestos is present in any amount. Principal Project Company shall meet its obligations under CCR Title 8, Section 1529. The regulation requires monitoring to determine exposure levels, wet methods, respirators and protective clothing, controlled access to the work area, and similar precautions associated with asbestos work regardless of the origin of the asbestos. Use

of a competent person to oversee the work may also be necessary. Principal Project Company shall utilize an experienced Certified Industrial Hygienist (CIH) and a Professional Geologist (PG) to assist it with this work.

7. Requirements of Principal Project Company and Principal Project Companies for implementing the following:
  - a. Medical surveillance programs. Principal Project Company is responsible for providing medical examinations and maintaining medical records of personnel.
  - b. Code of Safe Practices and Injury and Illness Prevention Programs (IIPP), i.e., SB 198, 8 CCR and CAL/OSHA, GISO 3203, Section 5192 and 1509.
  - c. Personnel air monitoring according to 29 CFR and 8 CCR.
  - d. The Construction Standard (29 CFR 1926).
  - e. Federal and California Lead Standards for the Construction Industry (29 CFR, Part 1926.62 and 8 CCR, Section 1532.1, respectively)
  - f. Asbestos OSHA Regulation 29 CFR Part 1926.1101 & 8 CCR 1529.
  - g. Workers' Right to Know (29 CFR 1910.120).
  - h. Section 6360-99 of the California Labor Code (Hazard Communication).
  - i. The American with Disabilities Act (ADA).
8. Engineering controls, specific Work practices, air monitoring for contaminants (e.g., dust, natural occurring asbestos (NOA), serpentine, lead, volatile organic, and hydrocarbons), and personal protective equipment (8 CCR 5144) to protect Principal Project Company personnel, City personnel on the Site, and the public impacted by the Work.
9. Methods to be used to decontaminate equipment and personnel.
10. Sanitation facilities to be provided for personal hygiene. Portable toilets and discharge of their waste products into sanitary sewers shall comply with local codes.
11. Contingency /Emergency Response Plan procedures for emergencies including fire, spillage of hazardous/toxic wastes and liquids (with special emphasis to clean up of spillage due to fuel/oil from Principal Project Company's equipment), traffic accident, personal accident, power failure, or any event that may require modification or abridgment of site control and decontamination procedures.

Part Two of HASP—Construction Safety:

12. Principal Project Company shall include an organizational structure in the HASP that sets forth lines of authority, responsibility, and communication, including a description of Principal Project Company's organization and Project responsibilities of key personnel.
13. Principal Project Company shall inform its employees, supervisory personnel and visitors (invitees) to the Project Site of known Project Site hazards.
14. Principal Project Company shall take necessary precautions and implement mitigation measures to prevent or reduce the release of pollutants in the form of dust, fume, mists, excessive noise and vibration into the air and surrounding environments.

15. Principal Project Company shall ensure at least one individual on each job site always has current CPR/First Aid/AED training.
16. Principal Project Company shall employ a Project-specific hard hat insignia (sticker) program which identifies workers that have successfully completed the Project safety training.
17. Information identifying and delineating all workplace safety hazards and how this information is communicated to employees (e.g., tailgate/toolbox safety meetings, monthly safety meetings, daily job briefing).
18. Principal Project Company shall at all time be responsible for providing its employees and visitors with the proper level of personal protective equipment (PPE), that shall be appropriate to the type of work being performed by the individual employee. At a minimum, Principal Project Company, Principal Project Company's personnel and visitor shall wear hardhats, ANSI class 2 vests, and safety glasses with side shields at the work site. Hardhats shall show company name.
19. Safety Action Measures: For Work requiring Cal/OSHA permits, special training and/or use of designated competent persons to oversee the Work, Principal Project Company shall prepare Safety Action Measures, to address these Work activities. The Safety Action Measures shall include detail information needed to perform the activity safely, verify that the persons involved in the Work are properly trained or certified, the equipment used is inspected and suitable for the Work, the proper permits have been obtained.
20. The format for all safety forms and reports shall be developed by Principal Project Company and submitted as part of Principal Project Company HASP.
21. Periodic safety performance reviews and procedures on safety inspections. A sample daily inspection form shall be provided in Principal Project Company's HASP and shall include date, Work area checked, employees present in the Work area, PPE, Work equipment being used in each area, safety and health issues, notes.
22. Procedures in handling non-compliance/violations of safety requirements, e.g. deficiency correction reports, stop Work orders, disciplinary actions, etc.
23. Communication and reporting requirements, including the immediate reporting of injury accidents and submittal of corrective action reports.
24. Requirements concerning, distribution, and maintenance of personal protective equipment and safety tools.
25. Measures and procedures to be used to report, monitor and control exposure of Principal Project Company personnel and public to any identified safety hazards. Principal Project Company shall monitor Site personnel for contaminant exposure and ensure appropriate PPE is used.
26. Provision for all personnel to be properly and regularly trained in construction safety and emergency response. The level of training required for all or specified Principal Project Company or Principal Project Company personnel, including, but not limited to the following:
  - a. Heat stress
  - b. Fire prevention and protection plan
  - c. Fall protection and prevention program

- d. Confined Space Entry
  - e. Special Equipment
  - f. Ergonomics
  - g. Contingency Plan for emergency including fire, earthquake, etc.
27. Site Access Control Plan covering Principal Project Company and City personnel, consultants, representatives, the public, and Project Site visitors (see relevant subparagraph 1.14 CONSTRUCTION SITE VISITORS).
  28. Construction site visitor guidelines, including the site-specific orientation and Project Site Visitor Policy form (see relevant subparagraph 1.14 CONSTRUCTION SITE VISITORS).
  29. Principal Project Company's alcohol and substance abuse program shall describe the measures that Principal Project Company will implement to ensure that all Principal Project Company personnel working on the Project comply with the drug and alcohol restrictions stated in this Agreement and in Principal Project Company's Corporate Policy and Program. Principal Project Company's and Principal Project Company's personnel shall not use any alcohol or controlled substance when performing the Work, and Principal Project Company shall not allow any person on the Project Site who is under the influence of any alcohol or controlled substance, including any prescription the negatively affects alertness or performance.
  30. Completed Activity Hazard Analysis (AHA) or Job Hazard Analysis (JHA) submitted with the HASP using the AHA/JsHA template for all significant activities and tasks with a high-risk potential, describing the job steps, hazards associated with each job step, and the controls used to remove or minimize the associated hazards.
  31. Activity Hazard Analysis (AHA):  
[https://www.navfac.navy.mil/content/dam/navfac/NAVFAC%20Atlantic/NAVFAC%20Southeast/PDFs/Safety/se\\_sf\\_activity\\_hw\\_trn.pdf](https://www.navfac.navy.mil/content/dam/navfac/NAVFAC%20Atlantic/NAVFAC%20Southeast/PDFs/Safety/se_sf_activity_hw_trn.pdf)
  32. Job Hazard Analysis (JHA) Form: <https://www.osha.gov/Publications/osha3071.pdf>
- H. Furnish copies of all records of all health and safety audits, inspections, and reviews to the City's Authorized Representative
  - I. The City reserves the right to require that Principal Project Company modify the HASP to address Project Site safety issues. However, the City's action or lack thereof on the HASP shall not be construed to mean approval, or acceptance of Principal Project Company's responsibility for compliance with the applicable laws and regulations.
- 1.6 INJURY AND ILLNES PREVENTION PROGRAM (IIPP) AND CODE OF SAFE PRACTICES (CSP)**
- A. Principal Project Company shall submit an Injury and Illness Prevention Programs (IIPP) and Code of Safe Practices (CSP) in accordance with this specification, CCR Title 8 and other applicable regulations. A copy of all applicable IIPP and CSPs must always be on-Site.
  - B. The City will not review IIPPs or CSPs for their content, nor will the City be liable for Principal Project Company's failure to have adequate IIPPs/CSPs or implement them. Submission to and receipt of IIPPs/CSPs to the City and regulatory agencies neither constitutes to the legality of the IIPPs/CSPs nor does it incur liability. Submission and receipt of IIPPs/CSPs to the City, or any review of the IIPPs/CSPs by the City, shall not be construed as approval of Principal Project Company's IIPPs/CSPs or any safety measures taken in or near the construction site.

- C. Any changes or modifications to Principal Project Company's IIPP/CSP must be submitted to the City. The modification shall be appended to the appropriate IIPP/CSP. All on-site personnel shall be fully informed of the modifications, changes, and required actions prior to conducting any additional work activities.

#### **1.7 REQUIREMENTS OF THE PROJECT SAFETY REPRESENTATIVE**

- A. Principal Project Company shall designate in writing a responsible competent person at the Project Site as Project Safety Representative (PSR) whose principal duties shall be the prevention of accidents and the maintenance and supervision of safety precautions and programs in accordance with the requirements of applicable laws and regulations. The PSR is also a qualified person having the necessary training to be knowledgeable in the identification, control, and management of the hazardous materials encountered onsite.
- B. Principal Project Company's Project Safety Representative (PSR) shall:
  - 1. Be readily available (within 30 minutes of City request) to consult with the City at the site during all Project working hours and shall be available 24 hours a day, 7 days a week by telephone or other approved means. The PSR shall meet with the City at least once per week.
  - 2. Have completed a 30-hour OSHA Certified Construction Safety training session and must submit documentation of such training to the City.
  - 3. Have completed the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training Program
  - 4. If more than one Project site working shift is initiated, Principal Project Company shall ensure that provisions are made to have a qualified PSR to cover all Work shifts
  - 5. Be knowledgeable with the safety provisions of Federal OSHA, Cal/OSHA and the requirements of this section.
  - 6. Be currently certified in First Aid/CPR and be able to use an automatic external defibrillator (AED).
  - 7. Possess qualifications, which include a minimum of three (3) years recent experience in conducting and supervising safety and health programs on construction projects like this Contract.
  - 8. Be capable of performing safety inspections and accident investigations.
  - 9. Perform twice daily inspections of their active field Work area(s) covering workplace conditions, physical facility safety, and employee Work practices. Any deficiencies and corrective actions shall be documented. Furnishing of daily inspection reports shall be done as incidental work. The PSR shall meet on-site with the City at least once per week.
  - 10. Administer and enforce the site-specific Health and Safety Plan, Injury and Illness Prevention Plan (IIPP), and Code of Safe Practices (CSP).
  - 11. Administer and enforce the visitor site-specific safety orientation, the Project Site Visitor Policy and its guidelines.
  - 12. Advise Principal Project Companies, vendors, and visitors to the job site of potential hazards and the requirements of Health and Safety practices and rules.

13. Coordinate Principal Project Company's Work regarding hazardous material procedures and controls (as required).
14. Establish and maintain restricted Work Areas.
15. Enforce proper use of personal protective equipment.
16. Communicate approved modified safety requirements to Project Site personnel as well as visitors to the site.
17. Notify to and coordinate with the City for the immediate assessment and remediation Work for unforeseen hazardous materials conditions discovered in the course of the Work.
18. Have "Stop Work Authority" – the ability to stop Work without any adverse consequences when unsafe conditions are present.

#### **1.8 REQUIREMENTS OF THE ASBESTOS COMPETENT PERSON**

- A. Principal Project Company shall designate in writing a responsible asbestos Competent Person (ACP) at the Project Site whose principal duties shall be overseeing asbestos soil disturbing activities, implementing engineering and administrative controls to prevent asbestos from becoming airborne, and general compliance with Cal/OSHA, CARB, and EPA regulations related to asbestos and naturally occurring asbestos (NOA) when impacted as part of the Project. The ACP is also a qualified person having the necessary training and experience to be knowledgeable in the identification, control, and management of asbestos and naturally occurring asbestos encountered onsite. The PSR and ACP may be the same person if all training and experience requirements for both positions are met.
- B. Principal Project Company's Asbestos Competent Person (ACP) shall:
  1. Communicate all NOA-related issues to the PSR daily and as needed as required for the PSR to fully execute its duties.
  2. Have completed 40-hour Cal/OSHA-required asbestos Principal Project Company supervisor training and must submit documentation of such training to the City.
  3. Possess qualifications, which include a minimum of three (3) years recent experience as an ACP on construction projects similar to this Contract.
  4. Implement the elements of Cal/OSHA asbestos in construction standard 8 CCR §1529 and other applicable regulations and standards, including but not limited to:
    - a. Demarcate the Regulated Areas and control the points of ingress and egress,
    - b. Conduct asbestos worker training to all workers in Cal/OSHA Regulated Areas, and NOA awareness training to all workers and visitors who enter the site and are outside of the Regulated Areas,
    - c. Assure that wet methods and other engineering controls are implemented to minimize asbestos emissions,
    - d. Conduct the Initial Exposure Assessment and select respiratory protection accordingly, as required,
    - e. Conduct daily personal monitoring and communicate exposure results to workers,

- f. Based on monitoring results, continuously re-evaluate PPE requirements select the appropriate respiratory protection to prevent exposure above the PEL,
  - g. Assure that personal decontamination stations are adequate and located to allow workers to decontaminate thoroughly prior to exiting the Regulated Areas. The decontaminate stations shall include water and boot scrubs, HEPA-vacuums, cleaning wipes for respirators, and facilities to dispose of used Tyvek.
5. Perform twice daily inspections of asbestos and NOA field work area(s) for compliance with all asbestos and NOA regulations and standards. Any deficiencies and corrective actions shall be documented.
  6. Have "Stop Work Authority" – the ability to stop work without any adverse consequences when unsafe conditions are present.

### **1.9 TRENCHING AND SHORING**

- A. Trench Safety: Principal Project Company shall comply with all shoring and excavation requirements set out in Federal OSHA (29 CFR 1926.650-652), Cal/OSHA (Construction Safety Order 1539-1544), the California Labor Code, and the Contract Documents.
- B. Federal and State Safety regulations requires
  1. Safe Exits: A stairway, ladder, ramp or other safe means of egress shall be in trench excavations that are 4 feet or more in depth to require no more than 25 feet of lateral travel for employees.
  2. Shoring is required for trenches at 5 feet depth or greater, and must be designed to prevent cave-ins. Shoring may be required for trenches less than 5 feet in depth unless excavations are made entirely in stable rock or examination of the ground by a competent person provides no indication of a potential cave-in.
  3. Keep excavated materials at least 2 feet or greater from the side of the excavation.

### **1.10 CONFINED SPACE ENTRY**

- A. Principal Project Company shall provide all equipment and assistance to make the confined space safe for entry by Principal Project Company's personnel, the City representatives, and its consultants in accordance with the California Code of Regulations, Title 8, General Industry Safety Orders, "Confined Spaces."
- B. If any activities associated with confined space entry become necessary, Principal Project Company shall be required to consult the City for guidance and prepare an appropriate Permit-Required Confined Space Entry Plan.

### **1.11 ELECTRICAL LOCKOUT/TAGOUT PROCEDURES**

- A. Training of Principal Project Company's employees in procedures for locking out and tagging out of electrical equipment that must be de-energized to accommodate the Work.
  1. The lockout/tag out of electrical energy sources shall occur at the circuit disconnect switch in all cases.
  2. Principal Project Company shall furnish locks used for this purpose.
  3. Principal Project Company shall furnish tags, locks, and lock box(s) that are compatible with electrical distribution equipment to be de-energized.

- B. Principal Project Company shall attach white "DANGER" tags to locked switches to indicate that the circuit must not be energized.
- C. Red "DANGER" tags shall be used to indicate that Principal Project Company personnel are actively working on equipment or lines connected to the locked switch. If the task that requires locking the switch has not been completed at the end of a shift or workday, Principal Project Company shall leave the switch lock in place, remove its Red Tag, but leave the White Tag in place on the locked circuit. When Principal Project Company resumes that Work, Principal Project Company shall again attach a Red Danger tag to the locked switch

#### **1.12 CONSTRUCTION EQUIPMENT AND TOOLS**

- A. Principal Project Company shall only use construction equipment and tools designed and intended by the manufacturer for the Work. All Principal Project Company equipment shall conform to Cal/OSHA requirements.
- B. Principal Project Company shall not use and remove from the Project Site at its expenses any equipment that the City as Regulator determines is unsafe, not intended for the Work, or that does not meet Cal-OSHA requirements.

#### **1.13 PERSONAL PROTECTIVE EQUIPMENT (PPE)**

- A. Principal Project Company shall define task-specific PPE requirements for all personnel and visitors in compliance with applicable laws, rules, and regulations. PPE shall always be worn on the Site, including travel within the Project Site when starting or ending shifts. Minimum requirements include:
  - 1. Hard hats are always required at the Site. Hardhats shall show company name.
  - 2. Appropriate eye and face protection that complies with ANSI Z87 shall always be worn.
  - 3. Safety glasses with side shields are required at the Site.
  - 4. Sensible and safe Work clothing and closed-toe shoes must be worn at the Site.
  - 5. No canvas/leather sneakers or sandals may be worn in the project work areas.
  - 6. Appropriate hearing protection shall be worn at the Project Site where sound levels exceed Cal/OSHA standards.
  - 7. Suitable gloves must be worn to protect the hands from injury as required by Cal/OSHA.
  - 8. High visibility warning vests (ANSI class 2 vests) or other suitable garments marked with or made of reflection or high-visibility material must always be worn at the Site.
  - 9. Within a Cal/OSHA asbestos Regulated Areas, suitable protective clothing and respiratory protection in accordance with 8 CCR § 1529 as prescribed by the Asbestos Competent Person (ACP).
- B. Principal Project Company's PSR and/or ACP shall establish additional appropriate levels of protection for each Work task in accordance with Cal/OSHA standards.
- C. If respiratory protection is utilized, Principal Project Company shall implement a Respiratory Protection Program in accordance with Cal/OSHA requirements. Principal Project Company will also provide the following to the City prior to beginning any portion of Work that requires respiratory protections:
  - 1. Copies of the Respiratory Program

2. Respirator training records
  3. Fit-testing and medical approval documentation
  4. Annual documentation for training, fit testing and medical evaluations
- D. Principal Project Company shall provide appropriate respiratory equipment to its personnel and visitors. Principal Project Company shall inspect and maintain equipment in accordance with Cal-OSHA regulations.
- E. Where “Hot Work” is involved, a Hot Work permit must be submitted to the City as Regulator prior to commencing that Work. Personnel performing Hot Work must wear clothing that provides thermal protection. Principal Project Company shall erect welding screens where welding operations may expose its personnel or the public to welding sparks, light and other hazards.
- F. Safety harnesses must be worn by personnel in manlifts and when working at heights, in accordance with OSHA requirements in manlifts.
- G. Workers must wear a safety harness with their safety lanyard secured to a separate lifeline while working from swing scaffolds, boatswain’s chairs, or other suspended Work platforms that present a fall hazard.

**1.14 PROJECT SITE VISITORS**

- A. All Project Site visitors upon arrival must check in with Principal Project Company’s Project Safety Representative (PSR). Visitors are defined as persons who are not assigned as direct staff or employees of Principal Project Company. The PSR will coordinate a site-specific safety orientation prior to jobsite entry. The site-specific safety orientation shall provide visitors with a review and understanding of safe jobsite procedures and practices, including any safety trainings if required. Principal Project Company’s site-specific safety orientation, at a minimum, shall include discussion of:
1. Required personal protective equipment (PPE)
  2. Site access/egress routes (Site Access Control Plan)
  3. Emergency contacts and procedures
  4. First-aid locations
  5. Potential known hazards
  6. Required safety trainings and procedures
  7. Construction site operations and conditions
- B. Following the site-specific safety orientation, visitors must complete and sign a construction site visitor policy form provided by Principal Project Company. Failure to acknowledge and agree to all requirements of the construction site visitor policy form shall result in denied access to the construction work zone. The visitor policy form, at a minimum, shall require visitors to accept and acknowledge that they:
1. Have received and understand the site-specific safety orientation
  2. Must not handle or utilize any job equipment, tools, or materials at any time

3. Must always wear proper PPE (Principal Project Company is responsible for providing any missing PPE to visitors)
  4. Must attend any required safety trainings
  5. Must observe and comply with construction signage, barricades, and operations
- C. All visitors re-visiting jobsites shall be identified with a visitor sticker provided by Principal Project Company. Principal Project Company shall be responsible for providing and maintaining legible stickers. Visitor stickers shall indicate the visitor's name, the date of the site-specific safety orientation, and the project number. Principal Project Company's PSR is responsible for determining if any additional re-training is required to account for changing site conditions and procedures.
- D. The City and Principal Project Company shall reserve the right to remove any visitor from the jobsite at any time, if he or she feels that the visitor is failing to adhere with the on-site safety requirements. Areas open to public access (e.g. sidewalks/designated paths of travel) are exempt from the Project Site Visitor Policy.

#### **1.15 EMERGENCY EQUIPMENT**

- A. Principal Project Company shall provide emergency and first aid equipment required by Cal-OSHA and other applicable regulations and necessary for the Project. The following items, at a minimum, shall be maintained at the Project Site and available for immediate use:
1. First aid equipment and supplies, including first aid kits and eyewash station per Cal/OSHA standards
  2. Spill control materials and equipment, including multi-purpose absorbent materials, poly bags, brooms and shovels and drums (if applicable)
  3. Fire extinguishers with a minimum rating of 2A-10B:C and as required by Cal/OSHA standards for scope of Work requirements
  4. Emergency rescue equipment including SCBA and tripod/extraction equipment for confined space rescue; backboard/basket for transport of injured personnel, air horns/bull horns for emergency signaling and communications (as applicable to the Work).
  5. All Principal Project Company's boats and vessels used on the project shall comply with the U.S. Coast Guard and Cal/OSHA and all applicable regulations for working in/around water and waterways.

#### **1.16 HAZARDOUS MATERIALS ENCOUNTERED AT THE SITE**

- A. Proposition 66 Warning: Many of the materials and items at the Project Site contain materials known to the State of California to be either carcinogenic, reproductive toxins, or that may be otherwise toxic or hazardous.
- B. Principal Project Company shall ensure that all personnel, including Principal Project Company's personnel, receive appropriate training and orientation concerning toxic and hazardous materials that will prevent inadvertent or unauthorized disturbance of hazardous materials present at the Site.
- C. Principal Project Company shall comply with all applicable requirements of the California Code of Regulations, Title 8, Section 1532.1, "Lead in Construction".

- D. Principal Project Company shall take necessary precautions to prevent the release of lead and/or asbestos in the form of dust, fumes or mists from lead-containing and asbestos-containing materials into the air or into surrounding environments.
- E. Principal Project Company shall inform all workers, supervisory personnel and authorized visitors to the Project Site of the potential hazards of lead and asbestos and of necessary precautions and housekeeping procedures to reduce the potential for exposure in areas where lead or asbestos is known to be present.

#### **1.17 HAZARDOUS MATERIALS THAT MAY BE INCORPORATED INTO THE WORK**

- A. Principal Project Company shall maintain copies of Safety Data Sheets (SDS) for all substances used at the Project Site or incorporated into the Work.
- B. Principal Project Company shall be responsible for coordinating the exchange of SDS or other hazard communication information that is required to be made available at the site.
- C. Principal Project Company shall notify the City if a specified product or piece of equipment, or the intended use of such product or equipment is unsafe, prior to ordering such items or incorporating such items into the Work.
- D. Principal Project Company shall be responsible for complying with all BAAQMD regulations regarding the use, documentation and notification procedures related to asbestos-related construction Work, use of aerosol products and products that are with the limits for Volatile Organic Compounds (VOC's) and other limits for compounds regulated by BAAQMD.

#### **1.18 MEETINGS**

- A. Principal Project Company shall conduct regular trainings for its personnel, including but not limited to "toolbox/tailgate" safety meetings, in accordance with Cal/OSHA requirements. Principal Project Company shall document the date, time, subject addresses, and names of persons who attended any training meetings using the Safety Meeting Attendance sheet, which Principal Project Company shall keep on file.
- B. Principal Project Company's Project Manager, Superintendent(s), and PSR shall attend Weekly Project Coordination Meetings (as required) to review the project's Immediately Dangerous to Life and Health (IDLH) actives, stop Work activities, incidents, and incident investigations.

#### **1.19 LOGS, REPORTS, AND RECORDKEEPING**

- A. Principal Project Company shall maintain Project safety audits, employee training records and certifications, equipment safety inspection logs, incident reports, visitor logs and all reports covering the implementation of Principal Project Company HASP at the Project Site for review upon request by the City.
- B. Principal Project Company shall submit Monthly project safety statistics, which shall include Project safety inspections, hours worked by Principal Project Company, OSHA Recordable Incidents, Incident Rates, Lost Work Day Cases, Total Project Lost Work Days, Days Away from Work Rate, First Aid Cases, and Property Damage Incidents, to City as part of the Monthly Progress Status Report.
- C. Principal Project Company shall provide the City access to the Project Site, and to all logs and records concerning the Work. The City's review of Principal Project Company's logs and records documenting its safety performance shall not be construed as approval or waiver of the adequacy of any safety measures taken in, on, or near the Project Site. The City's review of Principal Project Company's logs and records shall not relieve Principal Project Company of its responsibilities of performing and enforcing health and safety inspections/audits, monitoring, or any other components of the Project safety requirements or Principal Project Company's HASP,

and any liability that may arise from Principal Project Company's performance or failure to perform safety Work.

#### **1.20 REMEDIAL ACTION**

- A. The City will issue a notice of non-compliance if City personnel observe any condition at the Project Site that poses an immediate and serious risk to the life or health of persons at the Site, or if City personnel observe that Principal Project Company has failed to timely correct violations of health or safety standards. The notice will document the facts and circumstances of non-compliance and will require Principal Project Company to immediately remedy and correct the non-compliance and confirm in writing within 24 hours of receipt of the notice that the non-compliant conditions described in the notice have been corrected.
- B. If Principal Project Company repeatedly fails to comply with applicable health and safety laws, rules, regulations, and orders, the City reserves the authority to have the necessary Work performed by others and deduct corresponding costs from Principal Project Company's progress payment(s); suspend progress payments; or terminate the contract for cause.
- C. Principal Project Company's non-compliance with applicable health and safety laws, rules, regulations, orders, and contract safety requirements may be deemed breach of contract, for which the City may suspend the Work, and dismiss from the Work any employee of Principal Project Company, Principal Project Company, or Supplier responsible for the non-compliance, as provided in the General Provisions. Principal Project Company shall bear all costs arising from such suspension of Work or dismissal of employee(s).
- D. Principal Project Company shall not create any condition that endangers the safety of any person on the Project Site, including City employees, Principal Project Company employees, City consultants, and the public. If City personnel observe such a condition, the City is authorized to suspend the Work until the condition is corrected. Such order to suspend the Work shall not impose on the City any obligation, penalty, additional costs or assumption of liability of any kind. Contract Time shall not be extended by such suspension, and Principal Project Company shall be solely responsible for and the City shall not compensate Principal Project Company for any delay caused by a suspension of the Work due to unsafe conditions. Any suspension of Work due to unsafe conditions shall not relieve Principal Project Company of its control of the Project Site or responsibility for safety on the Project Site during the period the Work is suspended.

#### **1.21 INCIDENT REPORTING AND INVESTIGATION**

- A. Principal Project Company personnel who are involved in or witness an unsafe condition at the Project Site or a Reportable Incident (as defined by Cal-OSHA) shall immediately report the condition or incident to Principal Project Company's Project Site supervisor or foreman, who in turn shall immediately notify the City's Authorized Representative.
- B. Principal Project Company personnel who are involved in or witness a near-miss incident must report it to the responsible Project Site supervisor or foreman within a reasonable time frame, not to exceed 24 hours, who in turn shall immediately notify the City's Authorized Representative.
- C. Principal Project Company shall allow City to participate and review all Project incident or near-miss investigations.
- D. Principal Project Company's foremen, superintendents, and managers shall not decline to accept or relay a report of injury or significant near-miss incident from any person.
- E. All incidents and significant near-miss incidents shall be investigated immediately by Principal Project Company's designated Project Safety Representative (PSR).

- F. For all incidents and near miss incidents (“near miss”), Principal Project Company shall submit to the City a Preliminary Incident/Near Miss Investigation Report (PIR) within 24 hours of the incident or near miss. Principal Project Company shall submit a Final Incident/Near Miss Investigation Report (FIR) as soon as possible (generally within 48 hours) after incident or near miss. Principal Project Company shall not perform Work in the area or of a type that poses risks similar to those of the incident or near miss until a Corrective Action Report (CAR) is complete and submitted to the City.
- G. The PIR and the FIR shall include at a minimum the following:
1. What happened? Include interviews with injured workers and witnesses as well as examination of the workplace for factors associated with the incident or near miss.
  2. Why did the incident or near miss happen? Identify the root causes of the incident or near miss. Root causes are the underlying or systemic, rather than the generalized or immediate, causes of an incident/near miss. To identify root causes, the investigation must obtain all the facts surrounding the occurrence and then ask why. For example, what caused the situation to occur; who was involved; was/were the employee(s) qualified to perform the functions involved in the incident or near miss; were they properly trained; were proper operating procedures established for the task involved; were procedures followed, and if not, why not; where else this or a similar situation might exist, and how it can be corrected.
  3. What should be done? The investigation must determine all corrective actions required to eliminate the cause(s) of the incident or near miss.
  4. What action has been taken and what remains to be taken? Document actions already taken to reduce or eliminate the exposures being investigated. Document all interim or temporary precautions. Document any pending corrective action and reason for delaying its implementation.
  5. Principal Project Company shall submit to the City a Corrective Action Report (CAR) that documents that all corrective actions have been completed and fully implemented and all job site hazards and behaviors that caused the incident or near-miss incident have been corrected. The CAR shall include certification signed by an authorized Officer of Principal Project Company as to the completeness and accuracy of the FIR and the CAR.

## **1.22 ACCIDENT DOCUMENTATION AND REPORTING**

- A. If an accident causes death, serious injury, or serious property damage, Principal Project Company shall immediately report the accident to the City’s Authorized Representative by telephone, text message or email and to appropriate authorities (for example, Cal-OSHA).
- B. In addition, Principal Project Company shall promptly report in writing to the City all accidents or near-miss incidents whatsoever arising out of or in connection with, the performance of the Work whether on occurring on or adjacent to the Project Site or the Construction Area. Principal Project Company shall give full details of the facts and circumstances of the cause and nature of the incident including statements of witnesses.
- C. Principal Project Company shall make positive contact with City Authorized Representative. Voicemail does not constitute “positive contact.” Principal Project Company shall escalate from Project Manager to Project Director until positive contact is made immediately following an incident.
- D. Principal Project Company shall provide to the City within five working days of an incident or accident or near-miss incident or accident, a written incident or accident; or near-miss incident or a near-miss accident report. A significant accident is defined to include events where

personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

- E. If any person lodges a claim against Principal Project Company or any Principal Project Company alleging injury or property damage arising from the Work, Principal Project Company shall promptly report the claim and all relevant facts concerning the claim in writing to the City.
- F. Principal Project Company is responsible for all documentation and reporting obligations of any accident and near-miss incidents in accordance with as per federal, State and local laws and regulations.

### **1.23 CITY SAFETY REPRESENTATIVE**

- A. The City may at any time and without notice enter the Project Site and inspect the Project Site and the Work, observe Principal Project Company's means and methods of performing the Work and maintenance of the Project Site, and review Principal Project Company's compliance with applicable safety requirements, regulations and laws, including but not limited to the requirements of this Agreement and Cal-OSHA regulations. The purpose of these inspections and observations is to confirm that Principal Project Company is safeguarding all people and property on the Project Site.
- B. If the City observes an unsafe Project Site condition or unsafe means or methods of performing Work, the City will inform Principal Project Company's Construction Manager or PSR, who shall take whatever actions Principal Project Company deems necessary to immediately remedy the unsafe Project Site condition or unsafe work practice, or unsafe means or methods in which the Work is performed. Principal Project Company shall within 24 hours of taking such remedial action submit a report to the Engineer describing the unsafe Project Site condition or work practice, and how Principal Project Company remedied that unsafe condition, unsafe work practice, or unsafe means and methods of performing the Work.
- C. The City's inspection of the Project Site and the Work, the City's observation of Principal Project Company's means and methods, and the City's requiring Principal Project Company remedy an unsafe Project Site condition, unsafe work practice, or unsafe means and methods of Work shall not in any way relieve Principal Project Company of control of and responsibility for the Site, and does not relieve Principal Project Company of its responsibility for the safety of all persons on the Project Site.

### **1.24 SFMTA HEALTH AND SAFETY REQUIREMENTS:**

- A. Principal Project Company shall comply with the following requirements as applicable and at no additional cost to the City, if any part of the work for this job is under the jurisdiction of the SFMTA and is on one of its facilities and/or affects its bus/train routes.
- B. Principal Project Company shall obtain all the necessary City and SFMTA permits, trainings, clearances, and shall schedule any necessary SFMTA support at least two weeks prior to mobilization.
- C. Principal Project Company employees who will perform Work within 72 inches (measured transversely) of SFMTA rail tracks shall first receive "Roadway Worker Protection" training and certification from the SFMTA, at least two weeks prior to mobilization. Principal Project Company shall schedule "Roadway Worker Protection" training by contacting the SFMTA. Principal Project Company shall sign a Hold Harmless Agreement with SFMTA with respect to the safety training.
- D. In addition, and at least two weeks prior to mobilization, Principal Project Company shall obtain a "Track Access Clearance Permit" from SFMTA's Operations Control Center (OCC) before

working within 72 inches of the rail tracks. Principal Project Company shall schedule the "Track Access Clearance Permit" training by contacting SFMTA.

- E. All Principal Project Company personnel performing Work along a trackway or adjacent to a trackway shall comply with any instruction given by SFMTA Operations Control Center (OCC).
- F. Principal Project Company is alerted to the presence of the Overhead Contact System (OCS). The overhead contact system is above each trolley coach route and track, and adjacent to each platform. This is a HIGH VOLTAGE SYSTEM operating in excess of 600 volts DC. Principal Project Company's attention is directed to Article 37 of the California Public Utilities Commission General Order 95. Cal/OSHA regulations require that any boom type equipment that moves vertically must maintain 10 feet radial clearance and any other equipment must maintain a 6 feet clearance from OCS. Principal Project Company shall use only fiberglass ladders when working around the OCS. Principal Project Company shall obtain "clearance to start work" from the SFMTA facility's supervisor when working within 10 feet of the OCS, at least two weeks prior to performing that Work.
- G. Principal Project Company shall comply with California Public Utilities Commission's General Order 175-A and the SFMTA "Roadway Worker Protection" training when performing any work on or near Muni trackways.
- H. Principal Project Company shall provide proof of health and safety training required by CCR, Title 8, Subsection 3203 (a)(7) and Muni Procedures SY.PR.034 – Principal Project Company Safety Program and SY.PL.003 – Roadway Worker Protection (RWP) Plan, for each employee, including employee name or other identifiers, training dates, type(s) of training and training provider. These documents are available for review and inspection from SFMTA.
- I. Principal Project Company shall during the course of the Work regularly provide tail-gate trainings to all employees working in and around tracks, track switches, overhead catenary system, train signal system, and other Project specific hazards, as required by Cal-OSHA regulations and other applicable laws and as topics related to safe performance of the Work and maintenance of Project Site safety come to the attention of Principal Project Company.
- J. Principal Project Company shall ensure that its employees, agents, and contractors provide and maintain personnel safety training and medical examinations in accordance with all applicable Federal, State, and local safety and health standards, rules, regulations, and orders.
- K. Principal Project Company shall acquire all the proper permits, trainings, clearances, and schedule any SFMTA support as necessary, at least two weeks prior to mobilization.
- L. Principal Project Company shall sign an Assumption of Risk/Waiver of Claims/Hold Harmless Agreement with SFMTA with respect to the operational and safety training.
- M. Cost for all the above requirements, permits, training, and clearances is incidental and inclusive of the base bid.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01 35 50 - ADDITIONAL ENVIRONMENTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes additional environmental procedures and environmental mitigation measures derived from Project specific regulatory permits and/or CEQA compliance that Principal Project Company shall follow during construction.

This section includes:

1. Documentation of Historic Resource
2. Salvage Plan
3. Interpretation of Historic Resource
4. Oral Histories
5. Tribal Cultural Resources Preservation
6. Construction Transportation and Communications Management Plan
7. Driveway and Loading Operations Plan
8. Paleontological Evaluation and Monitoring Plan
9. Vibration Sensitive Equipment at 2601 Mariposa Street (KQED Building)

#### 1.2 DAMAGES FOR FAILURE TO MEET ENVIRONMENTAL REQUIREMENTS

- A. Principal Project Company shall be liable for all Federal, State, and local regulatory fines, penalties, liquidated damages and costs arising from any Principal Project Company failure to implement mitigation measures to control environmental impacts..

#### 1.3 PROJECT CONDITIONS

- A. Principal Project Company shall familiarize itself as to the actual site conditions that may be encountered during construction by all means available, including, but not limited to, the use of USGS geologic maps.
- B. Principal Project Company shall make provisions to ensure that environmental mitigation controls are consistently implemented for the project duration.
- C. Pursuant to California Assembly Bill 3180 (chapter 1232), the City Planning Department at its own discretion will monitor Principal Project Company's compliance with Code and Contract requirements, including required mitigation actions for construction impacts as indicated in the final MMRP, and will report on Principal Project Company's compliance with required mitigation controls. Said monitoring and reporting activities may include, but are not limited to, qualitative, quantitative and video observations and data collection on the impacts of noise, vibration air quality, traffic, street pavement damage, water quality, cultural resources, biological resources and hazardous materials.
- D. Principal Project Company shall cooperate with such monitoring activities, provide access to the Project Site and Construction Work areas to establish and secure monitoring stations, and make its facilities and records available to the City Planning Department for performing such monitoring.

- E. City will issue a Notice of Determination to Principal Project Company for any detected non-compliance with the provisions herein or of any environmentally objectionable acts and the corrective action to be taken. Failure to comply will result in an assessment of liquidated damages.

## **PART 2 - SUBMITTALS**

### **2.1 DOCUMENTATION OF HISTORICAL RESOURCE**

- A. Unless stated otherwise, the following must be submitted and approved by City Planning Department prior to issuance of a demolition permit. Principal Project Company shall undertake Historic American Building/Historic American Landscape Survey-like (HABS/HALS-like) documentation of the building features. Documentation shall be undertaken by a professional who meets the Secretary of the Interior's Professional Qualifications Standards for Architectural History, History, or Architecture (as appropriate) to prepare written and photographic documentation of the Potrero Trolley Coach Division Facility. Principal Project Company shall submit to the City Planning Department for approval the scope of the documentation which shall include the following elements:
  - 1. **Measured Drawings:** A set of measured drawings shall be prepared that depict the existing size, scale, and dimension of the historic resource. City Planning Department will accept the original architectural drawings or an as-built set of architectural drawings (e.g., plans, sections, elevations). City Planning Department will assist the consultant in determining the appropriate level of measured drawings.
  - 2. **HABS/HALS-Level Photographs:** Either HABS/HALS standard large-format or digital photography shall be used. All digital photography shall be conducted according to the latest National Park Service (NPS) standards. Photography shall be undertaken by a qualified professional with demonstrated experience in HABS/HALS photography. Photograph views for the data set shall include (i) contextual views, (ii) views of each side of the building and interior views, (iii) oblique views of the building, and (iv) detail views of the character-defining features. All views shall be referenced on a photographic key. This photographic key shall be on a map of the property and shall show the photograph number with an arrow to indicate the direction of the view. Historic photographs shall also be collected, reproduced, and included in the data set.
  - 3. **HABS/HALS Historical Report:** A written historical narrative and report shall be provided in accordance with the HABS/HALS Historical Report Guidelines. The written history shall follow an outline format that begins with a statement of significance supported by the development of the architectural and historical context in which the structure was built and subsequently evolved. The report shall also include architectural description and bibliographic information.
  - 4. **Video Recordation:** Prior to issuance of a demolition permit or site permit is issued, video documentation of the affected historical resource and its setting shall be conducted by a professional videographer, one with experience recording architectural resources. The documentation shall be narrated by a qualified professional who meets the standards for history, architectural history, or architecture (as appropriate) set forth by the Secretary of the Interior's Professional Qualification Standards (36 Code of Federal Regulations Part 61). The documentation shall include as much information as possible—using visuals in combination with narration—about the materials, construction methods, current condition, historic use, and historic context of the historical resource.

5. Softcover Book: All documentation will be reviewed and approved by the Planning Department's staff before any demolition or site permit is granted for the affected historical resource. A print-on-demand softcover book shall be produced that includes the content from the historical report, historical photographs, HABS/HALS photography, measure drawings, and field notes. The print-on-demand book shall be made available to the public for distribution. Principal Project Company shall transmit such documentation to the History Room of the San Francisco Public Library, San Francisco Architectural Heritage, the Planning Department, and the Northwest Information Center. Conduct outreach to identify other interested groups.

## **2.2 SALVAGE PLAN**

- A. Prior to any demolition that would remove character-defining features, Principal Project Company shall consult with the Planning Department as to whether any character-defining features that are proposed to be demolished may be salvaged, in whole or in part, during demolition. Principal Project Company shall make a good faith effort to salvage materials of historical interest to be utilized as part of the interpretative program).

## **2.3 INTERPRETATION OF THE HISTORICAL RESOURCE**

- A. Principal Project Company shall facilitate the development of an interpretive program focused on the history of the Project Site. The interpretive program should be developed and implemented by a qualified professional with demonstrated experience in displaying information and graphics to the public in a visually interesting manner, such as a museum or exhibit curator. Principal Project Company shall submit to the City Planning Department for approval an interpretive program plan prepared by a qualified consultant which shall include but not limited to:
  1. The proposed format and the publicly accessible location of the interpretive content, as well as high-quality graphics and written narratives.
  2. The proposal prepared by the qualified consultant describing the general parameters of the interpretive program shall be approved by City Planning Department prior to issuance of the architectural addendum to the site permit.
  3. The detailed content, media, and other characteristics of such an interpretive program shall be approved by City Planning Department prior to issuance of a Temporary Certificate of Occupancy.
  4. Installation of permanent on-site interpretive displays or screens in publicly accessible locations.
  5. Historical photographs, including some large-format photographs required by Article 2.1(A), may be used to illustrate the Project Site's history.
  6. Educational information for future visitors and occupants to learn about the property's historical themes, associations, and lost contributing features within broader historical, social, and physical landscape contexts.

## **2.4 ORAL HISTORIES**

- A. Principal Project Company shall undertake an oral history project on the resource that may include interviews of people such as former SFMTA employees, or other community members who may offer informative historic perspectives on the history and significance of the resource. The project shall be conducted by a professional historian in conformance with the Oral History Association's Principles and Best Practices (<https://www.oralhistory.org/principles-and-best-practices-revised-2018/>). In addition to transcripts of the interviews, the oral history project shall

include a narrative project summary report containing an introduction to the project, a methodology description, and brief summaries of each conducted interview. Copies of the completed oral history project shall be submitted to the San Francisco Public Library, Planning Department, and other interested historical institutions. The oral history project shall also be incorporated into the interpretative program (see Article 2.3).

## **2.5 TRIBAL CULTURAL RESOURCES PRESERVATION**

- A. During ground-disturbing activities that encounter archeological resources, if the City Planning Department determines that a significant archeological resource is present, and if in consultation with the affiliated Native American tribal representatives, the City Planning Department determines that the resource constitutes a tribal cultural resource (TCR) and that the resource could be adversely affected by the proposed project, the proposed project shall be redesigned so as to avoid any adverse effect on the significant tribal cultural resource, if feasible.
- B. If the City Planning Department, in consultation with the Principal Project Company, determines that preservation-in-place of the TCR would be both feasible and effective, then the archeological consultant shall prepare an archeological resource preservation plan (ARPP). Implementation of the approved ARPP by the archeological consultant shall be required when feasible.
- C. If the City Planning Department, in consultation with the affiliated Native American tribal representatives and the project sponsor team, determines that preservation-in-place of the TCR is not a sufficient or feasible option, then the project sponsor team shall implement an interpretive program of the TCR in consultation with affiliated Native American tribal representatives. An interpretive plan produced in consultation with affiliated Native American tribal representatives, at a minimum, and approved by the City Planning Department, would be required to guide the interpretive program. The plan shall identify proposed locations for installations or displays, the proposed content and materials of those displays or installation, the producers or artists of the displays or installation, and a long-term maintenance program. The interpretive program may include artist installations, preferably by local Native American artists, oral histories with local Native Americans, artifacts displays and interpretation, and educational panels or other informational displays.

## **2.6 CONSTRUCTION TRANSPORTATION AND COMMUNICATIONS MANAGEMENT PLAN**

- A. Principal Project Company shall submit to SFMTA the Construction Management Plan that shall include additional measures to further minimize disruptions to people walking and bicycling, transit, and emergency vehicles during construction. The additional measures include:
  - 1. To minimize parking demand and vehicle trips associated with construction workers, describe methods to encourage carpooling, bicycle, walk, and transit access to the Project Site by construction workers. These methods could include providing secure bicycle parking spaces, participating in free-to-employee and employer ride matching program from [www.511.org](http://www.511.org), participating in emergency ride home program through the City of San Francisco ([www.sferh.org](http://www.sferh.org)), and providing transit information to construction workers.
  - 2. To minimize construction impacts on access to nearby residence and businesses, provide nearby residences and adjacent businesses with regularly updated information regarding project construction, including construction activities, peak construction vehicles activities, travel lane closures, and parking lane and sidewalk closures. At regular intervals to be defined in the construction transportation management plan, a regular email notice will be distributed by Principal Project Company that would provide current construction information of interest to neighbors, as well as contact information for specific construction inquiries or concerns.

## **2.7 DRIVEWAY AND LOADING OPERATIONS PLAN (DLOP)**

- A. Principal Project Company to submit a Driveway and Loading Operations Plan (DLOP) to the City Planning Department for approval as a part of the application for the first temporary occupancy permit. The intent of the DLOP is to reduce potential conflicts between passenger and freight loading and transit operations, and between passenger and freight loading activities and people walking and bicycling, and other vehicles in the project vicinity, as well as to maximize reliance on onsite facilities to accommodate freight loading demand. The DLOP shall include:
1. Provisions to manage loading activities and driveway operations associated with the below-grade onsite loading spaces; and
  2. Provisions for assessing on-street commercial and passenger loading supply and protocol for expanding on-street supply, if needed; and
  3. Provisions for trash, recycling, and compost truck access and collection operations; and
  4. Provisions for resident move-in and move-out operations for the HCC; and
  5. Provisions for scheduling deliveries for SFMTA and IFM Principal Project Company using the onsite loading facilities; and
  6. Provisions for accommodating recurring deliveries such as UPS, Federal Express, and USPS within the onsite loading facilities.

## **2.8 PRECONSTRUCTION PALEONTOLOGICAL EVALUATION AND MONITORING PLAN DURING CONSTRUCTION**

- A. Principal Project Company shall engage a qualified paleontologist consultant as recommended by the Society of Vertebrate Paleontology standards (SVP 2010) and Best Practices in Mitigation Paleontology (Murphey et al. 2019), or as otherwise approved by City Planning Department, to develop a site-specific monitoring plan prior to commencing soil-disturbing activities at the Project Site. The Preconstruction Paleontological Monitoring Plan shall determine construction activities requiring paleontological monitoring based on those that may affect sediments with moderate sensitivity for paleontological resources. Principal Project Company shall submit the Preconstruction Paleontological Monitoring Plan to the City Planning Department for approval prior to issuance of any demolition permit. The plan shall include but not be limited to:
1. Project description.
  2. Regulatory environment; outline applicable federal, state and local regulations.
  3. Summary of sensitivity classification(s).
  4. Research methods, including but not limited to:
    - a. Field studies conducted by the approved paleontologist to check for fossils at the surface and assess the exposed sediments.
    - b. Literature Review to include an examination of geologic maps and a review of relevant geological and paleontological literature to determine the nature of geologic units in the project area.
    - c. Locality Search to include outreach to the University of California Museum of Paleontology in Berkeley.

5. Results which include a summary of literature review and finding of potential site sensitivity for paleontological resources; and depth of potential resources if known.
6. Recommendations for any additional measures that could be necessary to avoid or reduce any adverse impacts to recorded and/or inadvertently discovered paleontological resources of scientific importance. Such measures could include:
  - a. Avoidance: If a known fossil locality appears to contain critical scientific information that should be left undisturbed for subsequent scientific evaluation.
  - b. Fossil Recovery: If isolated small-, medium- or large-sized fossils are discovered during field surveys or construction monitoring, and they are determined to be scientifically significant, they should be recovered. Fossil recovery may involve collecting a fully exposed fossil from the ground surface, or may involve a systematic excavation, depending upon the size and complexity of the fossil discovery.
  - c. Monitoring: Monitoring involves systematic inspections of graded cut slopes, trench sidewalls, spoils piles, and other types of construction excavations for the presence of fossils, and the fossil recovery and documentation of these fossils before they are destroyed by further ground disturbing actions. Standard monitoring is typically used in the most paleontologically sensitive geographic areas/geologic units (moderate, high and very high potential); while spot-check monitoring is typically used in geographic areas/geologic units of moderate or unknown paleontological sensitivity (moderate or unknown potential).
  - d. Data recovery and reporting: Fossil and associated data discovered during soils disturbing activities should be treated according to professional paleontological standards and documented in a data recovery report. The plan should define the scope of the data recovery report.

## **2.9 STORMWATER MANAGEMENT ORDINANCE, STORMWATER CONTROL PLAN**

- A. Principal Project Company shall submit the Final Stormwater Control Plan to San Francisco PUC prior to submitting the Architectural building permit to the San Francisco Department of Building Inspection (SFDBI).

## **PART 3 - EXECUTION**

### **3.1 VIBRATION SENSITIVE EQUIPMENT AT 2601 MARIPOSA STREET (KQED HEADQUARTERS)**

- A. Prior to issuance of any construction permits (e.g.) site permit, demolition permit, etc.), Principal Project Company shall implement the following measures related to the KQED Headquarters located at 2601 Mariposa Street:
  1. Community Liaison
    - a. Designate and make available a community liaison to respond to vibration complaints from building occupants at the KQED Headquarters located at 2601 Mariposa Street.
    - b. Contact information for the community liaison shall be posted in a conspicuous location so that it is clearly visible to building occupants most likely to be disturbed.

- c. Provide notification, through the community liaison, to property owners and occupants at 2601 Mariposa Street at least 10 days prior to construction activities involving equipment that can generate vibration capable of interfering with vibration-sensitive equipment and inform them of the estimated start date and duration of vibration-generating construction activities.
- d. Equipment types capable of generating such vibration include an impact pile driver, or similar equipment, operating within 250 feet of the building or a vibratory roller, or similar equipment, operating within 125 feet of the building. If feasible, the project sponsor team shall identify potential alternative equipment and techniques that could reduce construction vibration levels. Alternative equipment and techniques may include, but are not limited to:
  - 1) Pre-drilled piles; and
  - 2) Caisson drilling; and
  - 3) Oscillating or rotating pile installation; and
  - 4) Jetting piles into place using a water injection at the tip of the pile could be substituted for driven piles, if feasible, based on soil conditions; and
  - 5) Static rollers could be substituted for vibratory rollers in some cases.
- e. If concerns prior to construction or complaints during construction related to equipment interference are identified, the community liaison shall work with the affected building occupants to resolve the concerns such that the vibration control measures would meet a performance target of the 65 VdB vibration level threshold for vibration sensitive equipment, as set forth by Federal Transit Authority. To resolve concerns raised by building occupants, the community liaison shall convey the details of the complaint(s) to the project sponsor team, such as who shall implement specific measures to ensure that the project construction meetings the performance target of 65 VdB vibration level for vibration sensitive equipment. These measures may include evaluation by a qualified noise and vibration consultant, scheduling certain construction activities outside the hours of operation or recording periods of specific vibration-sensitive equipment if feasible, and/or conducting ground-borne vibration monitoring to document that the project can meet the performance target of 65 VdB at specific distances and/or locations. Ground-borne vibration monitoring, if appropriate to resolve concerns, shall be conducted by a qualified noise and vibration consultant.

### **3.2 PALEONTOLOGICAL MONITORING DURING CONSTRUCTION**

- A. Principal Project Company's approved paleontologist consultant described above in Section 2.8 shall document the monitoring conducted according to the Preconstruction Paleontological Monitoring Plan (see subsection 2.8 of this Section) and any data recovery completed for significant paleontological resource finds discovered, if any. Principal Project Company's approved paleontologist shall submit a final monitoring report and any data recovery report to the City Planning Department for approval prior to the certificate of occupancy.

### **3.3 INADVERTENT DISCOVERY OF PALEONTOLOGICAL RESOURCES**

- A. Worker Awareness Training - Prior to commencing construction, and ongoing throughout ground disturbing activities (e.g., excavation, utility installation, etc.) the project sponsor team and/or their designee shall ensure that all project construction workers are trained on the contents of the Paleontological Resources Alert Sheet, as provided by the City Planning Department. The Paleontological Resources Alert Sheet shall be prominently displayed at the

construction site during ground disturbing activities for reference regarding potential paleontological resources.

- B. In addition, the project sponsor team shall inform the contractor and construction personnel of the immediate stop work procedures and other procedures to be followed if bones or other potential fossils are unearthed at the project site. Should new workers that will be involved in ground disturbing construction activities begin employment after the initial training has occurred, the construction supervisor shall ensure that they receive the worker awareness training as described above.
- C. The project sponsor team shall complete the standard form/affidavit confirming the timing of the Paleontological Resources worker awareness training to the City Planning Department. The affidavit shall confirm the project's location, the date of training, the location of the informational handout display, and the number of participants. The affidavit shall be transmitted to the City Planning Department within five (5) business days of conducting the training.
- D. In the event of the discovery of an unanticipated paleontological resource during construction, Principal Project Company shall temporarily halt ground disturbing activities within 25 feet of the find until the discovery is examined by a qualified paleontologist as recommended by the Society of Vertebrate Paleontology standards (SVP 2010) and Best Practices in Mitigation Paleontology (Murphy et al. 2019). Work within the sensitive area shall resume only when deemed appropriate by the qualified paleontologist in consultation with the City Planning Department.
- E. The qualified paleontologist shall determine:
  - 1. If the discovery is scientifically significant; and
  - 2. The necessity for involving other responsible or resource agencies and stakeholders, if required or determined applicable; and
  - 3. Methods for resource recovery.
- F. If the qualified paleontologist determines that the discovery is not scientifically important, the qualified paleontologist shall document this conclusion in a Paleontological Evaluation Letter to demonstrate compliance with applicable statutory requirements (e.g., Federal Antiquities Act of 1906, CEQA Guidelines Section 15064.5, California Public Resources Code Chapter 17, Section 5097.5, Paleontological Resources Preservation Act 2009). Principal Project Company shall submit the Paleontological Evaluation Letter to the City Planning Department for review within 30 calendar days of the discovery.
- G. If the qualified paleontologist determines that the discovery is of scientific importance, and there are no feasible measures to avoid disturbing this paleontological resource, the qualified paleontologist shall prepare and submit to the City Planning Department for approval a Paleontological Mitigation Program. The mitigation program shall include measures to fully document and recover the resource of scientific importance. The qualified paleontologist shall submit the mitigation program to the City Planning Department for review and approval within 10 business days of the discovery. Upon approval by the City Planning Department, ground disturbing activities in the project area shall resume and be monitored as determined by the qualified paleontologist for the duration of such activities. The mitigation program shall include:
  - 1. Procedures for construction monitoring at the Project Site.
  - 2. Fossil preparation and identification procedures.

3. Curation of paleontological resources of scientific importance into an appropriate repository.
  4. Preparation of a Paleontological Resources Report (report or paleontology report) at the conclusion of ground disturbing activities.
- H. If a Paleontological Mitigation Program is required, Principal Project Company shall prepare and submit a Paleontological Resources Report to the City Planning Department for review within 30 calendar days from consultation of the ground disturbing activities, or as negotiated with the City Planning Department. The report shall include:
1. Date of field work; and
  2. Results of monitoring; and
  3. Fossil identifications to the lowest possible taxonomic level; and
  4. Analysis of the fossil collection; and
  5. Conclusions; and
  6. Locality forms; and
  7. An itemized list of specimens; and
  8. Repository receipt from the curation facility.
- I. Principal Project Company shall be responsible for the preparation and implementation of the mitigation program, in addition to any costs necessary to prepare and identify collected fossils, and for any curation fees charged by the paleontological repository. The paleontology report shall be submitted to City Planning Department for review within 30 business days from conclusion of ground disturbing activities, or as negotiated following consultation with City Planning Department.

**END OF SECTION**

## SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Principal Project Company shall provide and maintain construction facilities and temporary controls as required to perform the D&C Work relocate as required by the progress of the Work.
  - 2. Unless otherwise required by the City, materials for construction facilities and temporary controls may be new or used, and shall be suitable for the purposes intended.
  - 3. Materials, installation and maintenance of construction facilities and temporary controls shall comply with applicable regulatory requirements.
  - 4. Principal Project Company shall maintain construction facilities in sound, neat and clean condition, and remove any graffiti and repair any vandalism to the satisfaction of the City.
  - 5. Principal Project Company shall remove construction facilities and controls, including associated utilities and equipment, when their use is no longer required.
- B. Related Sections:
  - 1. Section 01 77 00 - Closeout Procedures.

#### 1.2 OPERATION HOURS FOR TEMPORARY CONTROLS

- A. Principal Project Company shall provide and maintain temporary pumping, piping, power, lighting, controls, instrumentation, alarms, security devices, and all required safety devices at all times. Such items shall be made available for immediate use when Principal Project Company's operations impact existing systems.

#### 1.3 TEMPORARY ELECTRICITY

- A. Principal Project Company shall provide and pay for electrical service and weatherproof, grounded distribution system of sufficient size, capacity, and power characteristics during the construction period. Existing on-site City electrical facilities are not available for Contractor's use.

#### 1.4 TEMPORARY LIGHTING

- A. Principal Project Company shall provide and maintain lighting for Construction Work, including power to distribution boxes. Required illumination may be provided by approved cord sets with lamp guards. Principal Project Company shall provide and maintain temporary lighting whenever new permanent lighting fixtures are switched over from existing lighting.

#### 1.5 TELEPHONE SERVICE

- A. Principal Project Company shall provide, maintain and pay for telephone service to Principal Project Company's field office from the time of project mobilization.

## 1.6 TEMPORARY WATER SERVICE

- A. Potable Water: Principal Project Company shall arrange with the San Francisco Water Department to provide potable water by connecting to City water systems.
1. Contact the Water Department at 415-923-2400 for arranging such water service.
  2. Water is available from fire hydrants located in the streets. Obtain permission from the San Francisco Fire Department to use hydrants.
  3. Pay the costs of connection fees, meters, and all water furnished by the San Francisco Water Department under the water service account established above.
- B. Principal Project Company is advised that Ordinance # 175-91, Article 21, Section 1100 to 1107 of the San Francisco Municipal Code (Public Works Code), restricts the use of potable water for soil compaction or dust control activities, to the extent not directly in conflict with any applicable federal, state and local law.
1. In consideration for potential health concerns, an exemption may be allowed for the use of potable water for soil compaction or dust control activities when human contact and exposure exists. Such exemption will be considered and may be granted on a case by case basis.
  2. If Principal Project Company seeks to use potable water for soil compaction or dust control activities, Principal Project Company, shall apply for, and obtain an exemption pursuant to Ordinance #175-91, Article 21, prior to its use. The application for such use of potable water is to be sent to the Department of Public Health, Environmental Health Section, 1390 Market St., Room 910, San Francisco, CA 94102, Telephone 415-252-3945. Permission for such use may be granted by the General Manager of the Water Department, pursuant to Ordinance #175-91, Article 21.
- C. Reclaimed Water: Principal Project Company shall arrange with the SEWPCP to provide reclaimed water for soil compaction and dust control which is available at no cost to Principal Project Company at the SEWPCP from 8:00 A.M. to 5:00 P.M. on weekdays and Saturdays.
1. Arrangements can be made for access to reclaimed water at other times.
  2. A permit is required to obtain reclaimed water from the City. Contact [mfisher@sfgwater.org](mailto:mfisher@sfgwater.org) and/or (415) 695-7378 at least three (3) days prior to the date that reclaimed water is required. See <http://sfgwater.org/modules/showdocument.aspx?documentid=7234> for more information.
- D. Principal Project Company shall provide its own water tanker and hoses. Principal Project Company's hoses crossing traveled roadways shall be buried beneath the roadway or ramped over.
- E. Principal Project Company shall provide and maintain distribution piping, water tankers, hoses, and all appurtenances necessary to supply water at the job site.
1. Bury pipe crossing traveled roadways beneath the roadway. Use hose or ramp over temporary piping on roadway surfaces.

## 1.7 TEMPORARY SANITARY FACILITIES

- A. Principal Project Company shall provide and maintain required toilet facilities and enclosures. Location of facilities shall be a minimum of 50 feet away from the Project field office or otherwise approved by City.

- B. Principal Project Company shall be responsible to provide and maintain all construction facilities, temporary controls, and temporary utilities as required to perform the work of the Contract Documents. Principal Project Company shall arrange with the utility agencies to provide and pay for such utility services required, including furnishing, installing and removing on completion of all work all temporary connections to said utilities.
- C. Principal Project Company shall provide and maintain temporary toilet facilities and enclosures as required at no cost to the City.

## **1.8 TEMPORARY CONSTRUCTION FENCE**

- A. Principal Project Company shall furnish and install a temporary 6'-0" chain link construction fence with lockable gates at the limit of work and at areas to isolate and protect the public from hazardous conditions during construction.
- B. Principal Project Company shall provide fencing as needed to prevent unsafe entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- C. Protect vehicular traffic, stored materials, site and structures from damage. **TEMPORARY ENCLOSURES**
- A. Principal Project Company shall provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.
  1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
  2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
  3. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.

## **1.10 MAINTENANCE OF THE WORK AREA**

- A. Principal Project Company shall maintain the work areas in a safe condition, remove all accumulations of rubbish (Principal Project Company's waste and public refuse) and surplus materials at the end of each working day, restore them to a condition equal to that which existed prior to the start of work, and leave them at completion of the contract in a clean, orderly fashion.
- B. Demolished concrete, deteriorated masonry, cleared vegetation, and excavated material not indicated for reuse shall be removed from the site at the end of each working day without delay and disposed of in a legal manner.
- C. Cleaning During Construction: Control accumulation of waste materials and rubbish; collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly.
  1. Clean interior spaces prior to the start of finish work; maintain areas free of dust and other contaminants during finishing operations.
  2. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material off-site in a lawful manner.

3. Maintain the site and all adjacent public areas in a clean and orderly condition. Maintain the site, equipment, fences and signs free of graffiti. Remove all graffiti daily using methods which cause no damage to the work or existing facilities.
4. Sweep all pedestrian walkways and dispose of debris around the site perimeter on a daily basis.

#### **1.11 DRAINAGE CONTROL**

- A. Grade site to drain. Maintain excavations free of standing water.
- B. Provide, operate, and maintain pumping equipment as needed to control water at the site.
- C. Protect site from erosion caused by flowing water.

#### **1.12 CONFINED SPACE ENTRY**

- A. It is the responsibility of Principal Project Company to provide all equipment or assistance to make the confined space safe for entry by the City or its representative per the California Administration Code, Title 8, and General Industry Safety Orders Entitled "Confined Spaces".

#### **1.13 TEMPORARY PROJECT SIGN**

- A. Project sign image and layout shall conform to the graphical layout and color approved by the City.
- B. Principal Project Company shall obtain the City's approval of the proposed locations, height, and mounting details for each project sign. The project signs may be mounted on construction fence, face of wall, or on posts.
- C. ONESF Project Sign Fabrication:
  1. Size: Project sign shall be 4-feet by 6-feet.
  2. Digital File: Project sign shall match the final graphical layout provided by the City, including the colors and fonts. For more information, refer to the latest Sign Guidelines available from the following website: <http://onesanfrancisco.org/> (Click on "Data + Resources > Signage and Style Guide")
    - a. The design of Principal Project Company furnished project signs shall be in strict accordance with the 'ONESF' Guidelines established by the City.
  3. Mounting Material: Project sign shall be mounted on Medium Density Overlay board (MDO), at least 3/4-inch thick.
  4. Printing: Project sign shall be printed on a 4-color CMYK printer.
  5. Coating: Use UV and Anti-Graffiti coatings.
  6. Quality: Project sign shall last the entire construction duration.
- D. Principal Project Company shall submit a mock-up of the Project sign in color, on bond paper, 11x17 size, to the City for approval prior to fabrication.
- E. Principal Project Company shall install the required project sign(s) shall maintain project sign(s) in good condition for the duration of the contract.

- F. After Substantial Completion, Principal Project Company shall remove each Project sign from the site as its property, and restore area per plans or as directed by the City at no additional cost to the City.
- G. Damaged Project sign that cannot be repaired on site shall be replaced at no additional cost to the City.

#### 1.14 TEMPORARY TOW AWAY/NO-PARKING SIGNAGE

- A. On January 1, 2017, temporary occupancy permits and all other permits that include tow-away signage, aside from excavation permits activated through 311, will not be activated and permittees will not have tow away rights unless and until time and date stamped photos evidencing that signage was posted in the correct location a minimum of 72 hours prior to the time at which the parking restrictions shall become effective under the permit have been uploaded to the San Francisco Public Works, Bureau of Street Use and Mapping (SFPW/BSM) Tow-Away Sign Database. See Appendix B – Tow-Away Sign Activation and Photo Upload Process.
- B. Principal Project Company is advised that Sign Ordinance PWC Article 15, Section 724 which will require the applicant (Principal Project Company) to input the amount of right of way they will occupy during construction activities for a specific permit, to be issued by SFPW/BSM for all work in the Public Right-of-Way. Principal Project Company shall enter times of operation during construction with the proposed start and end times and specific calendar days. This information will be printed on the tow-away signs. Refer to Tow Away Manual at <http://www.sfpublishworks.org/sites/default/files/4506-Tow-Away%20User%20Guide.pdf>.
  1. The location of the Construction Zone will be entered as part of the excavation permit, which will include the length of occupancy (distance in linear feet). This information and date. Once a permit has been approved, the applicant is informed off the approval via email and will be provided a hyperlink to create/modify the tow/away signs prior to printing.
  2. The information required at time of permit will update the database and will validate that the total linear footage of construction occupancy does not exceed 1,200 linear feet. Upon completion of any adjustment to the tow-away signs, the applicant can determine which street segment to print out and may choose to either print one of two general tow-away sign template or request the Department of Public Works to print the tow-away signs. Principal Project Company shall pay for the printing of each sign.
  3. Size: Tow-Away/No-Parking Signs shall be 11' wide x 17' tall.
  4. Digital File: Project sign shall match the final graphical layout provided by the City, including the colors and fonts. The design of Principal Project Company furnished project signs shall be in strict accordance with the DPW Order for Towaway Signs located at: <http://sfpublishworks.org/sites/default/files/4508-TowAway-2015-Template.pdf>.
  5. Principal Project Company shall use only paper types which shall be waterproof durable; tear resistant' with laser paper labels type and templates: 11 x 17 10 PT CV, 215 grams/m<sub>2</sub>
  6. Printing: Project sign can be printed on a Xerox Phaser 7800, or equivalent that can print 11x17 120-130 lb paper. All Tow-Away/No-Parking Signs shall be secured and paid for by Principal Project Company.
  7. Principal Project Company shall maintain Tow-Away/No-Parking Sign (s) in good condition as needed throughout the duration of the Contract.

8. After substantial completion, Principal Project Company shall remove each Tow-Away/No-Parking Sign from the site as its property.
9. Damaged Tow-Away/No-Parking Sign that cannot be repaired on site shall be replaced at no additional cost to the City.

#### **1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Principal Project Company shall:
  1. Remove temporary above grade or buried utilities, construction equipment, temporary structures and facilities, unused materials, rubbish and debris prior to Final Inspection. Restore facilities to conditions prior to construction, to the satisfaction of the City.
  2. Clean and repair damage caused by installation or use of temporary work.
  3. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.
  4. Remove field offices and temporary utility services from the Site.

#### **1.16 STORAGE AND STOCKPILING**

- A. Principal Project Company shall make its own arrangements for off-site storage or shop areas and off-site construction parking facilities. On-site storage shall be limited to materials and equipment currently being installed or utilized.
- B. If necessary, Principal Project Company shall arrange for temporary off-site storage of equipment and materials at its discretion. No additional compensation shall be provided from the City.

#### **PART 2 - PRODUCTS (NOT USED)**

#### **PART 3 - EXECUTION (NOT USED)**

APPENDIX A (01 50 00): TOW-AWAY SIGN ACTIVATION AND PHOTO UPLOAD PROCESS

## Tow-Away Sign Activation and Photo Upload Process



[www.sfpublishworks.org](http://www.sfpublishworks.org)



**San Francisco Public Works**

1155 Market Street, 3rd Floor  
San Francisco CA, 94103  
Phone: (415) 554-5810  
Fax: (415) 554-6161

Processing Hours: 7:30 AM - 4:00 PM  
Monday through Friday, except official holidays



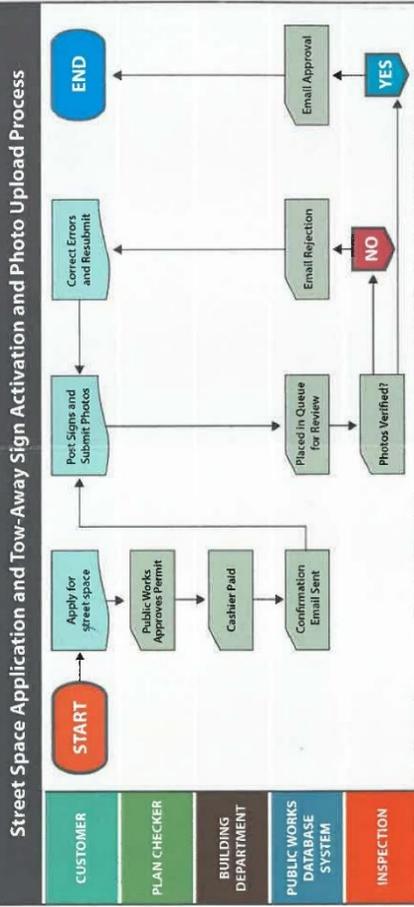
Contact 311 for complaints

Beginning on January 1, 2017, temporary occupancy permits and all other permits that include tow-away signage, aside from excavation permits activated through 311, will not be activated and permittees will not have tow-away rights unless and until time and date stamped photos evidencing that signage was posted in the correct location a minimum of 72-hours prior to the time at which the parking restrictions are to become effective under the permit have been uploaded to the Bureau of Street-Use and Mapping Tow-Away Sign Database.

Printed on 100% post-consumer recycled stock

# Public Works Tow-Away Sign Activation and Photo Upload Process

EFFECTIVE DATE: January 1, 2017



**PERMITS AFFECTED:**  
 The tow-away sign activation and photo upload process change is applicable to all temporary occupancy permits and all other permits that include tow-away signage. **Excavation permits activated through 311 will not be impacted.**

**ACTIVATION AND PHOTO UPLOAD PROCESS:**  
**STEP 1:** Request a street space permit from Public Works.  
**STEP 2:** Once permit is approved a link for tow-away signs will be provided via email along with a link to the Bureau of Street-Use and Mapping tow-away sign database.

**STEP 3:** Print signs and post them at the permitted location every 20 feet no less than 72 hours in advance of the time the parking restrictions are to become effective.  
**STEP 4:** Click on the link provided in the confirmation email and take photos showing the placement of the signs.

**STEP 5:** Click submit and the photos will be submitted to Bureau of Street-Use and Mapping for review.

**STEP 6:** A confirmation email will be sent stating the photos were accepted, the permit is active, and tow-away rights are reserved.

**NOTE:** If photos are inadequate, you will receive a rejection email identifying the deficiencies to be corrected.

## PHOTO REQUIREMENT 1:

A scene-setting photo clearly showing the signs are posted in the permitted location every 20 feet.



## PHOTO REQUIREMENT 2:

A close-up photo of a tow-away sign that enables essential information on the sign to be confirmed.



END OF SECTION

## **SECTION 01 57 26 - TEMPORARY PROTECTION OF CATCH BASINS AND STORM DRAIN INLETS**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. Documenting and protecting catch basins and storm drain inlets as incidental work.

#### **1.2 RELATED SECTIONS**

- A. 01 71 33 - Protection of Adjacent Construction

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. Principal Project Company shall provide all labor and materials necessary to protect debris from entering the sewer system.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Principal Project Company shall photograph all catch basins within the limits of work. Each catch basin shall have at least two photos, one from the top view and one from the side view along the flow line. Refer to Section 01 71 33-1.6B.
- B. Principal Project Company shall notify the City of any clogged catch basin or storm water inlet immediately upon discovery.
  - 1. Call SFPUC Sewer Operations at 415-695-2096 to report catch basins or storm water inlets containing debris in the barrels and/or cast iron traps.

#### **3.2 DRAINAGE PROTECTION**

- A. Principal Project Company shall be responsible for protecting and keeping in operation all storm water inlets and catch basins throughout the entire Project Site for the duration of the Project until Final Acceptance.
- B. Principal Project Company shall take adequate measures to prevent the impairment of the operation of the sewer system. Principal Project Company shall prevent construction material, pavement, concrete, earth, paints, thinner, solvents, and other debris or toxic material from entering a sewer or sewer structure including surface flow collection system, such as catch basins and culverts.
- C. Prior to the final inspection and acceptance, Principal Project Company shall check all storm water inlets and catch basins within the project limits for debris.

**END OF SECTION**

## SECTION 01 71 33 - PROTECTION OF EXISTING FACILITIES AND ADJACENT CONSTRUCTION

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Section includes requirements for protection of existing facilities and improvements.

#### 1.2 RELATED SECTIONS

- A. Section 01 50 00 –Temporary Facilities and Controls

#### 1.3 EXISTING UTILITIES AND IMPROVEMENTS

- A. Principal Project Company shall:
  - 1. Notify Underground Service Alert (USA) prior to excavating in the public right of way areas so that Utility Owners may be advised of the work and may field mark or otherwise protect and warn Principal Project Company of their existing utility lines. Contact USA, telephone 1-800-227-2600, or refer to USA website for more information at: <http://www.usanorth.org/>.
    - a. Provide reasonable access and do not hinder or otherwise interfere with any company or agency having underground facilities in removing, relocating, or protecting such facilities.
  - 2. Verify the actual locations and depths of all utilities indicated or field marked. Make a sufficient number of exploratory excavations at Principal Project Company's expense of all utilities that may interfere with the work sufficiently in advance of construction to avoid possible delays to Principal Project Company's work.
    - a. Notify the City if such exploratory excavations show the utility location as shown or as marked to be in error.
    - b. When utility lines are encountered within the area of Principal Project Company's operations, notify the City and the Utility Owners sufficiently in advance for the necessary protection measures to be taken to prevent interruption of service or delay to Principal Project Company's operations.
- B. Principal Project Company shall protect all existing utilities, facilities, and structures, public or private, and will be held responsible for all damage caused by Principal Project Company not exercising due care to avoid such damage.
- C. Overhead Contact System: Work on or under the overhead contact system shall be performed with lines and feeders energized unless shutdown of the system is granted. Notify the SFMTA at least 10 days prior to performing work on energized overhead trolley wires, feeder circuits, or at substations, so that the SFMTA may arrange for any necessary clearances and inspections.
  - 1. Principal Project Company is alerted to the condition that overhead trolley wires and feeder cables distribute electrical energy at up to 700 Volts dc. Comply with the "High Voltage" provisions of the California Code of Regulations (Title 8, Division 1, Chapter 4, and Subchapter 5).
  - 2. Take precautions to avoid accidents and damage to the overhead contact wires, and riser and feeder cables.

- D. Survey Monuments and Bench Marks: Principal Project Company shall bring to the attention of the City all survey monuments, bench marks, property line marks and the like, encountered on the work. Survey monuments, bench marks, or other survey marks or points shall not be removed or disturbed until referenced or relocated by the City or other agency or party having an interest therein, and then removed only at the time and in the manner specifically approved by the City. Principal Project Company shall bring all City monument frames within the limits of the work to grade, with the express provision that any and all work associated with the removal and relocation of such frames, with their covers, shall be under the direct supervision of the City, and all such work shall be considered incidental work. The cost of re-establishing and resetting survey monuments, bench marks or other survey marks or points lost or destroyed through the carelessness or negligence of, or inadvertently by, Principal Project Company shall be at the sole expense of Principal Project Company.

#### **1.4 SAFEGUARDING OF EXISTING FACILITIES**

- A. Principal Project Company shall perform all work, including dewatering operations, in such a manner as to avoid damage to existing fire hydrants, power poles, lighting standards, and all other existing utilities, facilities, trees and vegetation, and structures. Principal Project Company shall be responsible for any damage due to its failure to exercise due care.
- B. Broken concrete, debris, etc., shall be immediately removed from the Project Site as Principal Project Company's property and shall be disposed of in a legal manner.
- C. Principal Project Company shall take adequate measures to prevent the impairment of the sewer system and to prevent construction material, pavement concrete, earth or other debris from entering a sewer, sewer structures, catch basin, or storm water inlet. Principal Project Company shall restore damaged utilities and facilities to a condition equal to or better than they were prior to such damage.

#### **1.5 RESTORATION OF PAVEMENT**

- A. General: All paved areas cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing undisturbed areas, except where specific resurfacing requirements are called for in the Contract Documents or in the permit requirements of the Governmental Entity issuing the permit. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.
- B. Conserving Distinctive Sidewalk Elements: For work located within landmark and/or conservation historic districts, all distinctive sidewalk elements such as brick surfacing, brick gutters, granite curbs, cobblestones, non-standard sidewalk scoring and streetscape elements that appear to be 45 years or older will be treated as potentially character defining features of their respective historic districts.
1. Principal Project Company shall avoid damaging and protect in place any features described above and shall notify the City of any feature not identified on the plans that is in conflict with the proposed work.
  2. Granite curb shall only be replaced with concrete curb on curved sections and as part of the curb ramp construction.
- C. Temporary Resurfacing: Whenever required by the Authorities Having Jurisdiction, place temporary surfacing promptly after backfilling and maintain such surfacing in a satisfactory condition for the period of time before proceeding with the final restoration.
- D. Permanent Resurfacing: Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in neat straight lines. All pavement restoration shall be constructed to finished grades compatible with undisturbed adjacent pavement.

- E. Restoration of Sidewalks or Driveways: Wherever sidewalks, curbs and gutters, or driveways have been removed for construction purposes, place suitable temporary sidewalks, curbs and gutters, or driveways promptly after backfilling and maintain them in satisfactory condition for the period of time before the final restoration is made.

#### **1.6 JOINT SURVEY TO ESTABLISH AUTHENTICITY OF POSSIBLE CLAIMS**

- A. Principal Project Company shall use such methods and shall take adequate precautions to prevent damage to existing buildings, structures, and other improvements during the prosecution of the work.
- B. Principal Project Company shall retain an experienced photographer to perform preconstruction examination and, if necessary, post-construction survey of all nearby structures, including photographs of all catch basins within the limit of work and nearby intersections. Each catch basin shall have at least two photos, one from the top view, and one from the side view along the gutter line. The survey shall be made using digital still photographs or digital videos saved to compact discs. The survey shall be considered incidental work and no separate payment will be made therefor.
- C. Prior to the commencement of Construction Work, the Principal Project Company shall arrange for a joint examination with the City of existing buildings, structures and other improvements in the vicinity of the Project Site, as applicable, which might be damaged by Principal Project Company's Construction Work.
- D. The examination of the exterior of existing buildings, structures, and other improvements located within 25 feet of the construction excavation will be made jointly by authorized representatives of Principal Project Company, the City, and property owners. The scope of each examination shall include, but is not limited to, recording of cracks in structures, settlement, leakage and the like.
- E. Records in duplicate of all observations shall be prepared and delivered by the photographer to the City and to Principal Project Company. The photographer may be required to attest to the fact that they took the pictures; however, in no case, will they determine the cause cracks, settlement, leakage, or like condition nor is photographer being retained for the purpose of engineering evaluation.
- F. The above records and photographs are intended for use as indisputable evidence in ascertaining the extent of any damage which may occur as a result of Principal Project Company's operations and are for the protection of the adjacent property owners, Principal Project Company, and the City, and will be a means of determining whether and to what extent damage, resulting from Principal Project Company operations, occurred during the Construction Work.

#### **PART 2 - PRODUCTS (NOT USED)**

#### **PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01 74 50 - MATERIAL REDUCTION AND RECOVERY PLAN

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This section governs the recovery of construction and demolition debris.
- B. Principal Project Company is responsible for complying with all aspects of this Section.
- C. On October 16, 2006, the San Francisco Mayor issued Executive Directive 06-05 requiring all construction contracts to divert 75% of construction and demolition debris from landfill disposal sites. This directive is supported by existing policies that require reuse, recycling, and management of construction and demolition debris. Some of these policies are described below.
- D. The City and County of San Francisco adopted an ordinance (No. 27-06) that creates a mandatory program to maximize the recovery of all construction and demolition debris.
  - 1. The Ordinance requires that mixed construction and demolition debris material be transported off-site by a Registered Transporter and taken to a Registered Facility.
  - 2. Material source separated at the job site shall be taken to a facility that reuses or recycles such material.
  - 3. This ordinance applies to all construction projects within the City and County of San Francisco, such as new construction, remodels, tenant improvements, additions, repairs, and full and partial demolitions.
  - 4. This ordinance prohibits any construction and demolition debris from being placed in trash or sent directly to a landfill.
- E. Principal Project Company shall perform all work and meet all requirements in this Section at no additional cost to the City.
- F. Related Requirements:
  - 1. Section 01 50 00 -Temporary Facilities and Controls
  - 2. Section 01 77 00 - Closeout Procedures

#### 1.2 REFERENCES

- A. Mayor's Executive Directive 06-05, Recycling and Resource Conservation, October 16, 2006.
- B. San Francisco Environment Code
  - 1. Chapter 5, Resource Conservation Ordinance.
  - 2. Chapter 7, Municipal Green Building Requirements.
  - 3. Chapter 14, Construction and Demolition Debris Recovery Ordinance.
  - 4. Chapter 16, Food Service and Packaging Waste Reduction Ordinance.
  - 5. Chapter 19, Mandatory Recycling and Compositing.

- C. 2022 California Green Building Standards Code, Title 24, Part 11 (CALGreen): <https://www.dgs.ca.gov/BSC/CALGreen>
- D. California Integrated Waste Management Act of 1989 (California Public Resources Code 40000 et. seq.) - Assembly Bill 939.
- E. U.S. Green Building Council's Leadership in Energy and Environmental Design
  - 1. LEED Reference Guide for Building Design and Construction version 4.0.
  - 2. LEED Reference Guide for Interior Design and Construction version 4.0
- F. Universal Waste information from the following website: [Universal Waste | Department of Toxic Substances Control \(ca.gov\)](https://www.dtsc.ca.gov/UniversalWaste/DepartmentofToxicSubstancesControl)
- G. Treated Wood Waste Fact Sheet from the following website: <https://dtsc.ca.gov/toxics-in-products/treated-wood-waste-information-and-fact-sheets/>
- H. San Francisco Board of Supervisors Resolution Nos. 530-04 and 679-02 establishing a zero waste goal.
- I. Food Service Waste Reduction Ordinance as set forth in San Francisco Environment Code Chapter 16.
- J. Refuse Collection and Disposal Ordinance, adopted November 8, 1932.

### 1.3 DEFINITIONS

- A. Alternative Daily Cover (ADC): Materials, other than soil, that have been approved by the California Department of Resources Recycling and Recovery ("CalRecycle") or a successor agency for use as a temporary overlay on an exposed landfill face.
- B. Beneficial Reuse: The reuse of material at a landfill that does not include ADC but does include use of materials for the following purposes: alternative intermediate cover; final cover foundation layer; liner operations layer; leachate and landfill gas collection system; construction fill; road base; wet weather operations pads and access roads; and, soil amendments for erosion control and landscaping. "Beneficial reuse" shall not include disposal of material at a landfill.
- C. City-owned Facility: Any building owned by the City and County of San Francisco. "City-owned Facility" includes City-owned facilities or portions thereof that the City leases to non-City entities.
- D. City Leasehold: A building or portion thereof owned by others where the City and County of San Francisco is a tenant.
- E. City's Waste Tracking Platform: An on-line waste tracking platform hosted by Green Halo Systems that can be found at <https://wastetracking.com/city/sfgov/> .
- F. Compostable: Any material that can be broken down into, or otherwise become part of, usable compost (e.g., soil-conditioning material) in a safe and timely manner as accepted in San Francisco's compostables collection program, such as food scraps, soiled paper and plant trimmings.
- G. Construction and Demolition Debris or C&D Debris: Building materials and solid waste generated from construction and demolition activities including, but not limited to, fully cured asphalt, concrete, brick, rock, soil, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, fixtures, plastic pipe, metals, tree stumps, and other vegetative matter resulting from land clearing and landscaping for construction,

deconstruction, demolition or land developments. This term does not include refuse regulated under the 1932 Refuse Collection and Disposal Initiative Ordinance or sections of the Municipal Code that implement the provisions of that ordinance or materials from the public right-of-way. Hazardous material, as defined in California Health and Safety Code section 25100, et seq., as amended, is not construction and demolition debris.

- H. Disposal: The final deposition of material at a legally operating permitted landfill that does not include beneficial reuse or at a permitted transformation facility. A legally operating, permitted landfill includes Class III landfills and inert fills. Disposal of inert materials at inert fills or inert backfill sites does not constitute recycling.
- I. Diversion: Use of material for any purpose other than disposal in a landfill or transformation facility, such as source reduction, reuse, recycling, and composting activities that do not result in material being disposed at permitted landfills and transformation facilities.
- J. Landfill: A facility that (i) accepts for disposal in or on land non-hazardous material such as household, commercial, and industrial waste, and waste generated during construction, remodeling, repair and demolition operations, and (ii) has a valid current solid waste facilities permit from the California Department of Resources Recycling and Recovery (CalRecycle).
- K. Mixed Construction and Demolition Debris Material or Mixed C&D Debris Material: Construction and demolition (C&D) debris or C&D debris that are combined on the project site and hauled away for sorting.
- L. Recover or Recovery: Any activity, including source reduction, deconstruction and salvaging, reuse, recycling, composting, or anaerobic digestion which causes materials to be recovered for use as a resource and diverted from disposal. Recovery shall not include engineered municipal solid waste conversion.
- M. Recyclable Material: Any material or product that can be sorted and reconstituted, for the purpose of using the altered form in the manufacture of a new product, as accepted in San Francisco's recycling collection program, such as paper, bottles and cans. Recycling does not include burning, incinerating, converting, or otherwise thermally destroying solid waste.
- N. Recycling: The process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste, and returning them to the economic mainstream in the form of raw material for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace. Recycling does not include burning, incinerating, or thermally destroying solid waste, nor shall it include disposal.
- O. Recycling Facility: An operation or person that collects and processes materials for recycling.
- P. Registered Transporter: Anyone who is hired to remove Mixed Construction and Demolition Debris Material from a construction and/or demolition site in San Francisco, using a vehicle with more than two axles or two tires per axle (such as a large pickup truck with four tires on the rear axle or three-axle dump trucks) and is hauling at least one (1) cubic yard of Mixed Construction and Demolition Debris Material and holds a valid registration from the City and County of San Francisco pursuant to Chapter 14 of the Environment Code. A Registered Transporter is obligated to take all mixed material only to a Registered Facility.
- Q. Registered Facility: Any facility that accepts Mixed Construction and Demolition Debris Material for processing and recycling and holds a valid registration issued by the City and County of San Francisco pursuant to Chapter 14 of the Environment Code.
- R. Reuse: Using an object or material again either for its original purpose or for a similar purpose without significantly altering the physical form of the object or material.

- S. Source Reduction: Any action which causes a net reduction in the generation of solid waste. Source reduction includes, but is not limited to, reducing the use of non-recyclable materials, replacing disposable materials and products with reusable materials and products, reducing packaging, reducing the amount of yard wastes generated, establishing garbage rate structures with incentives to reduce waste tonnage generated, and increasing the efficiency of the use of paper, cardboard, glass, metal, plastic, and other materials.
- T. Source Separated Materials: Materials that have been separated or kept separate from the solid waste stream, at the point of generation, for the purpose of reuse, recycling or composting in order to return them to the economic mainstream in the form of raw material for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace.
- U. Solid Waste: Materials designated as non-recyclable and discarded for the purposes of disposal.
- V. Universal Waste (CCR Title 22, Division 4.5, Chapter 23): Certain specified hazardous materials that are more common and pose a lower risk to people and the environment than other hazardous materials. Universal wastes are handled with reduced management requirements. Examples of universal waste: batteries, fluorescent tubes (lamps), electronic devices (cell phones, computers, televisions), cathode ray tubes (CRTs), mercury wastes (thermometers and toys), and non-empty aerosol cans.
- W. Treated Wood Waste (CCR Title 22, Division 4.5, Chapter 34): Dimensional lumber and other wood products which have been removed from service and were treated with preserving chemicals that protect the wood from insect attack and fungal decay during its use. Examples include fence posts, sill plates, landscape timbers, pilings, railroad ties, guardrails, and decking. Treated Wood Waste is a hazardous material in California and must be managed according to specific regulations.
- X. Waste Diversion: a management activity that disposes of waste through methods other than incineration or landfilling. Examples include reuse and recycling.

#### **1.4 GENERAL REQUIREMENTS**

- A. Recovery Goal: In order to meet the City's zero waste goal, the goal for this Project is to recover no less than 75% of the construction and demolition debris material from landfill disposal through waste prevention, reuse, and recycling. If a construction site contains Hazardous Materials and/or Universal Wastes, the 75% minimum recovery requirement shall pertain to all non-Hazardous Material. No construction and demolition debris material shall be disposed in garbage or taken directly to landfill.
- B. In order for construction and/or demolition debris to be considered hazardous, such as containing asbestos or lead, it shall be evaluated and determined to be hazardous by an independent professional such as a Cal/OSHA or DOSH Certified Asbestos Consultant. The waste determination and other verification shall be included with the C&D Debris Management Plan (refer to Paragraph 1.5 below), together with a list of hazardous materials found at the project site and plans for proper disposal.
- C. All Hazardous Materials, including Universal Wastes and Treated Wood Waste, shall be documented separately, and a summary of all manifests or other disposal documentation, including material description and weights, shall be provided to the City.
- D. Highest and Best Use: Principal Project Company shall employ the following hierarchy of highest and best use for handling construction and demolition debris as follows:
  1. Implement reduced material usage or reuse of materials before any recycling;

2. Implement recycling or reuse of source separated material before any recycling of mixed construction and demolition debris material;
3. Implement recycling of mixed construction and demolition debris material before all other forms of disposal.

E. Recycling Requirements:

1. Source Separated Materials: Principal Project Company shall develop and implement procedures for source-separation, to the greatest extent feasible, of the following types of recyclable or reusable materials:
  - a. Asphalt.
  - b. Acoustical ceiling tiles.
  - c. Bricks, stone(s), granite, and other finished stone-type materials.
  - d. Carpet and padding.
  - e. Concrete, concrete block, slump stone (decorative concrete block).
  - f. Corrugated cardboard.
  - g. Dimensional lumber and beams.
  - h. Fixtures, hardware, doors, and windows.
  - i. Metal, ferrous and non-ferrous.
  - j. Mixed Inerts.
  - k. Rigid plastic.
  - l. Soil/dirt/rock.
  - m. Trees, Landscape Debris, cleared vegetation and cut-off or other wood scraps.
  - n. Wall board, gypsum sheetrock.
2. Mixed Construction & Demolition Debris Material:
  - a. For projects within the legal and geographical boundaries of the City and County of San Francisco, mixed C&D debris material must be taken to a Registered Facility by a Registered Transporter, per Environment Code 14. Registered Facilities Recovery (Diversion) Rates are listed at: <https://sfenvironment.org/construction-demolition-resources>
  - b. For projects outside San Francisco, if mixed C&D debris material is taken to a non-Registered Facility the diversion rate approved by the local jurisdiction shall be used, and official documentation of the diversion rate approved by the local jurisdiction must be provided by Principal Project Company. If a facility does not have a locally approved recovery/recycling rate, the recovery (diversion) rate is calculated as zero.

3. Handling of Recyclable Materials:
    - a. Principal Project Company shall assure that recyclable or reusable materials be free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process. Principal Project Company shall clean materials that are contaminated before placing it in collection containers.
    - b. Principal Project Company shall arrange for collection of reusable and recyclable materials by delivery to the appropriate reuse and/or recycling centers for purposes of reuse and/or recycling.
    - c. All mixed C&D debris material from projects in San Francisco must be taken to a Registered Facility authorized to process the material, and it must be hauled by a Registered Transporter. For the lists of Registered Facilities and Registered Transporters refer to the website: <https://sfenvironment.org/construction-demolition-resources>
  4. No construction and demolition debris shall be burned, buried or otherwise disposed of on the project site.
- F. Principal Project Company is prohibited from sending any construction and demolition debris directly to landfill or to any facility that would incinerate or otherwise process such debris using high temperature technology without submitting a written request to and receiving approval from the San Francisco Department of the Environment; see Form A and Form B.
- G. Requirements only for construction contracts within the legal and geographical boundaries of the City and County of San Francisco:
1. Registered Transporters and Registered Facilities: Only Registered Transporters can remove mixed C&D debris material and they must take this material to a Registered Facility. Source separated material at the job site shall be taken to the appropriate recycling or reuse facility.
    - a. For a list of Registered Facilities and Registered Transporters refer to the website: <https://sfenvironment.org/construction-demolition-resources>
  2. Full Demolition Requirements: Principal Project Company conducting full demolition of an existing structure must submit a Demolition Debris Recovery Plan (DDRP) to the San Francisco Environment Department (SFED).
    - a. The DDRP must demonstrate a minimum of 75% recovery from landfill of demolition debris, including materials source separated for reuse or recycling.
    - b. The DDRP must be submitted to and approved by SFED before the Department of Building Inspection will issue a Full Demolition Permit.
    - c. This requirement does not apply to City construction contracts outside of the legal and geographical boundaries of the City and County of San Francisco.
    - d. The DDRP is available at the following website: <https://sfenvironment.org/construction-demolition-resources>
- H. Mixed C&D debris material from projects outside the legal and geographical boundaries of the City and County of San Francisco must be taken to a Recycling Facility that processes the material to achieve maximum recycling. If the material is taken to a facility not registered with San Francisco, the local jurisdiction's recycling rate for that facility shall be used provided official documentation from the local jurisdiction is attached to all submittals as required in Paragraphs

1.5, 1.6 and 1.7 below. If a facility does not have a local approved recycling rate, the diversion rate is calculated as zero.

I. Universal Wastes: Principal Project Company shall handle and dispose of all hazardous material, including Universal Waste in accordance with the requirements of the California Department of Toxic Substances Control (DTSC). Refer to DTSC website: [www.dtsc.ca.gov](http://www.dtsc.ca.gov). In general, Universal Waste may not be discarded in solid waste landfills or with non-Hazardous Materials collected for recycling or composting. Principal Project Company shall comply with all Hazardous Material regulations, including, but not limited to, the following:

1. Universal Wastes shall be stored in containers so that they do not spill, leak, break, or are released into the environment.
2. Label or mark universal wastes, or their containers, to identify their types.
3. Send all universal waste to a facility authorized to collect, recycle or dispose of universal waste.
4. Do not dispose of universal waste in the trash.
5. Do not accumulate more than 5,000 kilograms of Universal Waste at any one time.
6. Train employees in proper Universal Waste management including handling, packaging, storing and labeling the Universal Waste, as well as how to respond to releases. This training may be accomplished by simply giving employees written instructions about Universal Waste.
7. Keep record of all shipments and receipts of Universal Waste for three years.

J. Treated Wood Waste: For complete information on handling and disposal of Treated Wood Waste (TWW), refer to the fact sheet available from the DTSC website. For incidental TWW wastes generated during construction, Principal Project Company shall comply with the following minimum requirements:

1. Keep TWW segregated from other materials.
2. Store no more than 1,000 pounds of TWW for no longer than 30 days. In the event that Principal Project Company stores more than 1,000 pounds of TWW or stores TWW for more than 30 days, Principal Project Company shall comply with additional requirements for routine generators of TWW. Refer to DTSC fact sheet.
3. Label all TWW bundle/shipments with the following information:

<p style="text-align: center;"><b>TREATED WOOD WASTE – Do not burn or scavenge.</b></p> <p><b>TWW Handler</b> <b>Name:</b> _____ <b>Address:</b> _____ <b>Accumulation Date:</b> _____</p>
--

4. Take TWW to an authorized TWW facility. See the listings at the end of the factsheet for information on facilities who have been authorized to accept TWW in California.
5. Keep records of all shipments of TWW for three years.

- K. Waste Reduction: Principal Project Company shall implement waste reduction measures, including, but not limited to, the following:
1. Eliminating the procurement of unneeded supplies;
  2. Reduce waste by printing and copying double-sided;
  3. Submit all submittals, reports, and forms in electronic format (PDF);
  4. Fully participate in available and required recycling and composting programs; and
  5. Purchase products made with recycled content such as paper and recycled aggregate.

L. LEED:

1. Principal Project Company shall comply with the requirements of LEED version 4.0 MR Prerequisite Construction and Demolition Waste Management Planning.
2. The 75% minimum recovery requirement cannot include any alternate daily cover (ADC) in order to meet the requirements of LEED version 4.0 MR Credit Construction and Demolition Waste Management to earn the project 2 points.
3. Principal Project Company shall submit the following items in electronic format by uploading to the City's Waste Tracking Platform and in accordance with Paragraphs 1.5, 1.6, and 1.7 below:
  - a. Material Reduction and Recovery Plan.
  - b. Material Reduction and Recovery Monthly Summary of Recovery (Diversion) and supporting documentation.
  - c. Material Reduction and Recovery Final Report.

**1.5 MATERIAL REDUCTION AND RECOVERY PLAN**

- A. Principal Project Company shall comply with the requirements under this Paragraph 1.5 for the Project.
- B. Before commencement of the D&C Work at the Project Site, Principal Project Company shall prepare a Material Reduction and Recovery Plan (MRRP) to be discussed with the City. To prepare the MRRP, Principal Project Company shall conduct a site assessment to estimate the types and quantities of materials that will be generated by construction and/or demolition at the site and which materials are anticipated to be feasible and practical for reuse and recycling. .
- C. Principal Project Company shall schedule a meeting with the City to discuss its proposed MRRP to develop a mutual understanding regarding the City's reuse and recycling policies and goals and their application to the Project. Principal Project Company must manage all Construction Workg and demolition debris to meet a minimum recovery rate of 75%.
1. The MRRP will be used as a submittal for compliance with the waste management plan requirements of LEED version 4.0 MR Prerequisite Construction and Demolition Waste Management Planning. The MRRP shall include any and all required information to meet the LEED prerequisite.
- D. Principal Project Company shall obtain tonnage estimates for all construction and demolition debris from all Principal Project Companys and compile data from all Principal Project Companys into the MRRP. The MRRP shall include, but not be limited to, the following:

1. Principal Project Company's information and Project identification.
  2. Procedures to be used for debris management.
  3. A list of the materials and estimated quantities to be reused or recycled.
  4. The names, locations, and permit or license, as applicable, of recycling and reuse facilities and Registered Facilities (for mixed C&D debris material) that Principal Project Company plans to use for the Project.
  5. Procedures for source separation for the materials listed in subparagraph 1.4E "Recycling Requirements" of this Section.
  6. Source Reduction: Describe any project practices that will reduce waste at the source, such as requiring vendors to deliver materials in reusable packaging.
  7. On-site Processing: Describe procedures in which materials are reused on-site, such as grinding materials for use on-site, or reuse of lumber for concrete frames, etc.
  8. Procedures to educate and train all employees and Principal Project Companys on recycling and reuse procedures to be used at the jobsite.
- E. Principal Project Company shall use the City's Waste Tracking Platform to provide all MRRPs and related reports for the Project. The City will create a Green Halo project account for use by Principal Project Company. Principal Project Company shall then use this account to prepare and submit the initial MMRP following these steps:
1. Register the Project and create a project tracking number
  2. Provide the MRRP (<https://wastetracking.com/city/sfgov/>).
  3. Coordinate the MRRP with the LEED Construction and Demolition Debris Management Plan (if the Project is pursuing a LEED certification) requirements.
  4. Comply with the City and County of San Francisco's requirement for a minimum 75% recovery rate from landfill.
  5. Describe Principal Project Company's approach to managing the Project's construction and demolition debris.
  6. When complete, click "Submit" for review and approval.
- F. The MRRP is subject to approval by the City. Principal Project Company shall revise and resubmit the MRRP as required by the City.
- G. Review of Principal Project Company's MRRP shall not relieve Principal Project Company of responsibility for compliance with applicable laws and regulations governing control and disposal of solid waste or other pollutants.

## **1.6 MONTHLY UPDATES OF MATERIAL RECOVERY**

- A. Principal Project Company shall provide monthly updates through the City's Waste Tracking Platform by uploading new information, quantifying the construction and demolition debris generated and reused, or recycled. Principal Project Company shall upload information regarding transporter method, recovered materials, facilities used, and weight tickets generated as well as any other applicable supporting files and additional requirements.

## **1.7 MATERIAL REDUCTION AND RECOVERY FINAL REPORT**

- A. Upon Final Acceptance of the Project, Principal Project Company shall submit a Final Recovery Report to the City's Waste Tracking Platform showing weight of all construction and demolition debris material recovered for the entire project and the overall recovery rate achieved.
- B. The Final Recovery Report shall be prepared into one plan/report by Principal Project Company with data from all Principal Project Companies and submitted to the City.
  - 1. The Final Recovery Report shall be used as a submittal for compliance with the final waste report requirements of LEED version 4.0 MR Prerequisite Construction and Demolition Waste Management Planning. The Final Recovery Report shall include any and all required information to meet the LEED prerequisite.

## **1.8 JOB SITE ADMINISTRATION**

- A. Principal Project Company shall review the environmental goals of the Project with Principal Project Companies of all tiers.
- B. Principal Project Company shall make a proactive effort to increase awareness of these goals and ensure full compliance to the MRRP and LEED Construction and Demolition Debris Management Plan among Principal Project Company's employees, contractors, and other workers.
- C. Principal Project Company shall communicate the presence of demolition debris which is Hazardous Material to all workers on the job site and shall establish and clearly identify Hazardous Material storage areas. Principal Project Company shall discuss practices and alternatives to minimize worker exposure to potentially harmful substances expected to be encountered on the job site.
- D. Principal Project Company shall provide green, blue and black refuse bins and appropriate signs for all temporary field offices to separate recyclable and compostable materials from the trash and subscribe to adequate collection services. To subscribe to these services, contact Recology San Francisco at 415-330-1300

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 02 41 16 - STRUCTURE DEMOLITION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Demolition and removal of existing building.
  - 2. Removing below-grade construction.
  - 3. Disconnecting, capping or sealing, and removing site utilities.
  - 4. Salvage of existing items
  - 5. Principal Project Company's Demolition Plan.
- B. Related Requirements:
  - 1. Temporary Facilities and Controls: Section 01 50 00; for temporary construction, protection facilities, and environmental-protection measures for building demolition operations.
  - 2. Information Sheet No. S-04 dated June 22, 2015 on the subject of Demolition Permits as published by the San Francisco Department of Building Inspection (SFDBI).

#### 1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or recycled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to City as directed.
- C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or recycled.

#### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Demolition Conference: Conduct conference at Project Site. Review methods and procedures related to building demolition including, but not limited to, the following:
  - 1. Inspect and discuss condition of construction to be demolished.
  - 2. Review structural load limitations of existing structures.
  - 3. Review and finalize Demolition Plan and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review and finalize protection requirements.

#### 1.4 MATERIAL SALVAGE

- A. The City will hand over the site in the Leave-Behind Condition.

- B. Any items of interest or value to City that may be encountered during building demolition and are noted in this Agreement shall be salvaged and remain City's property.
- C. Carefully remove and salvage items or objects in a manner to prevent damage and deliver promptly to City unless otherwise specified.
- D. Coordinate with City any special procedures for removal and salvage.

#### **1.5 ACTION SUBMITTALS**

- A. Demolition Plan as specified below.

#### **1.6 INFORMATIONAL SUBMITTALS**

- A. Items enumerated under Part C of SFDBI Information Sheet No. S-04.
- B. Qualification Data: For demolition firm.
- C. Inventory: After building demolition is complete, submit a list of items that have been removed and salvaged.
- D. Pre-demolition photographs.
- E. Sustainable Design (LEED):
  - 1. General:
    - a. Submit information necessary to establish and document compliance with the LEED Certification goals for this Project.
    - b. Sustainable design submittals are in addition to other submittals.
    - c. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance.
  - 2. The following information shall be provided:
    - a. Materials and Resources Credit for Construction and Demolition Waste Management: Comply with Section 01 74 50 "Material Reduction and Recovery Plan."

#### **1.7 DEMOLITION PLAN**

- A. The Principal Project Company shall submit a complete **Demolition Plan** detailing procedures and sequence for removing the existing structures including all features necessary to remove the structure in a safe and controlled manner to insure stability of the structure at any given time.
- B. Thoroughly investigate the condition of the existing structures to be removed before proceeding with the Demolition Plan.
- C. The Demolition Plan shall consist of the following:
  - 1. Detailed sequence of demolition and removal work, with starting and ending dates for each activity.
  - 2. Interruption of utility services.

3. Coordination for shutoff, capping, and continuation of utility services.
  4. Details and locations of shields or other protective measures in sufficient numbers to ensure that people, property and improvements will not be endangered.
  5. All other information as required and described in SFDBI Information Sheet No. S-04.
- D. The Principal Project Company's Engineer of Record shall be present at the site as required when removal operations are in progress. Should an unplanned event occur, the Engineer of Record shall report immediately the procedure of operation to correct or remedy the occurrence. The Engineer of Record shall report in writing within 24 hours of the event the details of the event and the procedure for correction. In addition, the Engineer of Record shall include proposed procedures to eliminate similar events in the future.

#### **1.8 QUALITY ASSURANCE**

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Regulatory Requirements: Comply with applicable Law.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.

#### **1.9 PRECONSTRUCTION PHOTOGRAPHS**

- A. Before commencement of work on the site, take digital photographs of the surrounding properties from different vantage points. Coordinate vantage point locations with the City's Authorized Representative.
- B. Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as cracking or other damage caused by the building demolition operations.
- C. Photographs shall:
  1. Provide factual presentation.
  2. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- B. Digital File:
  3. File Format: Joint Photographic Experts Group (JPEG), unless otherwise directed by Architect.
  4. Minimum Resolution: 12 mega pixels.
  5. Provide digital date/time imprint on each picture.
  6. Digital images shall be exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- D. Deliver on USB flash drive or other digital means to City before work onsite begins.
- E. Prints are not required.

#### **1.10 FIELD CONDITIONS**

- A. Building to be demolished will be vacated and their use discontinued before start of Work.

- B. Promptly repair damage caused by demolition operations to existing adjacent structures and facilities to remain at no cost to the City. If the existing finished surface of the paving of City streets is damaged, it shall be repaired to the satisfaction of the City. Corrective work shall be at the Principal Project Company's expense.
- C. Hazardous Materials present in building and structures to be demolished shall be abated by the Principal Project Company under this Contract.

#### **1.11 TRAFFIC**

- A. Conduct demolition operations and the removal of debris to ensure minimum interference with streets, walks, and adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.
- B. Existing pedestrian sidewalks shall be kept open at all times unless otherwise approved by the City.

#### **1.12 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE**

- A. If street closure is required, comply with the provisions of Section 12, "Construction Area Traffic Control Devices," of the State of California Caltrans Standard Specifications.
- B. If any component in the traffic control system is displaced or ceases to operate or function from any cause during the progress of the work, the PPC shall immediately repair said component to its original condition or replace said component and shall restore the component to its original location.
- C. When a lane closure is made for work periods only, at the end of each work period, all components of the traffic control system, except portable delineators adjacent to the traveled way, shall be removed.

#### **1.13 UTILITY SERVICES**

- A. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
- B. Do not interrupt existing utilities serving adjacent properties.

### **PART 2 - PRODUCTS (NOT USED)**

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Conduct a pre-construction survey of existing conditions and correlate the survey with requirements indicated to determine extent of building demolition and existing conditions of adjacent construction to remain. Survey shall be documented with the pre-construction photographs as specified.
- B. Inventory and record the condition of items to be removed and salvaged.
- C. When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to City.

- D. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

### **3.2 PREPARATION**

- A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures to be demolished.
  - 1. Arrange to shut off indicated utilities with utility companies.
  - 2. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of demolition.

### **3.3 PROTECTION**

- A. Existing Facilities: Protect adjacent walkways, buildings, and other facilities during demolition operations.
- B. Temporary Protection: Erect temporary protection, such as fences and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 01 50 00 "Temporary Facilities and Controls."
  - 1. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 2. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
  - 3. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.

### **3.4 DEMOLITION**

- A. General: Demolish indicated existing buildings and structures completely. Use methods required to complete the Work within limitations of governing regulations.
- B. Do not use cutting torches until work area is cleared of flammable materials. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
  - 1. Maintain adequate ventilation when using cutting torches.
  - 2. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- C. Perform surveys as the Work progresses to detect hazards that may result from building demolition activities.

- D. Conduct building demolition and debris-removal operations to ensure minimum interference with City streets, walks, and other adjacent occupied and used facilities.
- E. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as flooding, and pollution.
- F. Below-Grade Construction: Demolish foundation walls and other below-grade construction. Remove below-grade construction, including basements, foundation walls, and footings, completely.
- G. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures.

### **3.5 EXPLOSIVE DEMOLITION**

- A. Explosives: Use of explosives is not permitted.

### **3.6 SALVAGED ITEMS**

- A. Where required by this Agreement and when so directed to be salvaged and/or reused, remove item to be salvaged in the most careful manner possible to avoid damage; and, if damaged, such items shall be restored to conditions satisfactory to the City.
- B. Materials to be removed and not reused or salvaged shall become the property of the Principal Project Company, who shall be responsible for their timely removal from the Project Site and their legal disposal.
- C. Removed and Salvaged Items: Comply with the following:
  - 1. Clean salvaged items of dirt and demolition debris.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Store items in a secure area until delivery to City.
  - 4. Transport items to City as instructed.
  - 5. Protect items from damage during transport and storage.
- D. Coordinate re-installation of salvaged items into new work with Project Schedule to assure installation in the Project.

### **3.7 SITE RESTORATION**

- A. Rough grade below-grade areas ready for further excavation or new construction.
- B. Completely fill voids resulting from building demolition operations that will not be required by new construction with satisfactory soil materials according to backfill requirements and recommendations of the Geotechnical Engineer.

### **3.8 REPAIRS**

- A. Promptly repair damage to adjacent construction caused by building demolition operations.
- B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

- C. Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

### **3.9 RECYCLING DEMOLISHED MATERIALS**

- A. General: Separate recyclable demolished materials from other demolished materials to the maximum extent possible. Separate recyclable materials by type.
- B. Provide containers or other storage method for controlling recyclable materials until they are removed from Project site.
- C. Transport recyclable materials off the Project Site and legally dispose of them as specified in Section 01 74 50 (Material Reduction and Recovery Plan).

### **3.10 DISPOSAL OF DEMOLISHED MATERIALS**

- A. Except for items or materials indicated to be recycled, salvaged, or otherwise indicated to remain City's property, remove demolished materials from Project site and legally dispose of them as specified in Section 01 74 50 (Material Reduction and Recovery Plan).
- B. Do not allow demolished materials to accumulate on-site.
- C. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- D. Do not burn demolished materials.

### **3.11 CLEANING**

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

**END OF SECTION**

## SECTION 02 80 13 - HAZARDOUS BUILDING MATERIALS – REMEDIATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Many of the materials and items of equipment used to construct the improvements and facilities at the Project Site contain materials known to the State of California to be either carcinogenic or reproductive toxins. Such hazards include but are not limited to asbestos-containing materials (that are not NOA), lead based paints, lead-containing materials and demolition associated with Hazardous Materials.
- B. This Section includes hazardous and toxic materials precautions, general requirements, and handling procedures as required to the work and existing conditions of the project. This Section includes requirements and procedures to be performed by Principal Project Company for the handling, removal, abatement, remediation, transportation and disposal of hazardous building materials.
- C. Hazardous Materials removal shall be conducted as per the construction phasing and staging described as specified in the Contract Documents.
- D. Principal Project Company shall perform all Hazardous Materials remediation work under the Contract Documents as described herein and in Section 01 35 44 Hazardous Building Materials – Scope of Work and Section 7.7 of the Agreement.

#### 1.2 RELATED DOCUMENTS AND SECTIONS

- A. Section 01 35 44 Hazardous Building Materials - Scope of Work

#### 1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. E84: "Standard Test Method for Surface Burning Characteristics of Building Materials."
  - 2. E849: "Practice for Safety and Health Requirements Relating to Occupational Exposure to Asbestos."
  - 3. E119: "Standard Method for Fire Tests of Building Construction and Materials"
- B. American National Standards Institute (ANSI):
  - 1. Z41.1-1967: "Men's Safety-Toe Footwear."
  - 2. Z86.1: "Commodity Specification for Air."
  - 3. Z87.1-2020: "American National Standard for Occupational and Educational Personal Eye and Face Protection Devices."
  - 4. Z89.1: "Requirements for Industrial Head Protection."
  - 5. Z9.2-2018: "Fundamentals Governing the Design and Operation of Local Exhaust Ventilation (LEV) Systems"
  - 6. Z88.2-1992: "American National Standard for Respiratory Protection."
  - 7. Z88.6: "Respiratory Protection - Respirator Use Physical Qualifications for Personnel."

- C. National Fire Protection Association (NFPA):
  - 1. Standard 701: "Standard Methods of Fire Tests for Flame Propagation of Textiles and Films."
  - 2. Standard 10: "Standard for Portable Fire Extinguishers."
  - 3. Standard 70: "National Electric Code."
  
- D. California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA):
  - 1. Title 8 California Code of Regulations (8 CCR) Section 5144 - Respiratory Protection.
  - 2. Title 8 California Code of Regulations (8 CCR) Section 1532.1 - Lead in Construction Standard.
  - 3. Title 8 California Code of Regulations (8 CCR), Article 4, Section 1529 - Asbestos.
  - 4. Title 8 California Code of Regulations (8 CCR) Sections 3203 and 1509 - Injury and Illness Prevention Program.
  - 5. Title 8 California Code of Regulations (8 CCR), Article 110, Section 5208 – Asbestos, Appendix F.
  - 6. Title 8 California Code of Regulations (8 CCR), Article 2.5, Section 341.6 for employer registration when disturbing more than 100 sq. ft. of ACCM.
  - 7. Title 8 California Code of Regulations (8 CCR), Section 1537: Welding, Cutting, and Heating of Coated Materials.
  
- E. California Department of Public Health Title 17 California Code of Regulations (17 CCR) Sections 35001-36100 for Accreditation, Certification, and Work Practices for Lead-Based Paint and Lead Hazards.
  
- F. U.S. Department of Housing and Urban Development (HUD): Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing," referred to as the "HUD Guidelines."

#### **1.4 DEFINITIONS**

- A. Activity Class/Category - Lead: Lead hazard designations assigned to work activities that involve lead-containing materials. Activities, which fall into Classes 1 through 3, including as examples the operations defined below, are required to assume the following personal airborne exposure levels, unless otherwise demonstrated.

<b>Lead Hazard Trigger Activities</b>	<b>Work Activity</b>
Trigger Task, Activity 1 Exposure Less than 500 micrograms/m <sup>3</sup>	Surface clean-up of lead-containing dust or debris less than 15,000 microgram/square feet Spray painting with lead-based paints Manual demolition of structures (e.g. drywall, plaster, etc.) Manual sanding, grinding, needle gunning, chiseling, hammering, wire brushing, milling or scraping of lead-based coatings Heat gun removal of surface coating power tool Power tool cleaning with dust collection system
Trigger Task, Activity 2 Exposure 500 micrograms/m <sup>3</sup> or greater but less than 2500 micrograms/m <sup>3</sup>	Using lead mortar Lead burning Rivet busting Power tool cleaning without dust collection systems Clean-up of dry abrasive Abrasive blasting enclosure movement and removal
Trigger Task, Activity 3 Exposure 2,500 micrograms /m <sup>3</sup> or greater	Abrasive blasting of coated surfaces Welding on coated surfaces Torching or cutting of coated surfaces Torch burning of coated surfaces

B. Asbestos Work Class: Activities for removing asbestos materials by categories as follows:

<b>Asbestos Activity Class/Category</b>	<b>Work Activity</b>
Work Class I	Activity involving removal of Thermal System Insulation (TSI) and surfacing Asbestos-Containing Materials (ACM) or friable Presumed – Asbestos Containing Materials (PACM).
Work Class II	Activity involving removal of ACM which is not TSI or surfacing material, including, but not limited to, wallboard, floor tiles and sheeting, roofing and siding shingles, naturally occurring asbestos (soil, rock, etc.) and construction mastics. Note also that Class II materials that cannot be removed intact, such as soil, require usage of respiratory protection at all times, regardless of personal monitoring data showing compliance to PEL and EL.
Work Class III	Repair and maintenance operations where TSI or surfacing is likely to be disturbed, which fits within one standard glove bag or waste bag.
Work Class IV	Maintenance and custodial activities during which employees contact but do not disturb PACM or ACM and activities to clean up dust, waste bag and debris resulting from Work Class I, II, and III activities.
Unclassified	Any activities dealing with materials containing detectable but <1.0 % asbestos.

- C. Certified Lead Worker: includes those who do lead-related Construction Work activities on the Project Site under the directions of a Certified Lead Supervisor, including:
  - 1. Removal, disposal or abatement of loose and peeling lead-based paints as defined by CDPH, including scraping, demolition or other Cal/OSHA Activity 1 through 3 work as defined above.
  - 2. Removal or repair of lead plumbing.
  - 3. Repainting or general construction on surfaces painted with lead-based paints.
    - a. Removal, enclosing or covering of lead-contaminated soils.
  - 4. Exemption: renovations, remodeling, painting, operations and maintenance work or other activities listed above that are considered to be interim controls, or lasting less than 20 years, may be completed by workers satisfying Cal/OSHA's asbestos awareness training requirements only.
- D. Certified Lead Supervisor: includes those who supervise daily work activities on a lead-related construction site, as well as supervision of repainting or general construction performed on surfaces with lead-based paints where abatement is designed to permanently reduce or eliminate lead hazards for public (non-industrial) buildings or to last more than 20 years. The Certified Lead Supervisor shall oversee the Certified Lead Workers, enforce safe work practices, and schedule and coordinate work site activities with the building occupants and other contractors and consultants.
- E. Containment: as defined by the California Department of Public Health includes any system, process or barrier used to contain lead hazards in a work area, including plastic sheeting, wet scraping, and other lead-safe work practices as described in the HUD Guidelines, Chapter 8.
- F. Remediation: abatement, removal, control or containment of hazardous or toxic material(s).

## 1.5 SUBMITTALS

- A. Principal Project Company shall submit copies of any notice of safety and environmental violations received from the regulatory agencies that they may have received in the last 20 years in the USA.
- B. Principal Project Company shall submit copies all the minimum qualification licensing requirements required under Section 01 35 44 Hazardous Building Materials - Scope of Work.
- C. Principal Project Company shall submit proof of its five (5) years of Hazardous Materials abatement and/or removal experience asked for in Section 01 35 44 Hazardous Building Materials - Scope of Work.
- D. Principal Project Company or its Hazardous Materials abatement Principal Project Company shall submit proof of its environmental training requirements asked for in Section 01 35 44 Hazardous Building Materials - Scope of Work.
- E. BAAQMD-issued Approval Letter for Asbestos Demolition. "[Job Number]". For all demolition of buildings and structures, regardless of whether asbestos is present or not, Principal Project Company shall submit a copy of the BAAQMD-issued Approval Letter for Asbestos for Demolition, "[Job Number]" to the SAR group within the City Public Works Department prior to the start of demolition. To obtain this letter, Principal Project Company shall submit an Asbestos Demolition Notification to the BAAQMD through their web-based Online Asbestos Notification System (<http://learn.baaqmd.gov/course/view.php?id=4#section-5>) at least ten (10) business days prior to the start of any demolition.

- F. As per Section 01 35 44 Hazardous Building Materials - Scope of Work, Principal Project Company shall submit a Hazardous Materials Management Plan (HMMP) with the following documentation listed below. The HMMP shall be submitted no later than ten Days before start of Work at the Project Site or NTP2, whichever is earlier and before commencement of demolition activities. **No hazardous materials work may start without the HMMP reviewed and approved by the SAR group within the City Public Works Department.**
- G. The Hazardous Materials Management Plan (HMMP) is Principal Project Company's comprehensive plan for the management of Hazardous Materials encountered during the Work for the Project. The HMMP shall include the following Plans and information:
1. An asbestos abatement work plan.
  2. A lead hazard/removal control plan.
  3. A waste management plan (WMP).
  4. Information about Principal Project Company's designated Project safety representative (PSR) as per Section 01 35 44 Building Related Hazardous Materials - Scope of Work, and Section 01 35 45 Health and Safety Criteria. Include his/her training certification, qualifications; his/her name, phone number; fax number, and pager number.
  5. Management spill procedures in the event of asbestos or any hazardous materials release or any event that may require modification or abridgment of site control and decontamination procedures.
  6. Intended methods of compliance for hazardous materials handling work, including description of engineering controls, personal protective equipment as well as compliance monitoring as applicable.
  7. Schedule and sequence of work for all hazardous materials work.
  8. Worksite layout diagram: Detailing location of each regulated area and construction of each containment identifying location of each decontamination units, fire extinguishers and emergency exits.
  9. A copy of the Site-Specific Hazard Communication Plan in accordance with federal and California OSHA requirements.
  10. Copies of required licenses, certifications and notifications to handle and control hazardous materials.
- H. As part of Principal Project Company's HMMP, Principal Project Company shall submit a Waste Management Plan (WMP). The WMP is Principal Project Company's comprehensive plan for waste management of hazardous and non-hazardous waste generated during the remediation work of this project. The WMP shall include the following:
1. Information about the designated persons who will implement the plan. Include his/her name, phone number, and his/her roles and responsibilities for implementing the plan.
  2. Waste segregation procedures for waste generated from demolition debris, abatement, and stabilization.
  3. Proposed location of locked dumpster, if applicable.
  4. Sampling plan and protocol for waste characterization in accordance with 22 CCR §66262, et. seq.

5. Handling, segregation, and waste load-out procedures for hazardous and non-hazardous waste, including TSCA-regulated waste. Include diagrams showing regulated areas for waste segregation, load-out stations, paths of travel for off-hauls of waste, and engineering controls to prevent air pollution and potential exposures to airborne contaminants.
  6. Waste hauler identification, information, 24-hour contact number, and copy of licenses.
  7. Asbestos and lead waste disposal sites identification. Include name, address, 24-hour contact number.
- I. For Asbestos Containing Construction Materials (ACCM), or Asbestos Containing Material (ACM), as applicable by regulation, and as part of the Hazardous Materials Management Plan (HMMP) Principal Project Company shall submit the following, but not limited to:
1. Asbestos Pre-job Submittals:
    - a. Proof of current asbestos contractor's license issued by the California Principal Project Company's State License Board.
    - b. Proof of current California Department of Industrial Relations (CA-DOSH or Cal/OSHA) asbestos contractor's registration certification.
    - c. Valid and current Bay Area Air Quality Management District (BAAQMD) notification for the Project (as applicable).
    - d. Cal/OSHA 24-hour notice per 8 CCR 1529.
    - e. Worker documentation, including:
      - 1) Current AHERA training certification - supervisor/competent person
      - 2) Current AHERA training certifications for workers.
      - 3) Respiratory fit test records within past 12 months.
      - 4) Annual medical examination approvals for respirator use.
    - f. Written asbestos abatement work plan and schedule with the sequence of work.
    - g. Material Safety Data Sheets.
    - h. Emergency phone numbers, pagers and email addresses.
    - i. Aerosol Challenge Testing Certification
      - 1) Aerosol challenge testing using dioctylphthalate (DOP, also known as Bis(2-ethylhexyl) phthalate) or an approved alternative is required for all equipment fitted with High Efficiency Particulate Air (HEPA) filters including negative pressure units, air machines, fan units and vacuum cleaners.
      - 2) Prior to use, testing must be performed on site:
        - (a) Whenever equipment enters the site.
        - (b) After replacement of HEPA filters or any other significant repairs or alterations.

- 3) Equipment which fails testing shall be marked and promptly removed from the site.
  - 4) Equipment which has passed testing shall be marked with a unique identifier number and the date of the testing. The identifier number shall be reflected on all testing documentation.
  - 5) Recognized alternatives to DOP include, but are not limited to 4 centistoke (4 cSt) viscosity grade polyalphaolefin (POA) fluids such as Emery 3004 POA and selected mineral oils. Testing equipment modification and/or recalibration may be needed to use DOP alternatives.
- j. Rotameter calibration data calibrated by a primary standard within past 6 months.
- k. Periodic Submittals: Submitted upon request during abatement:
- 1) Principal Project Company's personal air monitoring results (daily)
  - 2) Updated workers documentation (as needed)
  - 3) Daily boundary access logs
  - 4) Daily negative pressure manometer records (print outs), as applicable
  - 5) Copies of updated schedules and notices to the regulatory agencies (as needed)
- l. Project closeout Submittals: Within 5 calendar days upon request by the SAR group within the City Public Works Department or within 5 calendar days after completion of the abatement or hazard control work, Principal Project Company shall submit the following:
- 1) Copies of updated schedules and notices to regulatory agencies, as needed.
  - 2) Receipt and weight tickets from landfill operator or incinerator, as applicable.
  - 3) Copies of completed uniform waste manifests.
  - 4) Certification of completion.
- J. For lead-related Work, and as part of the Hazardous Materials Management Plan (HMMP) Principal Project Company shall submit the following, but not limited to:
1. Pre-job Submittals: Principal Project Company shall submit documents pertaining, but not limited, to the following:
    - a. San Francisco Department of Building Inspections (DBI) notification and posting requirements as deemed required for exterior paint remediation.
    - b. Cal/OSHA notifications as per 8 CCR 1532.1
  2. Workers documentation:
    - a. Current CDPH lead contractor/supervisor training certificates.
    - b. Current lead awareness training certificates - workers or CDPH Certified Lead Workers Certificate, as appropriate.

- c. Respiratory fit test records within past 6 months.
  - d. Annual medical examination approvals.
  - e. Blood lead tests within past 90 days.
3. Lead hazard/removal control plan pursuant to 8 CCR 1532.1: Procedures for minimizing and controlling the migration of lead from disturbance of lead-containing materials including a written lead hazard or lead removal work plan and schedule with the sequence of work:
  4. Project close-out Submittals: Within 5 calendar days upon request by the SAR group within the City Public Works Department, or within 5 calendar days after completion of the abatement or hazard control work, Principal Project Company shall submit the following:
    - a. Updated worker documentation, as needed.
    - b. Principal Project Company periodic personal air monitoring results.
    - c. Receipt and weight tickets from landfill operator or recycler, as applicable.
    - d. Waste profiling data (TCLP, WET, and other analytical data)
- K. For Copper Chromate Arsenate (CCA) treated wood related Work:
1. As part of the Hazardous Materials Management Plan (HMMP), Principal Project Company shall submit the following, but not limited to:
    - a. Identification of EPA-approved hazardous waste landfill disposal facility, or an EPA-approved solid waste disposal facility.
    - b. Temporary storage plan.
  2. Workers documentation:
    - a. Certification of the workers and supervisor's forty (40) hour HAZWOPER training in compliance with 40 CFR 1910.120.
    - b. Medical examination approvals for respirator use within the past twelve (12) months, or in compliance with 8 CCR 5144.
    - c. Respiratory fit test records within the past twelve (12) months minimum, or in compliance with 8 CCR 5144.
  3. Within 5 calendar days upon request by the SAR group within the City Public Works Department or within 5 calendar days after completion of the abatement or hazard control work, Principal Project Company shall submit the completed manifest or evidence of shipment date, recycler, and quantities shipped.
- L. For fluorescent light tube related Work
1. As part of the Hazardous Materials Management Plan (HMMP), Principal Project Company shall submit the following, but not limited to:
    - a. Identification of EPA-approved recycler.
    - b. Temporary storage plan.

2. Project close-out Submittals: Within 5 calendar days upon request by the SAR group within the City Public Works Department, or within 5 calendar days after completion of the abatement or hazard control work, Principal Project Company shall submit the completed manifest or evidence of shipment date, recycler, and quantities shipped.

## 1.6 QUALITY CONTROL

### A. Meetings

1. Pre-abatement meeting: Prior to any removal of Hazardous Materials and upon approval of the HMMP, Principal Project Company shall arrange and attend a pre-construction meeting with the SAR group within the City Public Works Department, the City's Authorized Representative, and others whose work may be affected. The meeting agenda shall include the following considerations:
  - a. Weekly Meetings: At the option of the SAR group within the City Public Works Department, abatement work extending over one week in length may require attendance of Principal Project Company at a weekly progress meeting. The purpose of this meeting is to review abatement and project scheduling, coordination with other trades, security and site-specific requirements.
  - b. Start-up Hazardous Materials handler's meeting: Prior to the beginning of on-site work, all Hazardous Materials handlers shall attend a pre-start-up safety meeting that addresses hazardous materials issues specific for the project.
  - c. Review of the specifications and plans in detail related to the abatement and hazards control work. All conflicts and ambiguities, if any, shall be discussed.
  - d. Review in detail the Project conditions, schedule, construction sequencing, site protection, protection of historic building materials abatement application requirements, and quality of completed work.
  - e. Review in detail the means of protecting adjoining areas; protection of Principal Project Company's employees and contractors, City's employees and contractors, and completed work during the abatement and lead removal activities.
  - f. Pre-job submittals requirements.
  - g. Site security requirements.

### B. Field Quality Control Sampling

1. During all asbestos-related work, perimeter sample(s) shall be collected by the City's Certified Industrial Hygienist or its environmental consultant (DOSH Certified Asbestos Consultant). These sample(s) shall be analyzed by Phase Contrast Microscopy (PCM). Sample results that are in excess of the background level or 0.010 fibers per cubic centimeter (f/cc) Project Action Level may be forwarded for analysis by Transmission Electron Microscopy (TEM) with a 12-hour turnaround specified. Handling, shipping, and analysis charges (including the Environmental Consultants time and expenses) shall be paid for by Principal Project Company. Any sample results in excess of 70 asbestos structures per square millimeter of filter area (corrected for a 1,200 - 1,800 liter sample volume as appropriate, or in excess of 0.018 str/cc, normalized to a 1,500-liter air sample) shall require cleaning, inspection, and resampling of the affected area at Principal Project Company's expense.
2. During all lead-related work, such as demolition, torching and welding activities, etc., as applicable, visual inspections, perimeter air sample and/or lead wipe sample results shall be collected by the City's Certified Industrial Hygienist or its environmental consultant

(DOSH Certified Asbestos Consultant). These samples shall be analyzed by flame atomic absorption.

C. Clearance and Re-occupancy Sampling

1. Asbestos Clearance Sampling

- a. Clearance samples will be collected by the SAR group within the City Public Works Department or their designee at the completion of the asbestos abatement activity. Clearance will be either by visual inspection and/or phase contrast microscopy (PCM) and/or aggressive air sampling - transmission electron microscopy (TEM). The City reserves the right to conduct AHERA clearance criteria and limit the number of samples for clearances to be less than AHERA protocol when the City deems appropriate.
- b. Clearance air samples using aggressive air sampling techniques shall be collected for all abatement zones, unless otherwise designated in the Contract Documents.
- c. Phase Contrast Microscopy (PCM) Clearances: Areas cleared by PCM shall show an airborne concentration of total fibers for each sample at or below 0.010 fibers per cubic centimeter (f/cc) using the NIOSH 7400A counting rules. Any sample result exceeding 0.010 fibers/cc shall require re-cleaning of the work area and retesting. The City as Regulator will determine the minimum number of samples, based on the quantity and types of materials removed configuration, and sequencing of the work areas, and similar considerations.
- d. When transmission electron microscopy (TEM) clearances are conducted, as designated by the Contract Documents, analysis shall be conducted by using the method described in 40 CFR Part 763, Appendix A, Subpart E (AHERA), with an analysis turn-around time of 24 hours, unless otherwise designated by the City as Regulator. Z-test requirements under the AHERA regulations shall **NOT** apply to the Project. The TEM clearance standard is 0.018 s/cc for **ALL** samples (equivalent to 70 s/mm<sup>2</sup> for a 1500-liter sample volume). The City as Regulator may opt to adjust the sample volume to prevent possible overloading of the samples from interference dusts (e.g., demolition, welding particulates), if so, the analytical sensitivity shall be at or below 0.005 s/cc, maintained by having adequate number of grids analyzed by the laboratory.

2. Lead Wipe Sampling

- a. All areas with regular occupancy affected by disturbance, demolition or scraping of painted surfaces shall be cleared by wipe sampling. Lead wipe sampling will be collected immediately prior to area occupancy.
- b. The SAR group within the City Public Works Department or its designee will collect clearance wipe samples after approving the work area cleanliness based on visual inspection. The wipe samples will be collected from building surfaces, NOT from plastic sheeting or other temporary barriers. Principal Project Company shall re-clean the area if surface lead concentrations exceed any of the following HUD definitions for lead contaminated dust:
  - 1) <10 micrograms/ft<sup>2</sup> for interior floors
  - 2) <10 micrograms/ft<sup>2</sup> for interior horizontal surfaces other than floors
  - 3) <100 micrograms/ft<sup>2</sup> for exterior floor and horizontal surfaces, window sills and troughs

- c. All reoccupancy/clearances will be based on floors and any interior horizontal surfaces. Routine use of other levels is not expected and are for use only as determined by the City as Regulator on a case by case basis. Areas that do not meet the HUD lead contaminated dust criteria shall continue to be cleaned by Principal Project Company at its expense until the specified criteria is achieved. Only after passing re-occupancy clearance, shall Principal Project Company teardown the containment and demobilize.
- d. Where lead remediation occurs concurrently with asbestos remediation activities, the area may be cleared (in addition to the wipe samples) by aggressive air sampling, where airborne lead concentrations following the final visual inspection shall not exceed the EPA's NAAQS standard of 1.5 micrograms/m<sup>3</sup> as analyzed by NIOSH method 7082 (flame atomic absorption) or 7105 (graphite furnace atomic absorption) or ICP/MS.

D. Final Clearance Criteria

- 1. The City will pay the cost of the final round of visual inspections, aggressive air sampling, and PCM and/or TEM analyses that will meet the asbestos abatement specification. All rounds of visual inspections, aggressive air sampling, and PCM and/or TEM analyses that fail to meet the contract criteria shall be borne by Principal Project Company. For the purpose of this paragraph, visual inspection includes the area isolation inspection, pre-encapsulation inspection, and final area clean-up inspection.
- 2. If wipe sampling for re-occupancy clearance fails the HUD lead contaminated dust criteria, Principal Project Company shall be responsible for additional clean-up costs until clearance is achieved.
- 3. Principal Project Company shall pay for all environmental consultant costs for delays in completion of work beyond the Project Schedule. Such charges shall include consultant's observations and inspections, daily air monitoring, equipment, transportation and analysis charges. Such costs are estimated at \$1,200 per day, exclusive of any costs associated with final clearance air testing.

E. Inspections

- 1. Work Area Inspections: Inspections are required at the completions of the following job phases:
  - a. Pre-cleaning inspection(s)
  - b. Work area preparation inspection (Pre and post 24-hour hold times)
  - c. Pre-encapsulation inspection
  - d. Final visual inspection
  - e. Waste handling inspection
- 2. Principal Project Company shall provide in writing a signed or initialed request for inspection to the SAR group within the City Public Works Department. Request all inspections at least 24 hours in advance of the time required; inspections shall be performed between the hours of 8:00 a.m. and 3:00 p.m., Monday through Friday, unless otherwise noted. Written requests may be waived, and verbal requests accepted for short-duration projects at the discretion of the SAR group within the City Public Works Department. Adequate lighting is to be provided by Principal Project Company.

3. Precede all inspection requests by an evaluation by the Construction Manager, who shall verify that criteria for acceptability have been met prior to requesting an inspection.
4. Pre-cleaning Inspection:
  - a. The SAR group within the City Public Works Department or its designee shall inspect all surfaces requiring pre-cleaning to verify that dust and debris have been removed and cleaned up to an acceptable condition. Multiple inspections may be required to cover all systems and the required phasing of activities.
  - b. No object shall be covered until inspected or approved by the SAR group within the City Public Works Department or its designee as stated in the requirements herein. When covered before such inspections are made and approved, Principal Project Company shall uncover such work for inspection, subsequently restore it, and replace work of others damaged thereby, all at Principal Project Company's expense.
5. Work Area Preparation Inspection:
  - a. After preparing the work area and decontamination enclosure system(s) for Activity Class I and II work areas, as applicable, the SAR group within the City Public Works Department or its designee shall conduct an initial inspection to ensure completeness of work and type containment according to the specifications.
  - b. No hazardous material removal work shall commence without the approval of the SAR group within the City Public Works Department following a work area preparation inspection.
6. Pre-Encapsulation Inspection:
  - a. After detail cleaning has been completed and the Principal Project Company has checked and approved the area as adequately cleaned, the SAR group within the City Public Works Department or its designee shall inspect all surfaces requiring encapsulation to verify that hazardous materials have been removed and the area and abated surfaces leaned to an acceptable condition.
  - b. During such inspections, Principal Project Company shall provide adequate lighting, ladders, scaffolding, workers, etc., so as not to curtail the systematic inspection of all surfaces by the SAR group within the City Public Works Department or its designee. Areas requiring rework shall be tagged in a manner to allow continuation of the inspection in a timely manner. The SAR group within the City Public Works Department or its designee shall not be expected to remain within an area requiring extensive re-cleaning.
  - c. The pre-encapsulation inspection may be staged to allow inspection of detailed surfaces concurrent with the removal activities in adjoining areas ready for inspection, allowing a buffer zone to protect against cross-contaminating inspected surfaces. For lead removal: a final overall inspection shall be required to reconfirm the final wipe down of all horizontal surfaces, which may have been subjected to contamination from airborne releases during the staged inspection process. The staging of inspections shall not preclude Principal Project Company from conducting internal quality control inspections prior to requesting review by the SAR group within the City Public Works Department or its designee.
7. Final Visual Inspection: After the encapsulation process is complete, the encapsulant is dry, and all debris bags, tools, supplies, and equipment have been removed from the work area, as applicable, the SAR group within the City Public Works Department or its

designee shall inspect the work area to verify the cleanliness of the area, including but not limited to public and attic areas. The work area must be free of visible debris, dust, water, or loose and peeling lead-based paints as a minimum.

8. Waste Handling Inspection: The SAR group within the City Public Works Department or its designee shall inspect waste as it leaves the regulated area. Principal Project Company shall insure that all waste is packaged, labeled, and handled as required. The SAR group within the City Public Works Department or its designee may inspect the waste dumpsters at any time, including prior to transportation. Principal Project Company shall coordinate temporary relocation to a transport staging area with the SAR group within the City Public Works Department or its designee prior to removal.

## 1.7 ADDITIONAL CONTRACT REQUIREMENTS

- A. Specific mandatory asbestos abatement requirements for *occupied and unoccupied spaces* at San Francisco sites are more stringent than current regulations. This summary of additional requirements is not to be read as a stand-alone document.
  1. If work procedures are going to change, the SAR group within the City Public Works Department and the City's Authorized Representative must be notified, in writing, and given the opportunity to notify surrounding employees as the new procedures may impact surrounding areas (e.g., noise, vibration).
  2. Localized occupants must be notified in writing of limited access to the work areas prior to the start of project.
  3. Principal Project Company is responsible for coordinating with the SAR group within the City Public Works Department as to where the exhaust air is to be directed and to ensure the exhausted air will not be recirculated within the facility prior to the initial setup of the work area.
  4. A rigid and robust secondary perimeter with "Caution Construction" sign or equivalent. The secondary perimeter shall be a full height, 1-hour fire-rated, dust and sound proof construction barricade as per the architectural drawings for the Project.
  5. The regulatory signage is to be posted between the secondary construction perimeter and the regulated work area.
  6. All equipment shall be inspected by the SAR group within the City Public Works Department or its designee prior to being brought into the hospital. All equipment and supplies shall be free of dust and debris.
  7. On-site aerosol challenge testing of negative air machines and HEPA vacuums prior to start of work and every 90 days for longer projects, when machines are relocated between floors. The aerosol challenge testing shall be conducted in the work area.
  8. Sufficient quantities and types of dehumidifier units shall be installed and operated within the construction area to reduce humidity levels to 40% relative humidity.
  9. Method of sealing critical barriers including the capping of ducts, supply registers, etc. shall be dust tight and capable of withstanding air flow and pressure generated by the ventilation system. Tape and/or polyethylene sheeting alone shall not be used to seal the supply registers.
  10. Negative pressure differential of -0.04 inches of water with manometer reading records is required for all areas at all times during abatement and general construction activities.

Downgrading of negative pressure during construction may be considered on a case by case basis.

11. The negative pressure enclosure shall maintain the minimum Negative pressure differential of -0.04 inches of water for at least 24 hours prior to the start of abatement unless otherwise approved by the SAR group within the City Public Works Department. Following 24-hours, the SAR group within the City Public Works Department and its environmental consultant will review the containments to determine if the integrity of the containments has been maintained. The Containment will have passed when the following 3 conditions are met:
  - a. Containment integrity has been maintained for at least 24-hours; and
  - b. Negative pressure has been maintained at least at -0.04" w.g. for 24-hours; and
  - c. The SAR group within the City Public Works Department and the environmental consultant are satisfied that the containment has been constructed sufficiently so as to last for at least two months without modifications, repairs or improvements.
12. In negative pressure enclosures, a calculated air exchange rate of no less than 10 air exchanges per hour for the entire area in which the renovation activities are being performed.
13. Installation of clear, transparent view ports made of plastic or equivalent, in the polyethylene wall so that activities can be visually monitored from outside the containment. This window shall measure approximately 1' wide by 2' high. It shall remain transparent throughout the duration of the abatement process. It is recognized that viewing ports are not possible in all situations.
14. Adhesive tack ("sticky") mats with multiple layers shall be installed at all construction barricade entrances to prevent tracking of construction dust outside of the construction area.
15. The removal of debris shall be in tightly covered containers, and only at times and routes approved by the SAR group within the City Public Works Department and facility personnel.
16. All HEPA equipment, tools, decontamination chambers, etc. shall be clean upon entering the Project Site. Typically, the equipment and materials are inspected at a loading dock prior to bringing them into the facility. NOTE: The use of decontamination showers is limited to Class I work only unless otherwise specified by the abatement work plan.
17. Principal Project Company is responsible for ensuring that water is properly shut off at lavatory/faucet fixtures at the beginning and ending of each shift.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

- A. Prohibited Materials
  1. Mastic or paint removers shall not result in the generation of hazardous waste.
  2. Cleaning agents, equipment, and methods employed shall not in any way damage the substrate or adjoining surfaces and finishes which are to remain. Cleaning solvents shall be non-injurious to the surfaces upon which they are applied. The methods used shall cause no pitting, erosion or damages to the surfaces.

3. Paint removal chemicals may not attach or leave deposits on the substrate material.
  4. The following tools and equipment are specifically prohibited unless accepted in writing by the SAR group within the City Public Works Department:
    - a. High- or low-pressure water-blasting equipment for hosing of ductwork or work areas.
    - b. Gasoline, propane, diesel or other fuel powered equipment inside the building.
  5. Equipment that creates excessive noise or vibration that would affect safety of the building or its occupants or generate complaints from the occupants. Equipment shall not exceed an A-weighted sound level of 85 dB as measured at 50 ft. from the radiating source.
  6. Asbestos-containing materials shall not be disturbed by cutting, sawing, grinding, pulverizing, crumbling, breaking, or otherwise rendered friable or airborne unless these activities are conducted under the requirements of all applicable regulations and guidelines by trained certified workers.
- B. Minimum Requirements:
1. Deliver all materials in original packages, containers, or bundles bearing the names of the manufacturers and the brand names and details for proper storage and usage. Store all materials subject to damage off the ground, away from wet or damp surfaces, and under cover sufficient to prevent damage or contamination. Store materials so as not to interfere with Project Site operations.
  2. Do not use damaged or deteriorating materials. Remove damaged materials from the premises. Dispose of contaminated materials in accordance with applicable regulations.

## **2.2 MATERIALS AND EQUIPMENT**

- A. Principal Project Company shall ensure that following materials and equipment shall be available on the Project Site:
- B. Protective Devices: Temporary wash stations or showers, disposable clothing, respirators, gloves, hard hats, and other required items. Respirators shall protect against appropriate dusts, fumes and mists as approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) under provisions of 30 CFR Part 11.
- C. Waste Receptacles: Conform to federal and State regulations, with 6-mil minimum thickness waste bags.
- D. Polyethylene Sheeting and Dust Barriers
  1. Polyethylene sheeting shall be flame-retardant and approved and listed by the State Fire Marshal in accordance with Section 13121 and/or 13144.1 of the California Health and Safety Code.
  2. Thickness and Size: 6-mil thick minimum, unless otherwise specified, sized to minimize the frequency of joints.
  3. Flammability: Comply with NFPA Standard 701 with a flame spread rating of no greater than 5 and a smoke development rating of no more than 70 when tested in accordance with ASTM accordance with ASTM E84 procedures.

- E. Protective Devices to conform to the following:
1. Polyethylene drop cloths and dust barriers, temporary wash stations or showers, disposable clothing, respirators, gloves, hard hats, and other required items.
  2. Respirators shall protect against asbestos and other appropriate dusts, fumes and mists as approved by the National Institute for Occupational Safety and Health (NIOSH) under provisions of 30 CFR Part 11.
- F. Sealants:
1. Sealants shall, at a minimum, conform to the following:
    - a. Shall be Fire resistant
    - b. Shall be compatible with concrete, metals, wood, cable jacketing and other materials capable of preventing fire, smoke, water and toxic fumes from penetrating through sealants.
    - c. Shall be asbestos free and shall have a flame spread, smoke and fuel contribution of zero.
    - d. Shall be ASTM- and UL-rated for 3 hours for standard method of fire test for fire stop systems.
  2. Spray adhesives shall not contain methylene chloride or methyl chloroform (1,1,1-trichloroethane) compounds.
  3. Adhesive tape shall comply, at a minimum, with the following.
    - a. Must be 2" or wider, shall be capable of sealing joints of adjacent sheet of polyethylene and attaching polyethylene sheet to finished or unfinished surfaces of similar materials.
    - b. Tape shall be capable of adhering under dry and wet conditions, including use of amended water. Complete taping to critical or sensitive surfaces utilizing preservation sealing tape, such as:
      - 1) 3M Scotch Brand No. 4811 Preservation Tape; or
      - 2) 3M Scotch Brands No. 472 Plastic Film Tape.
- G. Surfactants and Encapsulants:
1. Wetting agents or surfactants shall be effective and compatible with the ACM being wetted.
  2. Bridging or penetrating type encapsulants shall have the following characteristics:
    - a. Water based. Do not utilize an organic solvent in which the solid parts of the encapsulant are suspended.
    - b. Non-flammable with no methylene chloride.
    - c. U.L. listed encapsulants, in full-scale ASTM E119 fire test, compatible with W.R. Grace "Retroguard, RG-1" fireproofing with "Spatterkote" Type SKII" bonding treatment for structural and decking widths exceeding 24 inches.

- d. Compatible with replacement materials, especially mastics, fireproofing, and adhesives.

H. Mastic and Paint Removers to conform to the following:

1. Non-flammable solvent or gel, with a flash point above 140 degrees Fahrenheit.
2. Of low odor type.
3. Solvent waste shall not result in the generation of hazardous waste as described under 22 CCR, Division 4.
4. Removers shall NOT contain methylene chloride, halogenated hydrocarbons, or any of the following glycol ethers:

Common Name	Abbreviation	CAS #	Chemical Name
Ethylene glycol methyl ether	EGME	109-86-4	2 - methoxyethanol
Ethylene glycol methyl ether acetate	EGMEA	110-49-6	2- methoxyethyl acetate
Ethylene glycol ethyl ether	EGEEA	111-15-9	2- ethoxyethanol
Ethylene glycol dimethyl ether	EGDME	110-71-4	1,2-dimethoxyethane
Ethylene glycol diethyl ether	EGDEE	629-14-1	1,2 - diethoxyethane
Diethylene glycol	DEG	111-46-6	2,2 - dihydroxyethyl ether
Diethylene glycol methyl ether	DEGME	111-77-3	2-(2-methoxyethoxy) ethanol
Diethylene glycol ethyl ether	DEGEE	111-90-0	2- (2-ethoxyethoxy) ethanol
Diethylene glycol dimethyl ether	DEGDME	111-90-6	Bis-(2-methoxyethoxy) ether
Triethylene glycol dimethyl ether	TEGDME	112-49-2	2,5,8,11-tetraoxadodecane
Dipropylene glycol	DPG	110-98-5	2,2 - dihydroxyisopropyl

- I. Vacuums and Negative Pressure Units (NPU) used for cleanup of materials and detailing shall be HEPA-filtered, clean, without significant dents, marring, or otherwise unprofessional appearance. Coordinate with the Environmental Consultant for inspection and approval prior to bringing this equipment into a building. Conduct DOP testing on-site in the presence of the City as Regulator's environmental consultant for all HEPA-filtered units.

J. Air filtration devices shall, at a minimum, conform to the following:

1. Filtration devices shall be high efficiency particulate absolute (HEPA) filtration systems bearing a UL 586 label indicating its ability to perform under specified conditions. Filters shall be marked with the name of the manufacturer, serial number, airflow rate efficiency and resistance, and the direction of the test airflow. Provide units with two stages of pre-filtering, as follows:
  - a. A low efficiency type first stage pre-filter for particle sizes 100 micrometers and larger.

- b. A medium efficiency type second stage pre-filter effective for particle sizes down to 5 micrometers.
  - c. Pre-filters installed either on or in the intake grid to the exhaust unit and held in place with special housings or clamps.
2. HEPA-filtration exhaust units are to include:
- a. An elapsed time meter showing the total accumulated hours of operation.
  - b. An electrical interlock preventing operation of the unit without a HEPA filter.
  - c. An automatic shutdown system to stop the fan in the event of a rupture in the HEPA filter or a blocked air discharge.
  - d. Warning lights to indicate normal operation (green), moderately high pressure drop across the filters, such as due to filter overloading (yellow), and too high of a pressure drop due to an overloaded or ruptured HEPA filter or obstructed discharge (red).
  - e. An audible alarm if the unit shuts down due to operation of the safety systems.
  - f. Electrical components approved by the National Electrical Manufacturers Association (NEMA) and the Underwriter's Laboratories (UL). Each unit shall be equipped with overload protection sized for the equipment. Properly ground the motor, fan, fan housing, and cabinet.
  - g. A cabinet constructed of steel or aluminum capable of withstanding damage from rough handling and transportation, with a width under 30-inches to fit through a standard-size doorway, mounted on casters or wheels.
  - h. Several spare HEPA-filtered exhaust units on-site to be used as needed if active units fail.
- K. Waste Containers:
- 1. Waste receptacles to conform to federal and State regulations, with 6-mil minimum thickness or glove bags or waste bags.
  - 2. Sealable drums shall be of 30- or 55-gallon capacity constructed of fiber or metal with tightly fitting lids for hazardous waste disposal. Label the drums and bags in accordance with U.S. EPA and local air quality management district requirements, including the Generator I. D. number or location identification, and manifest number. Provide air and watertight drums. If previously used, the drums shall be food grade and shall be approved by the City as Regulator prior to their storage or use on-site. Sealable polyethylene bags shall be of 6-mil minimum thickness for asbestos disposal. Size bags to fit within drums specified above.
- L. Cleaning Agents:
- 1. Cleaning agents, equipment, and methods employed shall not in any way damage the substrate or adjoining surfaces and finishes. Cleaning solvents shall be non-injurious to the surfaces upon which they are applied. The methods used shall cause no pitting, erosion or damages to the surfaces.
  - 2. Do not use chemicals that may attach or leave deposits on the substrate material. Modify the process or processes to suit the finish, hardness, and condition of the surface to be cleaned.

## **PART 3 - EXECUTION**

Principal Project Company shall:

### **3.1 EXAMINATION**

- A. Review Hazardous Materials reports and information and ensure the information is available to all contractors and trades working on the Project Site.
- B. Promptly notify the SAR group within the City Public Works Department of differing conditions or for suspected materials not identified or listed under Section 01 35 43.
- C. Notify the SAR group within the City Public Works Department, in writing, a minimum of 48 hours in advance of any planned disturbances to any Hazardous Materials or prior to performing any Hazardous Materials abatement.
- D. Disturbance of asbestos or lead and other Hazardous Materials, including demolition, surface preparation, or removal of paint, can contaminate air, soil, and water surrounding the Project Site. It is the responsibility of Principal Project Company to evaluate and determine the most appropriate level of containment necessary to prevent the uncontrolled release of Hazardous Materials from the work site.
- E. As per Cal/OSHA regulatory requirements, establish the required site controls, class of containment, of ventilation, and of air monitoring as appropriate for the removal means and methods as selected to perform the specific removal work. These systems shall be sufficient to control exposures to workers, the public, and to protect the surrounding environment.

### **3.2 PREPARATION**

- A. Protective Procedures and Workers Protection
  - 1. Protect Visitors and Other Site Personnel: Cordon off the Hazardous Materials removal and hazard control area(s) with appropriate signs, and provide temporary tunneling or scaffolding, as applicable.
  - 2. Provide site security to assure that no member of the public or any unqualified or untrained person is able to gain access to any Hazardous Materials work area at any time while maintaining open access and egress routes at all times.
  - 3. Provide worker training, respiratory protection, and medical examinations to meet applicable regulations.
  - 4. Provide temporary lighting and power to work areas, including installation of ground fault interrupters as required. Ensure that all electrical power is terminated in the work area, and ensure, among others, outlets and lights are disconnected and cannot be re-energized during the course of the Work. Fully ground all equipment within the work zone and decontamination assemblies.
  - 5. Construct enclosure system(s) for worker and equipment decontamination.
  - 6. Establish negative pressure in work area(s) as required under 8 CCR Section 1529. Follow and follow hazard control procedures as outlined under Cal/OSHA regulations CCR 1532.1 and CDPH regulations 17 CCR Sections 35001 through 36100.
  - 7. Provide workers with sufficient sets of protective full-body clothing to be worn in the designated work area and whenever a potential exposure to lead, asbestos, and hazards exists. Such clothing shall include but not be limited to full-body coveralls, headgear, eye

protection, and gloves. Disposable-type protective clothing, headgear, and footwear may be provided.

8. Respiratory Protection: Comply with Cal/OSHA Regulations included in 8 CCR Sections 1529, 1532.1 and ANSI Standard Z88.2, "Practices for Respiratory Protection: Workers shall wear appropriate respiratory protection during lead, asbestos and any other hazards work, unless negative exposure assessment testing verifies that employee exposures are below the PEL or Action levels.

B. Site Protective Controls:

1. Locate temporary scaffolding and dust barriers, as required, and proceed with the construction or demolition, allowing for continued operation of any adjacent occupied areas, as applicable.
2. Erect temporary protective covers over pedestrian walkways and at points of passage for persons or vehicles, which are to remain operational during the work.
3. Where life safety systems shall be made non-operational, coordinate shutoff with SAR group within the City Public Works Department. Protect all wiring associated with the system.
4. Air Filtration Device
  - a. Differential air pressure systems for each work area to be in accordance with Appendix J of the EPA's "Guidance for Controlling Asbestos-Containing Materials in Buildings," EPA 560/5-85-024.
  - b. Minimum work area differential air pressure of -0.025 inches w.g. at all times when required, including during the removal, gross clean-up, waste transfer, and encapsulation activities. Account for fluctuations of the negative pressure by aiming for a higher-pressure differential at the project outset to ensure that the chances of the pressure differential dipping below -0.025 inches w.g. are minimal.
  - c. Provide sufficient number of units for each work area to maintain differential air pressure in the work area at -0.025 inches w.g. between the work area and adjacent non-work areas at all times, allowing for stack and thermal effects. Locate unit(s) so that the primary make-up air enters the zone through the decontamination facilities and traverses the work area as much as possible, unless otherwise approved by the SAR group within the City Public Works Department.
  - d. Provide on-site certification of all HEPA-filtered negative pressure units to document adequate filtration efficiency for all units exhausting internally within the building or as otherwise required by the SAR group within the City Public Works Department. Systems shall be certified by a third-party to conduct onsite dioctylphthalate (DOP) or Portacount challenge testing, signed by an independent tester or Principal Project Company's Site Safety Representative. DOP testing shall verify an in-situ efficiency of 99.97% or greater. Portacount testing shall verify an in-situ efficiency of 99.3% or better.
5. Exhaust Air:
  - a. Establish negative pressurization within the work area exhausting air ducted through temporary panels located in window frames or exterior doorways. Such panels must be designed to prevent rainwater from entering the work area.
  - b. Unless otherwise directed by the SAR group within the City Public Works Department, Principal Project Company shall replace any windows removed at the

completion of Hazardous Materials removal work. Vent exhaust air to the exterior of the building at locations approved by the SAR group within the City Public Works Department unless otherwise noted or directed.

- c. Do not locate exhaust outlets near or adjacent to other building intake vents or louvers or at the entrances to the building. Do not exhaust air into the building interior spaces or within 50 feet of the building's supply air intakes, unless otherwise noted or directed by the SAR group within the City Public Works Department.

#### 6. Decontamination Enclosure Systems

- a. Construct a decontamination enclosure system (as a minimum) in accordance with OSHA Regulation 29 CFR Part 1926.1101 and Cal/OSHA Regulation 8 CCR Sections 1529 and 1532.1. The systems shall be contiguous to the work area consisting of three totally enclosed chambers and airlocks. Mobile isolation enclosures shall be permitted in areas where space limitations shall not permit such construction.
- b. For Work Class I, II and III work areas, provide, at a minimum, a two (2)-stage decontamination assembly, including an equipment and contiguous clean room with bucket wash-up facilities. A shower will be required if the work is greater than 25SF.
- c. Post all emergency phone numbers, notifications, emergency exiting diagrams and procedures, as required.
- d. Post danger signs at the entrance to all decontamination units, per OSHA Regulation 29 CFR Part 1926, 1529 and 1532.1.
- e. The SAR group within the City Public Works Department must approve location of decontamination enclosure systems prior to commencing Construction Work.
- f. Mobile isolation enclosure(s) shall be constructed of rigid frames (either 2 x 4-inch wood construction or PVC tubing, as appropriate) and polyethylene sheeting or rigid plexiglas sheets. Do not tape, nail, puncture or disturb asbestos containing building materials to attach, or secure the mini enclosure system.
- g. No eating, drinking, smoking, or chewing gum or tobacco is permitted in or near the asbestos or lead work areas or decontamination enclosure systems except in areas designated by the SAR group within the City Public Works Department. Smoking will not be permitted in the clean room and near storage or usage areas of flammable materials, such as spray adhesive and mastic removers.

### 3.3 ASBESTOS ABATEMENT PREPARATION

#### A. Notifications:

- 1. Notify the SAR group within the City Public Works Department, in writing, a minimum of 48 hours in advance of any asbestos-abatement work.
- 2. Notify, in writing, the BAAQMD at least 10 working days prior to commencement of any asbestos project equal or greater than 100 linear feet (LF) or more than 100 square feet (SF) or 35 cubic feet or more of regulated asbestos-containing materials. Obtain a job number.

3. Notify Cal/OSHA a minimum of 24 hours in advance of any disturbances of any amount of friable or non-friable asbestos-containing materials or prior to performing asbestos-related work.
  4. Advise Project Safety Representative of suspect conditions. Do not remove or disturb suspect materials until tested and approved by the SAR group within the City Public Works Department or its designee.
- B. Prohibited Activities:
1. Asbestos-containing materials shall not be disturbed by cutting, sawing, grinding, pulverizing, crumbling, breaking, or otherwise rendered friable or airborne unless these activities are conducted under the requirements of all applicable regulations and guidelines.
  2. Only a registered Asbestos Abatement Principal Project Company per Cal/OSHA regulation 8 CCR 1529 shall complete Work exceeding 100-sq. ft. or 100 linear feet or 35 cubic feet of asbestos-containing construction materials.
- C. Demolition of non-ACM obstructing known intact ACM:
1. Remove non-contaminated and non-asbestos materials for access using standard dust control procedures as required for painted assemblies and construction housekeeping controls.
  2. Minimize disturbances to substrates concealing friable or damaged asbestos-containing materials, such as laid-in ceiling tiles concealing asbestos-containing fireproofing, demolition of non-ACM partitions which may destabilize sprayed-on asbestos-containing acoustical finishes, etc. Qualified workers shall conduct work impacting asbestos-containing materials.
- D. Unexpected exposure to known or suspect Asbestos-Containing Material (ACM):
1. Where ACMs are discovered intact, such as intact pipe lagging, proceed to cordon off the affected area and immediately post it with a "caution" sign to prevent unintentional disturbances. Immediately alert Principal Project Company's site safety representative of the conditions for proper removal and disposal procedures.
  2. Where ACMs are damaged or suspect asbestos contaminated conditions are encountered, discontinue work in the immediate suspected area, shutdown the area's HVAC system, if not already disengaged, and alert Principal Project Company's site safety representative of the conditions for proper removal and disposal procedures.
- E. Unexpected release of asbestos into the environment:
1. Cordon off the immediate area (10 to 20 ft. radius minimum), and shutdown the area's HVAC system (if applicable).
  2. Notify the City's Authorized Representative and the **City Environmental Health and Safety Department** immediately.
  3. Notify Principal Project Company's site safety representative for proper removal and disposal using wet methods and HEPA-filtered vacuums. Clean-up work shall be completed under the directions of a Asbestos Competent Person with 16-hour minimum EPA operations and maintenance asbestos training and by workers with 2-hours asbestos awareness training minimum unless exposures exceed the permissible exposure limit (PEL) of 0.1 fibers/cc.

4. Decontaminate or dispose of friable waste in double 6-mil thick goose necked labeled waste bags for manifesting and disposal.

F. Work area set up and protection:

1. Principal Project Company shall carry out the following:

- a. Pre-Cleaning

- 1) Work Areas: Pre-clean surfaces in workspace. If the space has any contamination in the opinion of the SAR group within the City Public Works Department, then Principal Project Company shall install air locks and negative pressure system prior to pre-cleaning.
- 2) Fixed Objects: Pre-clean all fixed objects within the proposed work areas using HEPA filtered vacuum equipment and/or wet cleaning methods, as appropriate. Enclose with a layer of 6-mil polyethylene sheeting sealed with tape unless specified otherwise.
- 3) Ductwork: Pre-clean and wrap all active and inactive ductwork within the zone with a minimum of two layers of 6-mil polyethylene sheeting sealed with tape, unless otherwise directed by the SAR group within the City Public Works Department.
- 4) Removable Objects: Pre-clean removable objects within the proposed work areas exposed to friable ACM or debris using HEPA filtered vacuum equipment and/or wet cleaning methods, as appropriate. Properly remove and dispose of objects from work area before abatement operations commence.
- 5) Work area surfaces or items scheduled to remain covered with polyethylene sheeting during the clearance air sampling shall be inspected and approved by the SAR group within the City Public Works Department upon completion of pre-cleaning before critical barriers are erected or any other removal procedures are initiated.
- 6) Principal Project Company shall inspect all of its equipment and shower pans that it brings to the work site before and after its use and ensure that such equipment is not contaminated.

- b. Critical Barriers

- 1) Seal off all openings, including but not limited to corridors, doorways, ducts, grilles, diffusers, pipe chases, drains, grates, and any other penetrations of the work areas, with 6-mil polyethylene sheeting sealed with tape. Use caulking where necessary to ensure a complete seal.
- 2) Except for emergency exits, doorways, which will not be used for passage during work, must be sealed by first applying tape over the gap between the closed door and the doorframe and the gap between the bottom of the door and the floor. Then apply 6-mil polyethylene sheeting over the door and seal it with tape to the wall and to the floor.
- 3) Seal windows by applying two layers of 6-mil polyethylene sheeting sealed independently to the wall with tape.

- 4) HVAC registers and returns shall be sealed with metal or rigid plastic covered by polyethylene sheeting. Polyethylene sheeting is not an acceptable alternative.
- 5) At any time during the abatement activities after barriers have been erected, if visible suspect dust is observed outside of the work area or if the barriers are damaged, work in the abatement area shall immediately stop. Repair the barriers, and clean-up debris/residue using appropriate HEPA vacuuming and wet cleaning procedures before work recommences.

c. Regulated Work Area Isolation and Controls

- 1) Establish a pressure differential of -0.025 inches w.g. with manometer reading records. Submit manometer readings daily or upon request.
- 2) Conduct DOP testing of the HEPA-filtered negative pressure units and vacuum cleaners on site.
- 3) Install a transparent view port per work area for inspections.
- 4) Notify the SAR group within the City Public Works Department for changes in work practices immediately to allow the City the opportunity to notify and prepare the surrounding properties if the new procedures may impact the surrounding areas (due to noise, vibration, etc.).
- 5) Use a calibrated manometer to monitor the negative pressure, and provide the manometer print out to the SAR group within the City Public Works Department or designee at the end of the work shift.

d. Full Isolation Work Areas - Sequence of Major Events

- 1) This subsection outlines the sequence of events only. Modify the sequence as required if the work area is considered contaminated or if demolishing ACM or non-asbestos materials is required for access to the required abatement materials. Refer to other applicable sections of this specification for detailed requirements.
- 2) Cordon off the area with appropriate signs.
- 3) Deactivate HVAC system, unless otherwise noted or directed.
- 4) Protect or remove carpeting, if present, as appropriate. Contaminated carpeting will require decontamination by steam cleaning or disposal, as directed by the SAR group within the City Public Works Department.
- 5) Pre-clean work area, as necessary.
- 6) Establish temporary power and lighting.
- 7) Construct critical barriers.
- 8) Construct decontamination enclosure systems. All work areas shall contain a worker decontamination enclosure system and an equipment decontamination enclosure system, unless otherwise noted or directed.
- 9) Erect 6-mil polyethylene sheeting on the walls, windows, ceiling and floor, as applicable.

- 10) Establish negative pressure within the work area.
- 11) Request and facilitate a second work area preparation inspection from the SAR group within the City Public Works Department or designee following demolition and preparation of the final critical barriers, where applicable.
- 12) Remove ACM employing wet cleaning methods, HEPA vacuuming and proper work practices.
- 13) Clean-up work area.
- 14) Dispose of asbestos-containing waste.
- 15) Work area final clean up.

### **3.4 HAZARDOUS MATERIALS REMOVAL PROCEDURES FOR CONTROLLED RENOVATION**

- A. Principal Project Company shall have in place controlled renovation procedures for installation of anchors and minor disturbances to Asbestos- Containing Material under one hundred square feet (<100 SF) or under one hundred linear feet (<100 LF), except thermal system insulation (TSI) or surfacing materials (including but not limited to vinyl floor tiles, carpet or tile mastics, transite board, sheetrock wallboard, ceiling tile mastics) and carry out or comply with the following:
1. Minor work affecting non-friable materials, such as drilling molly anchors into wallboard or seismically bracing equipment through asbestos-containing may be completed by trained construction workers or maintenance personnel following procedures under the General Industry Asbestos Standards, 8 CCR 5208. All operations and maintenance procedures and personnel training records must be pre-approved by the SAR group within the City Public Works Department or its designee or prior to commencement of activities.
  2. Demarcate the area of exposure to minimize traffic within the area and to protect persons outside the area from airborne asbestos exposures, even if a negative exposure assessment has been produced.
  3. Assemble equipment and supplies, including but not limited to a Hudson sprayer, an HEPA- filtered vacuum, polyethylene drop cloths and wetted sponges.
  4. Install a drop cloth below the area to be disturbed on the floor and other surfaces and shoot or drill the anchor through the wetted sponge or cut the material through a wetted sponge, as applicable. HEPA vacuum the area following all work and place the sponge and debris into a sealed plastic disposal bag. Do not use these procedures on asbestos-containing thermal system insulation (TSI) or asbestos-containing surfacing materials, such as asbestos fireproofing or acoustical sprayed-on plaster finishes.
  5. Immediately clean up all debris dislodged from coring or drilling through asbestos and trace asbestos substrates using a wetted sponge and HEPA vacuum. HEPA vacuum the area immediately following completion of the controlled renovation procedures. Dispose of the debris as non-friable asbestos waste. Contamination of the site by use of improper procedures will require extensive clean-up and clearance air sampling by the City as Regulator, at Principal Project Company's expense.
  6. The following materials are classified as not "surfacing" materials for controlled renovation purposes involving anchoring or minor disturbances:
    - a. Vinyl Floor Tiles: Cordon off the room or area and remove the floor tiles before drilling through the concrete or wooden substrate. Vinyl floor tiles can be removed using heat or manual means such as hand scrappers. Where tiles cannot be

removed in advance of coring, saturate the tile with shave cream and core through the tiles, frequently wiping up all chips and debris and disposing as Category 1 non-friable waste. Wet wipe with a clean sponge and HEPA vacuums the area upon completion of work. Seal off the area below the core capture any debris that can fall into the ceiling plenum or crawl space below.

- b. Carpet Mastics: Cordon off the room or area and cutout the carpeting and mastics using a carpet knife, saturating the carpet with water to prevent airborne asbestos fiber releases. Remove excess mastics using a mastic remover with a flash point greater than 140 deg. F., as approved by the SAR group within the City Public Works Department or designee. Dispose of the carpet segment and mastics as Category 1 non-friable waste. Wet wipe and HEPA vacuum the area following completion of the controlled renovation procedures.
  - c. Vinyl Floor Tile Mastics: Cordon off the room or area and remove the mastics using a mastic remover with a flash point greater than one hundred and forty degrees Fahrenheit (>140 deg. F.), as approved by City. Dispose of the mastic and rags as Category 1 non-friable waste. Wet wipe and HEPA vacuum the area following completion of the controlled renovation procedures.
  - d. Transite Board and Mastics: Cordon off the room or area and remove the board intact, where feasible, following installation of drop cloths below. If removal is not feasible, drill through the board using the shaving cream methods described.
  - e. Sheetrock Wall or Ceiling Board: Shoot or drill anchors through a wetted sponge, where feasible, or use a Hilti-brand rotohammer drill equipped with a spring-loaded local exhaust hood connected to a HEPA-filtered vacuum cleaner. Cordon off the room or area and cut holes for receptacles or other devices using drop cloths on the ground and wet methods. Remove the sheetrock avoiding the joint compounds, where feasible. Continually wet the controlled renovation area during the process and wet wipe and HEPA vacuum the area following completion of the controlled renovation procedures.
  - f. Thin-Layered Asbestos-Containing Paints: Shoot or drill anchors through a wetted sponge or use a Hilti-brand rotohammer drill equipped with a spring-loaded local exhaust hood connected to a HEPA-filtered vacuum cleaner, where feasible. Cordon off the room or area and core using drop cloths on the ground and wet methods. Continually wet the controlled renovation area during the process and wet wipe and HEPA vacuum the area following completion of the controlled renovation procedures. Dispose of the paints as Category 1 or 2 non-friable wastes as determined by the substrate's composition.
  - g. Linoleum Backing: Cordon off the room and work area and cutout the linoleum, using a carpet knife prior to coring. Wet the backing using water and shave cream and remove the asbestos containing backing intact. Dispose of debris as friable asbestos waste. Wet wipe and HEPA vacuum the area of the controlled renovations for final clearance. Do not allow linoleum on cores to fall into the ceiling plenum or the space below, as applicable.
7. Other Non-Friable Materials: Complete controlled renovation procedures in compliance with Cal/OSHA's Work Class 2 procedures per 8 CCR 1529.
8. A Cal/OSHA & DOSH registered, and licensed Asbestos Abatement Principal Project Company shall complete work equal or greater than one hundred square feet (100 SF) or one hundred linear feet (100 LF) or asbestos-containing construction materials or other work as required in the Abatement Work Plan.

- B. Principal Project Company shall implement controlled procedures for installation of anchors or coring through friable asbestos materials, including but not limited to sprayed-on or troweled-on acoustical plasters, structural fireproofing, and linoleum backing (as applicable), and carry out the following:
1. Avoid contact with friable ACM where practical. Anchor to non-ACM materials where feasible.
  2. Install drop cloths on the ground and use a glovebag or mini-containment constructed of 6-mil polyethylene sheeting to contain work affecting friable materials.
  3. Wet the ACM with water and remove limited material as required for installations. Immediately clean up all debris and seal the waste in a double 6-mil disposal bag for disposal as asbestos waste.
- C. When conducting core drilling through ACM, Principal Project Company shall:
1. Assemble equipment and supplies, including but not limited to Hudson sprayers, nylon brushes, HEPA vacuums, labeled polyethylene disposal bags, approved encapsulant, duct tape, 5-in-1 tools, plastic buckets, etc.
  2. Coordinate exact location of the core hole, marking the location on the underside of the structure. Spray material to be disturbed with an approved penetrating encapsulant, restricted to the area of removal and disturbance only.
  3. Remove asbestos-containing materials following set-up of the isolation area under full isolation procedures or glove bag removal procedures.
  4. Cordon off the area with appropriate signs and deactivate the HVAC systems, as appropriate.
  5. Isolate the area with a mini-containment and decontamination assembly, and pre-clean and wrap fixed items and surfaces, as appropriate. Establish a mini-containment and decontamination assembly in the floor below.
  6. Establish negative pressure within the mini containment.
  7. Begin coring from the floor above, protecting against water seepage or spraying near active electrical or telephone equipment. After coring is complete, double bag, and encapsulate the raw edges of the cored hole with an approved penetrating encapsulant.
  8. Clean up any residual debris and insert a non-conductive sleeve into the hole, extending 6-inches minimum below the asbestos coating. Properly secure the sleeve and seal the openings around the circumference with a fire-rated caulking or seal.
  9. Dispose of ACM waste and proceed with the final work area clean up and inspection.
- D. With respect to hanger installation, Principal Project Company shall:
1. Assemble equipment and supplies, including but not limited to Hudson sprayers, nylon brushes, HEPA vacuums, labeled polyethylene disposal bags, approved encapsulant, duct tape, 5-in-1 tools, plastic buckets, etc.
  2. Lightly wet the material with an approved penetrating encapsulant, using a 5-gallon bucket lined with a plastic bag as a catch basket during the installation of the hanger or anchor. Cut an appropriately sized hole in the bottom of the bucket for the anchor grip to reach through. Place the plastic bag in the bucket, and with one hand, push the bottom of the anchor through the hole in the bucket sandwiching the plastic bag between the

anchor and the gun grip. Locate the anchor location and push the bucket tight against the material before setting the anchor. Carefully lower the bucket and the gun and dispose of the waste gathered in the bag and any loosened materials.

3. As an alternative to the above procedures, lightly wet the material with an approved encapsulant, placing a 3" x 5" sponge dampened with encapsulant against the material. Shoot the anchor or drill through the sponge so that any localized loosened material is trapped between the sponge and substrate. Leave the sponge in place, removing any signs of loose or dislodged debris. Re-spray any loosened materials with an approved encapsulant, restricted to the area of the disturbance.
  4. Clean-up the immediate area using wet methods and a HEPA vacuum. Dispose of friable plasters, linoleum backing, fire proofing and thermal system insulation as friable asbestos waste.
- E. With respect to coring on Fireproofing and Textured Acoustical Plasters, Principal Project Company shall:
1. Cordon off the area and set-up negative pressurization of the controlled renovation activity using glovebag or mini-containment methods. Do not drill or core openly through friable ACM. A Certified Asbestos Worker only under Cal/OSHA Work Class I or III procedures, as applicable shall complete such work. Wet the materials throughout the controlled renovations. Do not allow ACM on cores to fall into the ceiling plenum or Crawl Space below. Following the controlled renovation activities, clean up the mini containment using wet methods and a HEPA vacuum. Gooseneck and dispose of the glovebags, where applicable, within a double waste bag.
- F. Principal Project Company shall work within crawl spaces, confined spaces, or plenums with *Thermal System Insulation (TSI): Control Renovation Procedures for Friable Asbestos Materials*, and carry out the following:
1. Core or anchor through adjoining non-ACM materials, where feasible. If not feasible, cordon off the area and set-up negative pressurization of the controlled renovation activity using glovebag or mini-containment methods per 8 CCR 1529.
  2. Do not drill or core openly through friable ACM. Wet the materials throughout the controlled renovations. Do not allow ACM on cores to fall into the ceiling plenum or Crawl Space below. Following the controlled renovation activities, clean-up the mini containment using wet methods and a HEPA vacuum. Gooseneck and dispose of the glovebags and waste in double goose necked bags as friable asbestos waste.
  3. Adhere to all the requirements for confined spaces as follows:
    - a. It is the responsibility of Principal Project Company to provide all equipment and assistance to make the confined space safe for entry by Principal Project Company's employees, the City, the City as Regulator, and its representatives in accordance with the California Code of Regulations, Title 8, General Industry Safety Orders entitled "Confined Spaces."
    - b. If any activities associated with confined space entry become necessary, Principal Project Company shall be required to consult the City as Regulator for guidance and prepare an appropriate Permit-Required Confined Space Entry Plan.
- G. For asbestos-containing sheetrock and joint compound, Principal Project Company shall:
1. Lightly spray the material to be disturbed by spot removal, drilling, etc., with an approved penetrating encapsulant, restricted to the area of disturbance only. For anchoring into

ACM, locate the attachment location and push an encapsulant-wetted sponge between the stud or joist and the existing sheetrock before setting the anchor. Carefully shoot the anchor or drill through the stud or joist and sponge, and HEPA-vacuum any loosened materials or debris. For small-scale removals, penetrate the material with care, using a sharp utility knife or other appropriate tools, removing the encapsulated section and catching it directly into a lined bucket or waste disposal bag, where feasible, disposing of as asbestos waste. HEPA-vacuum the edges of the remaining materials and re-encapsulate the friable edges of the remaining sheetrock with penetrating encapsulant. Do not disturb materials beyond the limited scope of work.

### 3.5 HAZARDOUS MATERIALS REMOVAL PROCEDURES

- A. When removing asbestos-Containing Thermal System Insulation (TSI), Principal Project Company shall carry out or comply with the following:
1. Set-up a full isolation containment or a secondary containment for all glovebags abatement areas. Install critical barriers with two layers of polyethylene sheeting on the floors and on the walls. Set up a full decontamination system with shower for quantities greater than 25 LF, unless otherwise directed by the Contract Documents.
  2. Areas with evidence of damaged TSI will require HEPA-vacuuming of the access to this debris as well as vacuuming of all piping, ductwork and substrate materials within a minimum five (5) ft. radius of all such contamination.
  3. Use wet methods and HEPA vacuums. The removal of TSI shall be sufficient to accommodate access by applicable trades within the plenum, wall cavity or crawl space zone for routing of conduit, cables, etc. Coordinate with abatement of other applicable materials.
  4. Pipe Insulation Removal: Cut and separate metal bands, where appropriate. Locate the section length (typically three feet) and cut around the circumference at the end of the attached section. Twist the section to ensure it is free from the pipe. Using an airless sprayer, saturate the exterior of the covering with amended water to limit fiber release. Locate the upper and lower half seam and position one seam at the top of the pipe. After positioning, cut along the length of the section and carefully open each half. Immediately saturate the exposed inner surface thoroughly with amended water. Lower both halves into 6-mil polyethylene disposal bags. Do not place or allow insulation to fall on the floor. Pick-up debris falling on the floor and place it in disposal bags immediately. Clean to remove all debris remaining on the pipe.
  5. Fitting Insulation: Saturate fitting insulation with amended water. Remove fitting insulation using scraping tools, hand pressure and brushing. Immediately saturate the exposed inner surface thoroughly with amended water. Do not remove insulation by striking or chipping the surfaces. Deposit fitting insulation directly into 6-mil disposal bags. Do not place or allow insulation to fall on the floor. Pick-up debris falling on the floor and place it in disposal bags immediately. Clean to remove all debris left on fitting.
  6. At a minimum, use glove bags procedures as per Cal/OSHA Regulation 8 CCR 1529, Asbestos Activity Class/Category - Work Class I when removing Asbestos – Containing Thermal System Insulation (TSI) materials.
  7. Disassemble the pipping tanks and mechanical component on the boiler and heater systems using wet methods. Saturate the packing ACM before removing the bricks, pipes, and other ACM insulated (tar paint, canvas, materials).

8. Dispose of TSI and packing material in double goose necked-labeled bags or double wrap cutout sections in 6-mil polyethylene sheeting and properly labeled as friable asbestos waste.
- B. With respect to removing friable insulation, fireproofing, acoustical plaster, and, laid-in, splined or glued-on acoustical tiles, Principal Project Company shall comply with the following:
1. Mist asbestos material with amended water, using airless sprayers, or spray equipment recommended by the surfactant manufacturer and capable of providing a "mist" application to reduce the release of fibers. Saturate the material sufficiently to wet it to the substrate without causing excessive dripping or de-lamination of the material. Mist the asbestos material continuously during work process to maintain damp conditions and to minimize asbestos fiber dispersion, but without accumulating water on the floor.
  2. Remove ACM and overspray from all surfaces, including but not limited to structural steel, deck, walls, ceilings, ducts, insulation, piping, conduit, junction boxes, cables, etc.
  3. Remove the saturated ACM in small sections. As it is removed, place the material in sealable plastic bags. Do not allow materials to dry out prior to insertion into the bags. Do not permit materials to accumulate on floors and other surfaces in the work area.
  4. After removing the ACM, wet and wipe all surfaces, or use a soft-bristle brush to remove all residual accumulated material. Clean all surfaces with special emphasis on the top edge of the Spray-Poly or polyethylene covers.
- C. With respect to removing asbestos floor coverings, Principal Project Company shall comply with the following:
1. Mastic removal solvents, procedures, and equipment information submittals must be approved prior to floor coverings removal.
  2. In flooring areas where a solvent-based mastic remover is to be applied, Principal Project Company shall use a low odor mastic remover. Principal Project Company shall submit the Safety Data Sheets (SDS) of the mastic remover it intends to use, for the review and approval of the SAR group within the City Public Works Department or designee. After the application of a solvent-based mastic remover, Principal Project Company shall rinse the flooring areas by wet-mopping, applying "simple green cleaner" or equivalent, scrubbing floors, and finalize the clean up by re-mopping with clean water. Principal Project Company shall provide adequate ventilation to exhaust out the odors from the solvent-based mastic remover. Principal Project Company shall ensure that no odors from the solvent-based mastic remover remain.
  3. Vinyl floor tiles adhering to old non-ACM linoleum or tiles may require removal of the sub flooring intact to remove the overlying asbestos-containing mastic residues. For demolition projects, remove leveling compounds under VAT and non-VAT removal areas as asbestos containing unless otherwise noted.
  4. Use an approved mastic removal solvent following the manufacturer's recommended procedures. Wipe residual material and dispose of waste and rags in a proper manner.
  5. Where removing the mastic is feasible without the use of solvents, use water with liquid dishwashing detergent (1 ounce of detergent to 1 gallon of water), and scrub surfaces as required to remove residual material, scraping the wetted surface with a stiff-bladed wall or floor scraper. Wipe residual material and dispose of rags as ACM waste. Wet vacuum standing water with a HEPA vacuum.

6. Use of an approved portable shot abrasive "bead blaster" system that strips, cleans, and etches the floor, shall follow the manufacturer's recommended procedures. This method can dislodge sprayed-on fireproofing and/or sprayed-on acoustical plasters on the floor below due to excessive vibrations, where applicable. Therefore, adhesion and cohesion testing of these materials shall be conducted prior to the bead blaster's use. Usage of this system will require a variance from Cal/OSHA and the local Air Quality Management District as a "dry removal" method and approval by the SAR group within the City Public Works Department.
  7. Use of a buffer for mastic removal will require wet buffing only. Using a buffer will render the mastic onto a friable state. Principal Project Company shall conduct mastic removal using a buffer following the BAAQMD Regulation 11, rule 2. Buffer brushes shall be disposed of after each use as asbestos waste. Thoroughly remove all mastic residues from the buffer before removal from the work area.
- D. With respect to removing vinyl floor tiles and mastics, Principal Project Company shall comply with the following:
1. Remove the flooring and mastics as indicated on the Contract Drawings using full isolation procedures, satisfying the requirements of Cal/OSHA Regulation 8 CCR 1529, Work Class II.
  2. Set-up critical barriers and splash guards and establish negative pressurization.
  3. Remove the tiles using wet methods to minimize breakage and airborne fiber releases.
  4. Remove the mastic using an approved mastic remover.
  5. HEPA vacuum the contained area following abatement for clearance.
  6. Provide a full decontamination system with shower for areas exceeding 25 SF.
  7. Dispose of tiles and mastic as Category 1 wastes.
- E. With respect to removing linoleum flooring and mastic, Principal Project Company shall comply with the following:
1. Remove the flooring and mastics as indicated on the Contract Drawings using full isolation procedures, satisfying the requirements of Cal/OSHA Regulation 8 CCR 1529, Work Class II and BAAQMD Regulation 11, Rule 2.
  2. Set-up critical barriers and splash guards and establish negative pressurization.
  3. Remove the linoleum backing using wet methods to minimize breakage and airborne fiber releases.
  4. Remove the mastic using an approved mastic remover.
  5. HEPA vacuum the contained area following abatement for clearance; minimize use of encapsulant on substrates to be retiled.
  6. Provide a full decontamination system with shower for areas exceeding twenty-five square feet (>25 SF).
  7. Dispose of linoleum backing and mastics as friable asbestos waste.
- F. With respect to removing electrical/Wiring Insulation, Principal Project Company shall comply with the following:

1. Remove wiring by cutout of the conduit in manageable sections, where possible. Otherwise, pull the wire through the conduit with a properly sized sponge wetted with encapsulant tied to the distal end, misting the insulation continually and HEPA vacuuming any residual debris. Avoid unnecessary cutting or peeling.
  2. Clean up the area and dispose of the asbestos-containing waste. Wire bundles may be wrapped in burlap or cardboard, prior to bagging, to protect against penetrating the disposal wrapping.
- G. With respect to removing tar-coated electrical wrap, Principal Project Company shall comply with the following:
1. After confirming that the systems have been de-energized, including the proper deployment of log out/tag out procedure, remove materials using full isolation or mini-containment procedures, satisfying the requirements of Cal/OSHA 8 CCR 1529 Work Class 2 procedures. Use wet methods for dust controls. Dispose of materials as non-friable asbestos waste.
- H. With respect to removing ACM paint of ceiling plasters, Principal Project Company shall comply with the following:
1. Remove materials using full isolation or mini-containment procedures, satisfying the requirements of Cal/OSHA 8 CCR 1529 Work Class 2 procedures. Use wet methods for dust controls. Dispose of materials as non-friable asbestos waste. Remove substrates as required to access materials and overspray.
  2. Removal of larger ceiling segments, particularly demolition of elements that may impact paint finishes (see Demolition Plans), shall be completed under full isolation or mini-/mobile containment procedures by a licensed abatement contractor. The asbestos contractor using glovebag and mobile mini-containment methods or full isolation methods, depending on the quantities impacted, shall complete coring greater than two (2) inch diameter, which cannot be properly controlled using a wetted sponge.
  3. If a mobile containment is used, clean-up and reseal the phone booth-type containment and airlock entry between uses.
- I. With respect to removing window and door glazing compounds, Principal Project Company shall comply with the following:
1. Remove windows and doors following abatement of other interior finishes and materials and wrap in a double layer of polyethylene sheeting, where feasible.
  2. Where complete removal and disposal of the frames is not feasible, scrape the glazing compound following installation of polyethylene drop cloths under each window or door.
  3. Scrape residual compounds from wood or metal frames, as applicable. Double bag and dispose of materials as Category I non-friable waste unless otherwise directed by the SAR group within the City Public Works Department or designee.
- J. With respect to removing exterior/perimeter windows and door caulking, Principal Project Company shall comply with the following:
1. Cordon off the work area, installing critical barriers at the windows, doors, and other penetrations, as applicable.
  2. Remove ACM using wet methods per Cal/OSHA Regulation 8 CCR 1529, Work Class II.

3. Set-up drop cloths on the ground and nearby objects to contain falling materials on the ground or public access areas surrounding the work area.
  4. HEPA vacuum the sills and frames following abatement.
  5. Provide a full decontamination system with shower for areas exceeding 100 sf.
  6. Remove residual caulking from perimeter stucco, wood, metal, window and doorframes and concrete finishes, as applicable. Double bag and dispose of materials as Category I non-friable waste.
- K. With respect to removing roofing material, Principal Project Company shall comply with the following:
1. Seal any air intakes, operable windows, and skylights within 50 feet of the work area with 6-mil polyethylene sheeting secured in place over the opening. Weather conditions shall be dry and wind conditions less than 10 mph with dry. Establish a secured waste storage area where sealed bags of roofing material are stored during removal. Provide such areas for each different roof elevation or section. Line the storage areas with a layer of 6-mil polyethylene sheeting.
  2. Employees and authorized visitors at the work site during on-going work shall wear approved respirators and full body disposable protective clothing as described in "Personnel Protection" and are required to fully shower out when exiting the abatement zone.
  3. Set-up drop cloths on the ground under roofing removal area and abate the roofing materials using wet methods. Seal rooftop vents, windows, etc. with one layer of 6-mil polyethylene sheeting as a critical barrier. Bag or wrap waste in 2 layers of 6-mil polyethylene sheeting and lower to ground. Debris chutes must be sealed and negatively pressurized, if used.
  4. Comply with the following Cal/OSHA requirements:
    - a. Adequate wet ACM per 8 CCR 1529 Para. (g)(B)(2).
    - b. Provide continuous misting of cutting machines per 8 CCR 1529 Para. (g)(B)(3).
    - c. Use HEPA vacuums or dust collectors during power cutting per 8 CCR 1529 Para. (g)(B)(4).
    - d. Do not throw ACM roofing off the roof per 8 CCR 1529 Para. (g)(B)(5).
  5. For Disposal & Cleanup: HEPA vacuum the surrounding area following the abatement for final clearance. Dispose of all roofing debris as Category 1 non-friable asbestos waste.
  6. Allow for a 20 ft. minimum buffer zone between the roof removal activities and other demolition or renovation work. Dampen the roof surface with a fine spray of amended water before proceeding with removal. Keep roofing material damp throughout the removal process.
  7. Double bag roofing material in 6-mil labeled disposal bags and dispose of by methods described herein. Do not drop bags from the roof to the dumpster; transport bags without risk of their integrity utilizing the stairs or a lined waste chute. Where a lined waste chute is used, contain the opening to the dumpster with polyethylene sheeting and install a HEPA-filtration device to scrub the dumpster containment in the event of a bag rupture. Clean and seal the chutes overnight, as applicable.

8. HEPA vacuum and/or wet wipe the entire work site including adjacent roof area and removed areas following the roofing's abatement. The area may be sprayed with a light coat of encapsulant to lockdown all remaining asbestos fibers, except the skylights, as applicable.
  9. Provide a full decontamination system with shower for areas exceeding one hundred square feet (100 SF).
  10. Non-friable asbestos roofing material is considered non-hazardous and can be disposed of as non-hazardous asbestos waste. This can be transported and disposed of at a landfill-accepting Category I, non-friable ACM.
- L. With respect to removing window glazing putty, Principal Project Company shall:
1. Set up the lead hazard control regulated areas. Ensure that drop cloths extend sufficiently, about ten (10) ft. minimum, in all directions.
  2. Remove the windows intact to avoid disturbance to the window glazing putties. Burrito-wrap and dispose of windows as Category 1 non-friable waste. Where full removal intact is not feasible, close and seal windows and scrape putty utilizing drop cloths and wet methods. HEPA-vacuum the sills and surrounding area and use drop cloths, before final visual clearances.
- M. Window and Door Glazing Compounds
1. Remove windows and doors following abatement of other interior finishes and materials and wrap in a double layer of polyethylene sheeting, where feasible.
  2. Where complete removal and disposal of the frames is not feasible, scrape the glazing compound following installation of polyethylene drop cloths under each window or door.
  3. Scrape residual compounds from wood or metal frames, as applicable. Double bag and dispose of materials as Category I non-friable waste unless otherwise directed by the SAR group within the City Public Works Department or designee.
- N. With respect to removing fire rated doors, Principal Project Company shall:
1. Remove fire doors with 45-minute or greater fire rating intact, burrito-wrap in two (2) layers of six (6) mil fire-retardant polyethylene sheeting and dispose as friable asbestos waste.
- O. With respect to removing lead – containing ceramic tiles: Principal Project Company shall:
1. Set up the lead hazard control regulated areas. Seal vents, windows, etc., with one layer of six (6) mil polyethylene sheeting as a critical barrier. Post signs.
  2. Remove the ceramic tiles off from the substrate without bashing, cutting, grinding, or pulverizing the glaze, or include the ceramic tiles as part of the substrate demolition, if applicable. Bashing, cutting, grinding, or pulverizing glazed ceramic tiles is known to create significant airborne lead above the PEL.
  3. Manually demolish ceramic wall tiles using drop cloths, wet methods, and HEPA vacuums for dust control in compliance with Cal/OSHA regulation 8 CCR 1532.1. Do not use power tools or airline tools to demolish ceramic wall tiles.
  4. Avoid dry sweeping. Clean-up all work areas before leaving the site daily.

5. For tiles mounted to concrete, plaster or masonry substrates, isolate the room and establish negative pressurization of the work areas using HEPA-filtered negative pressure units and demolish the tiles using a pneumatic or electric chipper or jackhammer. Continuously mist the work area during chipping activities.
6. Dispose of debris as hazardous waste if waste characterization determines the waste to be hazardous. HEPA vacuum the fine debris and dust residues and dispose as hazardous waste.

P. With respect to removing lead sheeting, Principal Project Company shall:

1. Set up a negatively-pressurized containment for removal of the sheeting. Seal vents, windows, etc., with one layer of six (6) mil polyethylene sheeting as a critical barrier. Post signs.
2. Remove lead sheeting intact by unscrewing panels from substrate. Doors with sandwiched lead sheeting shall be removed by the pins/hardware without disturbance to the sheeting within the core.
3. If unbolting panels cannot be performed, and cutting of sheeting is required, non-powered tool shall be used. Lead sheeting is relatively soft and pliable, manual tearing / cutting can be easily done. Absolutely no torching or welding on the lead sheeting or in the vicinity of the lead sheeting, until after the zone has been tested, cleared and released as a non-lead containment work zone.
4. Use wet methods and HEPA vacuums for dust control in compliance with Cal/OSHA regulation 8 CCR 1532.1. Do not dry sweep any dust or debris generated by removal of panels.
5. Wrap sheeting to prevent it from scratching and leaving score marks on the floor. Lead sheeting waste shall be rolled up and wrapped with 10-mil plastic sheeting, labeled, before taken out of the containment. All scuff marks left by the lead sheeting on any surfaces must be thoroughly scrubbed and cleaned.
6. Characterize and dispose of sheeting and debris as potentially hazardous waste.
7. HEPA vacuum debris daily for all work areas before leaving the site.
8. Triple wash all surfaces inside the containment prior to final lead wipe sampling by the Environmental Consultant.

Q. With respect to removing painted plaster ceiling/wall/column lead paint removal, Principal Project Company shall:

1. Provide ladders, scaffolding, etc., to access and remove paint and or paint/substrate from all surfaces, as applicable. Ceilings shall be scraped first in each area.
2. Remove materials at applicable locations. Wet wipe, as required. Lightly dampen the work surface and mist the surrounding area continuously throughout the scraping process.
3. Scrape and nylon brush decorative or rough ceiling surfaces or trusses, as applicable, to remove the paint and or paint/substrate. Then, HEPA vacuum these surfaces.
4. After scraping, HEPA vacuum all surfaces to remove any remaining dust.

R. With respect to exterior paint removal, Principal Project Company shall:

1. Place drop cloths on the ground surrounding surfaces to catch any debris from scraping lead-based coatings, as applicable.
  2. Erect temporary protective covers over pedestrian walkways and at points of passage for persons or vehicles, which may remain operational during the course of the paint removal.
  3. Protect glass, metal trim and attachments, polished stone, or other sensitive materials and finishes from contact with chemical paint removers by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with the manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces, or masonry, as applicable.
- S. With respect to steel/metal/piping spot removal, Principal Project Company shall:
1. Remove paints on steel components scheduled for welding or torching using a chemical stripper, needle gun or other approved methods as outlined in the approved Principal Project Company's Hazardous Materials Management Plan (HMMP).
  2. Use drop cloths, polyethylene barriers, Hudson and airless sprayers and other methods as required for dust control.
  3. Characterize and dispose of paints, rags, etc., separately for possible disposal as a Hazardous Waste.
- T. With respect to removal of surface coatings with power tools, Principal Project Company shall:
1. Where mechanical removal of surface coatings constitutes a Level II activity, provide power tools, to the extent feasible, with local HEPA exhaust or dust collector systems to capture the aerosolized lead.
    - a. Removal with power blasting tools: For steel coated structures and as approved by the SAR group within the City Public Works Department or designee, power blasting tools may be used for removal of the lead-based paint or hazardous coating materials. To the extent a containment construction will be required to emissions. As part of the HMMP a detailed work plan including an enclosure system with dust collection systems and exhaust ventilation as needed shall be submitted and approved by the SAR group within the City Public Works Department prior to using this method.
    - b. Removal with power washing: For industrial facilities or where otherwise approved by the SAR group within the City Public Works Department or designee, power washing may be used for removal of the lead-based paint or contamination. Use of this method requires construction of containment, water collection system, a filtering system, and proper disposal of the wastewater. Adequately protect adjoining sensitive materials and equipment from damage or inclusion within the lead abatement waste. Deactivate electrical systems or adequately protect them prior to the power washing. A detailed work plan including an enclosure system shall be submitted and approved by the SAR group within the City Public Works Department prior to conduct such activities.
    - c. Removal with Sodium Bicarbonate Blasting: For areas requiring complete removal of all coating residues, use of sodium bicarbonate blasting may be used to supplement scraping or chemical stripping. Use of this method requires construction of containment and filtering system to segregate activities and waste from active work areas. Adequately protect adjoining sensitive materials and equipment from damage or inclusion within the lead abatement waste. Deactivate

electrical systems or adequately protect them prior to the water and sodium bicarbonate blasting. A detailed work plan including enclosure shall be submitted and approved by the SAR group within the City Public Works Department prior to such activities.

- U. With respect to removal of lead containing jacketed telephone cable, Principal Project Company shall comply with the following:
  - 1. Removal, handling and disposal of lead jacketed telephone cables that may be encountered during demolition activities shall be conducted in accordance with the Cal/OSHA's Construction Lead Standards 8 CCR 1532.1 and CDPH Regulation 17 CCR Section 3500 through 36100. This includes, isolation controls, personal protective procedures and dust controls.
  - 2. Prevent dust generated from trimming, cutting and otherwise manhandling lead sheathed telephone cables, dust from deconstructing and hauling off outmoded equipment and dust from soldier waste deposited on floors.
  - 3. Isolate and remove in its entirety each cable designated for removal. Use appropriate equipment and work practices to prevent lead releases. If at all feasible remove the cables using hand electrical shear tools with local HEPA exhaust or dust collector systems to capture the aerosolized lead. To further minimize lead dust during the cutting, apply isolation materials such as foam or "Vaseline" in the entire area of the cutting.
  - 4. Segregate, containerize, and characterize the electrical cables for waste disposal.
  
- V. With respect to removal of transite wall and ceiling board, Principal Project Company shall:
  - 1. Remove transite board using wet cleaning methods and HEPA vacuuming. Avoid unnecessary sawing and breakage. Take out as whole sheets, if possible. Remove debris remaining at the nails, screws, or other attachments to the studs and joists. Scrape residue remaining on studs or joists flush with the surface of these materials, if these materials are not scheduled for demolition. Continually mist the air with an airless sprayer or Hudson sprayer to lockdown suspended particulate.
  - 2. Clean up debris from pipe insulation, fireproofing, acoustical insulation, or other sources (as applicable), which may exist on the topside of the studs or within the wall or ceiling cavity.
  - 3. Clean up the area and dispose of the asbestos-containing waste. Panels may be wrapped in burlap or cardboard, prior to bagging, to protect against penetrating the disposal wrapping.
  
- W. With respect to removal of transite pipelines, ducts, breechings, or flues, Principal Project Company shall:
  - 1. Remove using full isolation procedures satisfying the requirements of Cal/OSHA Regulation 8 CCR 1529, Work Class II.
  - 2. Remove transite materials using wet cleaning methods and HEPA vacuuming. Avoid unnecessary sawing and breakage. Take out as whole lengths, if possible, cutting at the hanger supports and wrapping the separated sections in a double layer of polyethylene sheeting. Note that water penetration of this material is usually minimal.
  
- X. With respect to removal of underground transite piping or pipe insulation, Principal Project Company shall comply with the following:

1. Carefully excavate the areas identified for the underground utility or with potential to encounter underground piping. Using wet methods mist the excavated areas, as the pipe gets uncovered. To the extent feasible provide an enclosure for removal as required to control airborne fibers.
  2. Using wet methods and HEPA vacuuming techniques, remove pipe intact to the extent feasible. Cutting, abrading or breaking the pipe shall be prohibited. Immediately place pipe in polyethylene bag or wrap in polyethylene and label the waste.
  3. At the end of each work shift, all removed pipe shall be transferred to a closed receptacle.
  4. Clean up the regulated area and dispose of the asbestos-containing waste. Duct or flue edges may be wrapped in burlap or cardboard, prior to polyethylene sheeting, to protect against penetrating the disposal wrapping.
  5. Dispose of transite as Category 2 non-friable waste, double wrapping intact segments in six (6)-mil polyethylene sheeting.
- Y. With respect to removal of exterior vapor barrier or expansion joint, Principal Project Company shall:
1. Cordon area and set up drop cloths on the ground under the removal area and abate using wet methods. Seal vents, windows, etc. with one layer of six (6) mil polyethylene sheeting as a critical barrier. HEPA-vacuum surrounding area and drop cloths before final visual clearances.
- Z. With respect to removal of PCBs and mercury containing lamps, Principal Project Company shall comply with the following:
1. Disassemble all light fixtures to visually examine the ballasts; ballasts that are not labeled as non-PCB shall be collected and disposed of as PCB-waste. Collect fluorescent tubes for disposal / recycling as mercury containing wastes.
  2. Handling and Disposal of Lamps
    - a. Spent fluorescent and other mercury-containing lamps shall be considered a hazardous waste as per the California Department of Health Care Services.
    - b. Ship lamps to a commercial recycler (e.g., Mercury Technologies) where they shall be crushed and the mercury reclaimed.
    - c. Comply with DOT requirements for manifests, with evidence of proper disposal provided to the SAR group within the City Public Works Department, including a log of shipping dates and quantities.
    - d. Remove mercury fluorescent lights and load into secured cardboard boxes for shipment to prevent unnecessary breakage.
    - e. In the event of lamp breakage, clean-up broken glass and debris immediately, using a HEPA-filtered vacuum for final clean up.
- AA. With respect to loose debris cleanup, Principal Project Company shall comply with the following:
1. Construction operations may occasionally disturb loose and peeling paints outside the immediate work area through building vibration or other means. All such loose paint and debris shall be cleaned-up daily using a HEPA-filtration vacuum. Provide adequate protection to offset future disturbances by abating or otherwise sealing affected surfaces.

2. Clean-up background or construction-related dusts from demolition of lead-coated elements or other contaminant sources using wet methods and HEPA-filtered vacuums.
  3. Do not dry sweep.
- BB. With respect to stabilization of loose & peeling paints, Principal Project Company shall comply with the following:
1. Post notices, including CDPH, Cal/OSHA and EPA RR&P notices, as applicable, prior to start of work.
  2. Manually scrape and stabilize loose and peeling paints prior to demolition of painted substrates using drop cloths, wet methods, and HEPA vacuums for dust control in compliance with Cal/OSHA regulation 8 CCR 1532.11 and the EPA's RR&P rules. Avoid dry sweeping. Burning of paints, use of heat guns greater than 1,100 deg. F, and use of leaf blowers or compressed air for clean-up are prohibited.
  3. Use of mechanical equipment, such as sanders, grinders and needle guns without a HEPA-vacuum attached thereto are prohibited for sites with children under the age of 6 as occupants (per EPA's RR&P rules).
  4. Work areas shall be cleaned-up of lead hazards daily before leaving the site.
- CC. For mechanical sanding, Principal Project Company shall comply with the following:
1. Sanding is prohibited without written authorization from the SAR group within the City Public Works Department.
  2. If approved, work areas requiring mechanical sanding or stripping of painted surfaces with any lead content shall be fully contained with polyethylene dust barriers, establishing negative pressure of the zone, and using HEPA-filtered tools and other dust control procedures as outlined under 8 CCR 1532.1.
- DD. For prime or painted structural steel spot abatement, Principal Project Company shall comply with the following:
1. Manually scrape paints and primers at locations of new welded connections as shown in Contract Documents. Use an approved chemical stripper with "low odor" and scrape using manual, wet methods, drop cloths, visqueen barriers, and HEPA vacuums for dust control in compliance with Cal/OSHA regulation 8 CCR 1532.1, CDPH regulation 17 CCR Section 35001 through 36100 and the EPA's RR&P rules, as applicable.
  2. Avoid dry sweeping, burning of paints, use of heat guns greater than 1,100 deg. F, and use of leaf blowers or compressed air for clean-up. Use of mechanical equipment, such as sanders, grinders and needle guns without a HEPA-vacuum attached thereto are prohibited for this site per the EPA RR&P rules. Work areas shall be cleaned-up of lead hazards daily before leaving the site.
  3. Note that 8 CCR 1537(c) and SFPUC require stripping of any painting coating for a distance of at least 12-inches from the area of heat application (torching/welding, etc.), or workers shall be required to use supplied air respirators in accordance with 8 CCR 1532.1 or the provisions of 8 CCR 1536(b)(c). Dispose of stripper and contaminated drop cloths as hazardous waste.
  4. Ventilate the abatement zone as required by the stripper manufacturer. Workers shall wear combination organic (charcoal) and HEPA filter respirator cartridges, as necessary.

5. Note that despite the quality of abatement, some minor residues may remain on structural elements as well as paints and primers on inaccessible surfaces, which cannot be abated. During the welding phase, Principal Project Company shall operate "smog hogs" or localized exhaust units in the vicinity of welding work to prevent build-up of airborne lead contaminants within occupied and other construction areas. Localized exhaust units shall exhaust outdoors.
  6. For Disposal & Cleanup: Demolish and dispose of intact painted substrates as non-hazardous waste. Characterize and dispose of loose and peeling paint debris, chemical strippers, rags, etc. as potentially hazardous waste. Clean-up drop cloths and HEPA vacuum loose and peeling chips and debris daily for all work areas before leaving the site.
- EE. Principal Project Company shall comply with the following encapsulation procedures:
1. Do not start encapsulating work until receiving a notice to proceed from the SAR group within the City Public Works Department to apply encapsulant.
  2. Prepare and apply encapsulant in accordance with the manufacturer's specification, using airless spraying equipment. Because application by spraying could cause dissemination of residual fibers, encapsulant must be applied with as much caution and at as low a nozzle pressure as possible.
  3. Apply encapsulant in 2 coats with a tint to be approved by the SAR group within the City Public Works Department. Apply the first coat as a penetrating encapsulant, allowing it to properly dry. Then apply a second coat of bridging encapsulant.
  4. Apply penetrating type encapsulant to provide complete penetration of asbestos fireproofing surfaces exposed during the controlled renovation activities in accordance with manufacturer's recommendation. Apply encapsulant using airless spray equipment.
- FF. Principal Project Company shall comply with the following daily cleaning procedures:
1. Clean asbestos-containing debris and contaminated water from the work area daily using wet methods and HEPA vacuuming equipment. Place asbestos debris and water in bags, sealed and either stored or removed from the work area.
  2. Worker decontamination enclosure system; clean the clean room, shower, and equipment room daily or as required more frequently to maintain acceptable clean room perimeter air sample total fiber counts. Keep the clean room floor dry and free of any waste. Repair and replace the clean room flap whenever damaged or torn.
- GG. Principal Project Company shall comply with the following in bagging, drumming, and handling waste:
1. Protect all workers handling waste in full body protective clothing and at least a respirator approved by NIOSH for protection against asbestos. Workers transporting clean, sealed drums or other clean, sealed waste may handle waste with less protective clothing if approved by the SAR group within the City Public Works Department or its designee.
  2. Do not allow asbestos waste to dry out prior to sealing bags.
  3. Seal bags of asbestos-containing waste with tape within the work area. Seal bags with a goose neck fold: first twist bag and seal top opening with tape; fold remaining bag extension over the first tape enclosure and re-tape around top of bag there by double sealing the top opening. No free-flowing water shall be present at any time in the bag. If free-flowing water is present, Principal Project Company shall add absorbent into the bags to remedy the condition.

4. Wrap and seal waste treated as asbestos contaminated that cannot be contained in bags in 6-mil clear polyethylene plastic or other impermeable material approved by the SAR group within the City Public Works Department. Wrap objects that will tear, cut, or damage the integrity of the plastic in a protective material such as canvas or burlap to reduce the potential for damage to the plastic or other impermeable material.
5. Sealing Waste from Glove Bag with Cut-Out: Wrap sections of piping covered with ACM in a minimum of two layers of 6-mil polyethylene sheeting before removal from the work zone.
6. While in the work area, decontaminate bags and/or wrapped objects of any bulk debris by wet wiping. Utilizing the equipment decontamination enclosure system, pass the bags and/or wrapped objects into the washroom where they will be thoroughly decontaminated by wet sponging with amended water. Decontaminated bags will then be passed directly into the holding room where they will immediately be placed in a second clean bag and sealed with tape.
7. Wrap and seal decontaminated objects in a second layer of impermeable material.
8. Deposit bags with friable hazardous waste into clean sealable drums for transport. Seal filled drums. Mark drums with the label prescribed by the EPA, including the Generator I.D. Number or source location and the Waste Manifest Number.
9. Deposit bags into clean sealable dumpster for transport, except non-friable roofing which can be deposited directly into double-lined waste dumpsters for disposal at a landfill accepting Category I, non-friable ACM.
10. The SAR group within the City Public Works Department must be notified prior to removing materials from the work area and prior to loading waste into dumpsters or other transport containers for removal from the site. At least 24 hours of advance written notification must be given.

**END OF SECTION**

## **SECTION 02 81 10 - ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. Up to 80% of the surplus soils to be excavated, transported and disposed may be classified as a Hazardous Waste and/or contaminated material. The Work will involve working environments that may be hazardous, contaminated, or non-hazardous to activities associated with the excavation, handling, transportation, and disposal of all excavated materials and other wastes in the Project Site with emphasis to Hazardous Materials.
- B. Serpentine, serpentinite, or other ultramafic rocks and soils containing naturally occurring asbestos (NOA) will be encountered on the Project Site.
- C. Such hazardous, contaminated, and non-hazardous environments include, and are not limited to Hazardous Materials and non-Hazardous Materials, soils, groundwater, heavy metals, petroleum hydrocarbons, polynuclear aromatic hydrocarbons, organic compounds, serpentine rock and ultramafic material (which may contain natural occurring asbestos - NOA), lead-based paint materials, sewage, sludge, debris, grit, sewer gases, bacterial/biological contamination, rail road ties, oxygen deficiency, and confined spaces.
- D. If Hazardous Materials are discovered, immediately notify the SAR group within City Public Works Department and the City's Authorized Representative both orally and in writing.
- E. Provide employees with all levels of personal protective equipment (PPE), including personal air monitoring if required. Principal Project Company shall have taken into account the productivity losses, if any, due to the use of respirators and personal protective equipment.
- F. Do not use the Project Site as a storage facility for work being performed at another site.
- G. Lead Hazards: All Work that affects any level of lead will at a minimum be performed under the Cal/OSHA Lead in Construction Standard 8 CCR 1532.1 as well as all federal, State, and local regulations.
- H. Hazardous Waste and non-Hazardous Waste shall only be disposed at permitted California landfills (22 CCR 66262), equivalent out-of-state landfills (40 CFR 262), permitted recycling facilities, and at other projects as approved by the SAR group within City Public Works Department.
- I. Any screening or crushing operations of excavated materials cannot proceed without the appropriate BAAQMD and Cal-EPA/DTSC permits.
- J. A Site Mitigation Plan was prepared and approved by the San Francisco Department of Public Health, the requirements of which are included in this Section 02 81 10.

#### **1.2 RELATED SECTIONS**

- A. Section 01 35 43 Environmental Procedures
- B. Section 01 35 50 Additional Environmental Procedures

#### **1.3 SUBMITTALS**

- A. Principal Project Company shall submit the documents listed below no later than ten Days before start of Work at the Project Site or NTP2, whichever is earlier, before any soil disturbing activity may begin.
- B. Principal Project Company shall submit the following to the SAR group within City Public Works Department as separate submittals:
  - 1. Name environmental consultant and the accredited environmental laboratory, if used.
  - 2. Pre-Excavation Soil Profiling Sampling Plan draft and final version in accordance with Part 1.4 herein.
  - 3. An Environmental Site Assessment (Phase II) draft and final report in accordance with Part 1.4 herein.
  - 4. Site Mitigation Completion Report (SMCR) as requested by San Francisco Department of Public Health.
  - 5. Waste profile application package on each waste stream planned for disposing the excavated soil. Prepare and submit waste profile application to each proposed disposal facilities for acceptance. The formal waste profile application will also include, if any, additional information (such as slurry additive applied as part of the construction) shall be included in the formal waste profile application.
  - 6. Waste Profile # (s) from the permitted landfills or the permitted disposal & recycling facilities that will be used.
  - 7. Workers Mandatory Environmental Training Records in accordance with Part 1.7 herein, as requested by the City as Regulator.
  - 8. Transporter's current Class 1 Certificate of Compliance from the California Highway Patrol and Hazardous Substance Removal Certification in accordance with Part 1.9 herein, as warranted.
  - 9. Copy of the Non-Hazardous Waste form for and subsequent copies attached to the monthly Soil Disposal Spreadsheet in accordance with Part 1.10 herein.
  - 10. Hazardous Waste Manifest in accordance with Part 1.11 herein, as warranted.
  - 11. The original source of where the import soils are coming from, the name of the laboratory used to analyze the soils, and the date of chemical analysis, and the analytical test results, and frequency of the analytical testing in accordance with Part 3.3 herein.
  - 12. Monthly Import Fill Spreadsheet in accordance with Part 3.3 herein.
  - 13. Cal/OSHA asbestos Competent Person training records as pertaining to requirements specified in the Cal/OSHA standard 8 CCR § 1529, and when Serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) is present.
  - 14. Cal/OSHA asbestos worker training records as pertaining to requirements specified in the Cal/OSHA standard 8 CCR § 1529, and when Serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) is present.

**1.4 CLASSIFICATION AND MANAGEMENT OF EXCAVATED MATERIALS**

- A. The pre-excavation profiling shall be done so as to classify the excavated soils for a "load and go" disposal to a permitted California landfill or equivalent out of State landfill for Class I, II & III disposal, or permitted disposal & recycling facilities.

- B. An intermediate soil staging and loading facility is not provided as part of this Agreement. Principal Project Company may use its own or a subcontracted intermediate soil staging and loading facility. Such a facility shall be permitted in accordance with applicable Laws and meet the definitions of the California Code of Regulations (CCR) Title 22, 66260.10 for "Individual generation site", "Onsite", "Onsite facility".
- C. Except as otherwise stated in the Contract Documents, Principal Project Company shall perform or cause to be performed excavation, loading, handling, transportation, and disposal of all surplus waste excavated soils and sediments from dewatering activities, meeting requirements of a certified and permitted California landfill or an equivalent out-of-state landfill. All such disposal activities shall require the approval of the SAR group within City Public Works Department prior to actual loading and disposal.
- D. Conditions for acceptance at various local landfills/waste disposal facilities include, filling out of a waste profile, that the surplus waste excavated soil hauled to the landfill will have greater than 50 percent solids, and cannot have any free liquids. Principal Project Company is responsible for meeting landfill requirements for disposal.
- E. Principal Project Company shall maximize reuse of excavated soils. Excavated soils can be reused anywhere within the Project Site. If the soils from this area cannot be reused, such surplus waste excavated soils shall be disposed at a certified and permitted California landfill for Class I, or Class II, or Class III, disposal or an equivalent out-of-state landfill. Acceptable landfills/waste disposal facilities for California Class I, II and III wastes are:
1. Republic Services, <http://www.republicservices.com/Corporate/Business/WasteRecycling/Facilities/landfills.a.spx>
  2. Waste Management Inc, <https://www.wm.com/find-a-facility.jsp>
  3. Clean Harbors Buttonwillow LLC, [www.cleanharbors.com](http://www.cleanharbors.com)
- F. Except for Article 1.4 herein, Principal Project Company shall not conduct any environmental or Hazardous Materials sampling or analysis without prior permission from the SAR group within City Public Works Department. If approved, the environmental or Hazardous Materials sampling shall be done in the presence of a SAR group within City Public Works Department. This does not include the Principle Project Company's obligation for any personnel air monitoring.
- G. Principal Project Company shall inform the SAR group within City Public Works Department in writing and obtain City's approval prior to any sale, supply, or offer to sell excavated material. Comply with Bay Area Air Quality Management District's (BAAQMD's) Regulation 11, Rule 14 for asbestos-containing serpentine. Additional information may be found at <http://www.baaqmd.gov/~media/dotgov/files/rules/reg-11-rule-14-asbestoscontaining-serpentine/documents/rg1114.pdf?la=en>, the California Air Resource Board Advisory #161 (<https://ww2.arb.ca.gov/enforcement-advisory-161-serpentine-rock>), and Title 17, Section 93106 of the California Code of Regulation (CCR). Principal Project Company shall perform all the engineering and chemical testing as required by the SAR group within City Public Works Department and applicable Laws and policies.
- H. Cal/OSHA regulations are triggered when asbestos is present in any amount. Principal Project Company shall fulfill the obligations under CCR Title 8, Section 1529. The regulation requires monitoring to determine exposure levels, wet methods, respirators and protective clothing, controlled access to the work area, and similar precautions associated with asbestos work regardless of the origin of the asbestos. Use of a competent person to oversee the work may also be necessary. Utilize an experienced certified industrial hygienist (CIH) and a professional geologist (PG) to assist it with this work.

- I. Asphalt, concrete, aggregate base, vegetation, debris, wood, obstructions, and other organic, unsound or deleterious matter shall be excavated separately from the soil layer, and shall not be reused as backfill. The removal, management, transportation, and disposal of asphalt, concrete, aggregate base, vegetation, debris, wood, obstructions, and other organic, unsound, or deleterious matter shall be incidental to its respective bid items.
- J. Soils of different waste disposal classification shall be segregated when excavated, managed, transported, and disposed separately with no mixing of the different types of wastes.
- K. When performing the Work, Principal Project Company shall take into account productivity losses, if any, due to but not limited to encountering and managing Hazardous Materials or non-hazardous materials, the use of respirators and personal protective equipment. The City as Regulator reserves the option and right, at any time, to use its own forces to excavate, remediate, bioremediate, haul, recycle, or dispose of both, Hazardous Materials and non-Hazardous Materials at its own facilities, State-approved facilities, contracted facilities or contracted out-of-state facilities.

## 1.5 DEFINITIONS

- A. Waste: Discarded material of any form as defined by the Code of Federal Regulations 40 CFR 261.2 (<http://www.access.gpo.gov/nara/cfr>) and the California Code of Regulations 22 CCR 66261.2 (<http://ccr.oal.ca.gov>).
- B. Hazardous Waste: This may include excavated material, friable asbestos containing material (ACM) that is not naturally occurring in rock and soil, loose and peeling lead-based paints, and other material that is regulated by and requires management, handling, transport, treatment, storage, and disposal according to the requirements of the Federal Resource conservation Recovery Act (RCRA) and associated regulation 42 U.S.C. 6901 et seq. (<https://www.epa.gov/laws-regulations/summary-resource-conservation-and-recovery-act>) and 40 CFR Part 260 et seq., or the California Hazardous Waste Control Law (<https://www.epa.gov/rcra/resource-conservation-and-recovery-act-rcra-regulations>) and associated regulations (Health and Safety Code 25000 et seq. ([https://leginfo.legislature.ca.gov/faces/codes\\_displayexpandedbranch.xhtml?tocCode=HSC&division=20.&title=&part=&chapter=&article=](https://leginfo.legislature.ca.gov/faces/codes_displayexpandedbranch.xhtml?tocCode=HSC&division=20.&title=&part=&chapter=&article=) and 22 CCR 66260 et seq.).
- C. Management of excavated materials or “management” means transportation, transfer, recycling, recovery, disposal, handling, processing, storage, and treatment of excavated materials in accordance with applicable Laws.
- D. Soil: earth material composing the superficial geologic strata (material overlying bedrock), consisting of clay, silt, sand, or gravel size particles as classified by the U.S. Soil Conservation Service. Soil does not include asphalt, concrete, aggregate base, vegetation, debris, wood, obstructions, and other organic, unsound, or deleterious matter.
- E. Project Site Mitigation Plan (Project SMP): In accordance with San Francisco Health Code Article 22A and 22B, a Project SMP was approved by the San Francisco Department of Public Health on October 1, 2024, which contains mandatory requirements for managing all soil excavation activities to protect the environment and public health . .
- F. Excavated material includes all soils (fill, alluvium, bedrock), and other materials generated in the course of the Work, which shall be excavated, handled, or disposed under this Agreement.
- G. Waste excavated soil is excavated soil that is a waste and cannot be reused within the Project Site in accordance with reuse criteria of this Section. It is surplus and shall be managed, transported, and disposed of as part of this Agreement. Waste excavated soil does not include

asphalt, concrete, vegetation, wood, debris, obstructions, and other organic, unsound, or deleterious matter.

- H. Naturally Occurring Asbestos (NOA): NOA in the City and County of San Francisco is typically associated with ultramafic, metamorphic or metamorphosed rocks within the Franciscan mélange, including serpentinite, greenstone, and blueschist. There are six regulated naturally occurring asbestos minerals: chrysotile, crocidolite (asbestiform riebeckite), amosite (grunerite-cummingtonite), tremolite, actinolite, and anthophyllite (CGS 2002). The six asbestos minerals are divided into two distinct mineral groups; serpentine minerals (chrysotile), and amphibole minerals, which include the remaining five above-mentioned minerals. These asbestos minerals are classified as known human cancer-causing substances by local, state, and federal health agencies (DTSC 2004), and regulated by name.
- I. The following soil classifications with corresponding requirements are established solely for the purpose of payment for the handling, transportation and disposal of the excavated materials determined to be a waste:
  - 1. California Class I (non-RCRA) hazardous waste: is waste excavated material that is classified as California (non-RCRA) hazardous waste, requires disposal at a California Class I disposal facility or a similarly permitted out-of-state facility and requires transport by a registered hazardous waste transporter.
  - 2. California Class II and Class III designated waste (Class II and Class III): is non-hazardous waste, and is not a California or Federal hazardous waste. It requires disposal at a California Class II or Class III disposal facility or at a similarly permitted out-of-state facility without the need of a registered hazardous waste transporter.
  - 3. Asbestos containing rock and soil where the asbestos is naturally occurring and not associated with cross contamination by building materials may be classified as California Class II waste. Principal Project Company shall contact the landfill it identifies to receive waste to assure that asbestos containing naturally occurring materials meet the acceptance criteria of the California Class II landfill.

## **1.6 WORKER'S MANDATORY ENVIRONMENTAL TRAINING**

- A. Principal Project Company, and its DB Contractor, shall:
  - 1. Provide sufficient numbers of properly trained personnel who may come in contact with, may be exposed to, disturb, operate equipment in, or otherwise excavate, handle, transport and dispose hazardous or contaminated excavated materials, asbestos, naturally occurring asbestos (NOA), and silica.
  - 2. Ensure workers have the environmental training, listed below, and training certifications and personal protective equipment (PPE), as required by applicable Laws. Submit certifications or proof of such training when requested by the SAR group within City Public Works Department.
  - 3. Hire an experienced Certified Industrial Hygienist (CIH) and a Registered Geologist (RG) to assist it with the following:
    - a. HAZWOPER: This training is required of Principle Project Company and DB Contractor's employees and Subcontractors who may come in contact with, may be exposed to, disturb, operate equipment in, or otherwise excavate, handle, transport and dispose hazardous or contaminated excavated materials, asbestos, naturally occurring asbestos (NOA), and silica. Employee(s) shall possess a current 40-hour Hazardous Waste Operation and Emergency Response ("HAZWOPER") training and certification and the associated 8-hour HAZWOPER

refresher training (in accordance with Sections 5192 and 5144 of Title 8, CCR and Title 29 CFR, Sections 1910.120 and 1910.134), and shall be certified to wear appropriate personal protective equipment and respirators.

- b. Cal/OSHA Asbestos Class II asbestos operations and Asbestos Competent Person (ACP): Principal Project Company shall meet its obligations under CCR Title 8, Section 1529 when Serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) is present.
    - 1) Principal Project Company and its DB Contractor shall have its workers, trades people and Asbestos Competent Person that will come in contact with serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) be trained for the Class II work activity level as per the Cal/OSHA standard 8 CCR § 1529.
    - 2) Principal Project Company shall have a Cal/OSHA Asbestos Competent Person as it pertains to requirements specified in the Cal/OSHA standard 8 CCR § 1529, and when serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) is present.
  - c. SILICA: Principal Project Company shall meet its obligations under the Respirable Crystalline Silica standard for construction, found in the California Code of Regulations, Title 8, Sections 1530.1, 1532.3, and 5155; and OSHA Regulation 29 CFR 1926.1153.
  - d. Health and Safety training.
  - e. Lead awareness training (for all trades who will come in contact and disturb lead containing paints as per Cal/OSHA 1532.1 Lead in Construction standard). If personal exposures to the workers exceed the 8-hr Permissible Exposure Level (PEL) of 50 micrograms/cubic meter, such worker(s) must have received training as a CDPH Certified Lead Worker (as per 17 CCR Division 1, Chapter 8).
  - f. Dust Control and Mitigation awareness training to enable Principal Project Company's personnel to comply with Sections 01 35 49 Minimum Environmental Procedures and 01 35 50 Additional Environmental Procedures.
  - g. Medical examination and blood tests (as warranted).
  - h. Respiratory protection (including current respirator fit test records).
  - i. Other training as necessary and pertaining to the work being conducted.
- B. Only qualified persons shall engage in Hazardous Materials-related work. Principal Project Company and DB Contractor personnel, who come in contact with, are exposed to, disturb, operate equipment in, or otherwise handle hazardous or contaminated materials, or demolition debris shall have appropriate hazards communication, environmental training and medical monitoring.
  - C. The City will not grant extensions of time or increases in payment for costs associated with Principal Project Company's productivity losses, inability to provide properly trained personnel, costs of training Principal Project Company's workers, or hiring of required personnel.
  - D. It is Principal Project Company's responsibility and liability to ensure that its workers and contractor have the proper training, personal protective equipment (PPE), and respiratory protection.

- E. Principal Project Company and its DB Contractor, not the City, is responsible for the health and safety, training, personal protective equipment (PPE), and monitoring and protection from exposure risks of its employees, as per federal, state and local statutes, laws and regulations.
- F. Principal Project Company is obligated to conduct any required personal air monitoring of its workers, at its own expense, in accordance with Section 01 35 45 Health and Safety Criteria.

#### **1.7 REGULATORY INDEMNIFICATION**

- A. Principal Project Company is specifically alerted to, and shall familiarize itself and its DB Contractor to, the liability statutes of:
  - 1. The Comprehensive Environmental Responses, Compensation, and Liability Act (CERCLA) of 1980 found in 42 USC, Section 9601 et seq.
  - 2. The Superfund Amendments and Re-authorization Act (SARA) of 1986 found in 42 USC, Section 9601 et seq.
  - 3. The California Hazardous Substance Account Act (HSAA) of 1981 found in California Health and Safety Code, Section 25300 et seq.
  - 4. California Health and Safety Code, Division 20, Regulations and CCR 22 Section 6600 et. seq.
  - 5. Cal/OSHA Lead in Construction Standard, Title 8, CCR, Section 1532.1.
  - 6. BAAQMD Regulation 6 for Particulate Matter and Visible Emissions (<http://www.baaqmd.gov/~media/files/planning-and-research/rules-and-regs/workshops/2017/rg0601-pdf.pdf?la=en>) and Regulation 11 for Hazardous Pollutants (<http://www.baaqmd.gov/regs/rulereg.htm>).
  - 7. The Final Regulation Order of the California Code of Regulations (CCR) Title 17, Public Health, Section 93105, on Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations ([http://www.baaqmd.gov/~media/Files/Compliance%20and%20Enforcement/Asbestos/final\\_reg\\_order.ashx](http://www.baaqmd.gov/~media/Files/Compliance%20and%20Enforcement/Asbestos/final_reg_order.ashx)).
  - 8. The California Air Resources Board (CARB) Asbestos Airborne Toxic Control Measure for Surfacing Applications.
  - 9. The San Francisco Building Code Section 106.3.2.6
  - 10. San Francisco Health Code, Article 22B - Construction Dust Control Requirements.
  - 11. The DPW Dust Control Order 171,378.
- B. Principal Project Company shall be responsible for all liability and costs necessary to prevent its own or DB Contractor's operations from violating federal, State, or local statutes, laws, regulations, and policies.

#### **1.8 REQUIREMENTS FOR THE TRANSPORTER**

- A. As warranted, Principal Project Company shall ensure that its drivers have in their possession, during the hauling of material and soil, all applicable State and local vehicle insurance requirements, valid driver's license, and vehicle registration and licensing. A current Class 1 Certificate of Compliance from the California Highway Patrol shall be affixed to each vehicle.

- B. All hazardous materials/waste haulers shall possess a Hazardous Substance Removal Certification granted by the State of California, Contractors State License Board (1-800-321-2752 or <http://www.cslb.ca.gov>), and all other required certifications and insurance.
- C. Haul trucks carrying excavated material shall be loaded so that the material does not extend above the walls of the truck bed, and there is no leakage from any vehicle. All truckloads shall be covered.
- D. All truckloads containing Naturally Occurring Asbestos (NOA) and Serpentine require both covering the load as well as lining the underneath of the truck bed ("burrito wrap") with 10mil HDPE. This is required regardless if the material is wet, hazardous, or non-hazardous.
- E. Principal Project Company shall be responsible for cleaning up excavated material spill, which occurs during loading, handling, and transportation.
- F. Preparation for shipment: Marking, labeling, placards, and packaging prior to transport shall be in accordance with all regulations and shall be the responsibility of Principal Project Company.

**1.9 USE OF NON-HAZARDOUS WASTE MANIFEST FOR CLASS II MATERIAL OR LESSER**

- A. For transportation and disposal of the non-Hazardous Waste, Principal Project Company shall initiate and fill out a non-Hazardous Waste profile form with the Class II/III landfill of its choosing. Then, submit this waste profile form to the SAR group within City Public Works Department for its approval & signature. Next, Principal Project Company shall prepare a non-hazardous waste manifest form from the landfill. The non-hazardous waste manifest form shall be completed for each vehicle carrying excavated material classified as California Class II and Class III designated waste, or of a lesser waste classification. Principal Project Company shall submit the non-hazardous waste manifest form to the SAR group within City Public Works Department for the Generator's signature at least 72 hours in advance of the day of the off-haul with an estimate of the number of loads scheduled for off-haul. The non-hazardous waste manifest form shall contain the following information before providing the final copy to the SAR group within City Public Works Department to sign:
  1. Name, address and phone number of the Generator, Project name, and Specification Section number.
  2. Principal Project Company's billing information
  3. The soil profile approval number and description of the waste.
  4. Name, address and phone number of the transport company.
  5. The name, address, and telephone number of the receiving facility i.e., disposal facility.
- B. The City will not be responsible for off haul delays if Principal Project Company does not notify the SAR group within City Public Works Department in a timely manner to sign the non-hazardous waste manifest forms.
- C. On a monthly basis, Principal Project Company shall provide the SAR group within City Public Works Department with a copy of each completed non-hazardous waste manifest Form (with the landfills signature) and its corresponding certified weight ticket.

**1.10 HAZARDOUS WASTE MANIFESTING PROCEDURES FOR CLASS I MATERIAL**

- A. As warranted, Principal Project Company shall furnish all labor, materials, equipment, and incidentals required to transport those materials identified as Hazardous Waste for the purpose of disposal.

- B. Principal Project Company shall comply with all applicable regulatory requirements listed as well as other applicable federal, State, or local laws, codes, and ordinances, which govern or regulate transportation of wastes (including but not limited to DOT-HM 181 in accordance with 49 CFR 172).
- C. All material classified as hazardous waste (Federal Class1 RCRA and California Class1 non-RCRA wastes only) shall be hauled off using a licensed hazardous waste transporter and the uniform hazardous waste manifest form (DTSC Form 8022A and/or EPA Form 8700-22 a.k.a. the manifest).
- D. Preparation and handling of waste manifests:
  - 1. For transportation and disposal of the Hazardous Waste, Principal Project Company shall initiate and fill out a Hazardous Waste profile form with the Class I landfill of its choosing. Then, it shall submit this Hazardous Waste profile form to the SAR group within City Public Works Department for its approval and signature. Next, Principal Project Company shall provide and prepare the Hazardous Waste manifest for each shipment of Hazardous Wastes from the Project Site. Principal Project Company is hereby notified that Hazardous Waste manifest, waste profiling, and landfill service agreements have to be prepared and have to be approved by the landfill in advance of the off haul. Principal Project Company shall consult with the SAR group within City Public Works Department for local requirements in filling out the forms.
    - a. The manifest shall describe the contents of each truck carrying materials to the waste disposal site, including the weight of the waste materials. Weight, not volume, shall be used to measure waste quantities.
    - b. The SAR group within City Public Works Department will provide a Hazardous Waste generator identification number for use on the manifest. Principal Project Company shall provide the State Transporter identification number and telephone number.
    - c. The licensed transporter shall also sign and date the manifest indicating that it has accepted the load described in the manifest on that particular day.
    - d. Only a City employee (and not Principal Project Company) from the SAR group within City Public Works Department will sign the manifest for the "generator" of the waste.
- E. Principal Project Company shall notify the SAR group within City Public Works Department 72 hours prior to off-haul of all excavated material. If the manifest and other forms above are to be signed by the SAR group within City Public Works Department during periods other than the hours stipulated above, Principal Project Company shall give an additional 72-hour advance notice to the SAR group within City Public Works Department.
- F. The SAR group within City Public Works Department will sign and keep the Generator's copy and give the remaining copies to the licensed transporter.
- G. The licensed transporter shall carry the hazardous waste manifest with each truckload using the traffic control approved routes for off haul
- H. Within 2 days of its return, Principal Project Company shall provide the SAR group within City Public Works Department with the completed waste manifest. The completed waste manifest shall be certified by the receiver of the waste shipment, confirming that the shipment was received at the waste treatment or disposal facility designated in Principal Project Company's bid, and certifying the weight of the shipment.

- I. Should any waste manifest not be returned within 35 days of shipment, Principal Project Company shall initiate follow-up, shall document such follow-up effort in writing with an Exception Report in accordance with 40 CFR 262.42 and/or 22 CFR 66262.42, and shall provide a copy to the SAR group within City Public Works Department.
- J. Mandatory Information for the Manifest
  1. Manifest Item 1: Generator's US EPA ID Number for Project. (Will be provided by the City after NTP as deemed necessary)
  2. Manifest Item 3: Emergency response Phone: # 24 hours line to be provided by Principal Project Company
  3. Manifest Item 5:
 

Generator's Name and Mailing Address:  
SFDPH  
Municipal Hazardous Waste Program  
49 South Van Ness Avenue, Suite 600  
San Francisco, Ca 94103
  4. Generator's Site Address:  
Name of the project
  5. Manifest Item 14: The following information is mandatory:
    - a. Contract JO # & Name of Project TBD
    - b. Project Manager: TBD
    - c. Project Manager Phone Number #:
    - d. Profile # \_\_\_\_\_ (Defined when manifest is generated. To be obtained and provided by Principal Project Company)
  6. The City & County of San Francisco applies for an exemption from the BOE Hazardous Waste Generator fees in accordance with H&SC 25174.7, 25174.1; 25205.5, and 25345. (1) Hazardous wastes which result when a government agency, or its contractor, removes or remedies a release of Hazardous Waste in the state caused by another person, and in an area from beneath a public street and originated from earthquake fill."

#### **1.11 UNDERGROUND TANK REMOVAL PROCEDURES**

- A. Principal Project Company is alerted to the fact that underground structures and tanks may be encountered during excavation. In the event that an underground storage tank, pipes, and associated fixtures are encountered, Principal Project Company shall immediately suspend the work in the immediate area and notify the SAR group within City Public Works Department as well as the San Francisco Department of Public Health.
- B. Principal Project Company shall be responsible for removing and disposing the underground storage tank, pipes, and associated piping in the excavation area according to applicable laws and regulations including:
  1. California Health and Safety Code (H&SC), Division 20, Chapter 6.9 (Section 25280 et.seq.)
  2. California Code of Regulations (CCR), Title 23, Division 3, Chapter 16 (Section 2610 et.seq.)

3. California State Water Resources Control Board (SWRCB), Leaking Underground Fuel Tank (LUFT) Manual.
  4. City & County of San Francisco, Department of Public Health, Underground Storage Tank Removal Regulations. Information available at but not limited to <https://www.sfdph.org/dph/EH/HMUPA/UST.asp>
- C. Principal Project Company shall obtain all permits, excavate, sample, analyze and prepare all reports as required by the San Francisco Health Code.
  - D. Principal Project Company shall prepare an Underground Storage Tank (UST) Closure Plan in compliance with Article 21 of the San Francisco Health Code, if UST's will be removed. Principal Project Company shall only remove the underground tanks, pipes, and related appurtenances only in the presence of an inspector from the City's Department of Public Health, the City's Fire Department, and the City's Authorized Representative.
  - E. Principal Project Company shall furnish documentation of the removal of an underground tank.

#### **1.12 DISPOSAL OF RAILROAD TIES AND TREATED WOOD WASTE**

- A. Railroad ties and wood treated with preservatives (e.g. utility poles, piers, pilings, posts, pressure treated lumber, etc), such as creosote, and/or pentachlorophenol, and/or Copper Napthenate, Zinc Napthenate, and/or Copper, Chromium, Arsenate (CCA), and/or Ammonical Chromium, Zinc, and Arsenate (ACZA) (that are not otherwise recycled by Principal Project Company) shall be transported and disposed of at a California Class 2 (non-hazardous) landfill.
- B. For wood treated with chemical preservatives such as Chromate Copper Arsenate (CCA) treated wood: Principal Project Company shall comply with the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA) and by the California Department of Pesticide Regulation (DPR) and Department of Toxic Substances Controls (DTSC) Regulations or for the treated wood waste as per the Health and Safety Code (HSC) 25150.7 and 25150.
- C. Principal Project Company shall fill out a separate waste profile with the landfill for such materials.
- D. The transportation and disposal of the railroad ties and treated wood waste shall be paid as a change order.

#### **1.13 POLLUTION INSURANCE**

- A. All Work that involves the management, handling, transportation, and disposal of hazardous and contaminated (non-hazardous) materials shall be performed either by Principal Project Company or a properly licensed Principal Project Company, who shall furnish evidence of Principal Project Company's Environmental Pollution Liability Insurance.

### **PART 2 - PRODUCTS (NOT USED)**

### **PART 3 - EXECUTION**

#### **3.1 SITE MITIGATION PLAN REQUIREMENTS**

- A. Principal Project Company shall ensure that all activities associated with soil excavation comply with the requirements of the approved Project SMP (see definitions above), which include but are not limited to:
  1. Environmental controls, which include:

- a. Health and safety requirements;
  - b. Site control and exclusion zones requirements
  - c. Project signage requirements
  - d. Noise control requirements
  - e. Equipment decontamination requirements
2. Soil management, which includes:
    - a. Soil field screening requirements
    - b. Soil containment requirements
    - c. Dust and fugitive emissions control requirements
  3. Excavation activities, which include:
    - a. Bedrock asbestos requirements
    - b. Excavation dewatering requirement
  4. Stormwater protection requirements
  5. Backfilling and restoration requirements
  6. Waste management and disposal, which includes:
    - a. Areas of potential concern requirements
    - b. Soil waste management requirements
  7. Asphalt and concrete debris waste management requirements
  8. Groundwater waste management requirements
  9. Recordkeeping requirements
- B. Upon completed implementation of the Project SMP, Principal Project Company shall submit the following documents to the SAR group within City Public Works Department as well as the City Public Health Department:
1. Verification sampling results from the areas of soil vapor samples SVP-4I and SVP-7S, that demonstrate either tetrachloroethene (PCE) is not present in sub-slab vapor at concentrations that pose a vapor intrusion concern following completion of the new slab, or PCE is not present in indoor air at concentrations that pose an unacceptable health risk following completion of the new slab and building envelope.
  2. A Site Mitigation Completion Report (SMCR) which documents implementation of the SMP, including the dust and fugitive emissions control plan contained therein, including any additional sampling, soil disposal, and post-construction verification sampling activities.
- C. In the event Project SMP requirements differ from the remainder of these Part 3 Sections 3.2 – 3.6, the Project SMP requirements shall supersede.

### **3.2 TEMPORARY STOCKPILING OF EXCAVATED MATERIAL AND IMPORT MATERIAL**

- A. Principal Project Company shall comply with Article 2.4: Excavation in the Public-Right of-Way and specifically Article 2.4.53(c) Storage of Materials and Equipment.
- B. If feasible and in the event that the SAR group within City Public Works Department permits Principal Project Company to temporarily stockpile excavated and import material along the project alignment, the following conditions shall apply (including those in Sections 01 35 43 Environmental Procedures and 01 35 50 Additional Environmental Procedures):
  - 1. Material shall be stockpiled at a location approved by the City. The volume of the stockpile will be limited within the discretion of the City.
  - 2. Stockpiled materials shall not be stored for more than 48 hours.
  - 3. The City retains the right to suspend the use of temporary stockpiling in the event of negative public perception, aesthetic concerns, and regulatory concerns. In such an event, Principal Project Company is directed to remove the stockpile within 24 hours.
  - 4. After a stockpile has been removed, Principal Project Company shall wet sweep and vacuum the area, street, and sidewalk to remove residual soil, restore the site to its original condition.
  - 5. Stockpiles of site backfill soils shall be tarped using a different colored tarp from that of import soils.
  - 6. Stockpiles must be kept adequately wetted, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile, and securely tarped & braced (weighted or tied down).
  - 7. Stockpile Maintenance requirements in Section 01 35 43 Environmental Procedures and Section 01 35 50 Additional Environmental Procedures.
- C. All costs associated with the temporary stockpiling of soils shall be borne by Principal Project Company. Such related incidental costs include, but are not limited to dust control, vacuum and wet sweeping, covering of stockpiles, multiple handling and transportation, multiple staging, work re-sequencing or rescheduling, time loss and standby time due to the duration of storage, and complying with Federal, State, and local requirements.

### **3.3 REUSE OF EXCAVATED SOILS AS BACKFILL**

- A. For backfill work: Principal Project Company shall maximize the reuse of native soils from the excavation, unless directed otherwise by the SAR group within City Public Works Department. In such a case, the following conditions shall apply:
- B. The reuse of native soils as backfill material shall meet the requirements of Part 7 – Excavation, Backfill and Embankment of the Standard Specifications and Plans, Department of Public Works, City and County of San Francisco. The Standard Specifications and Standard Plans are accessible online at <http://www.sfpublicworks.org/services/standards-specifications-and-plans>
  - 1. Native soils to be reused must not contain asphalt, concrete, bentonite, bay mud, clay, bricks, cobblestones, rocks, rubble, scrap metal, railroad tracks and ties, debris, contaminated soils, vegetation, wood obstructions, and other organic, unsound, objectionable, or deleterious matter. Principal Project Company shall remove such materials matter prior to the placement and reuse of fill.

2. Native soils must meet sieve and chloride requirements. Principal Project Company shall submit sample results to the SAR group within City Public Works Department prior to placement.
3. With approval by the SAR group within Public Works Department, native soils that are visually contaminated or are classified as a California Class I (non-RCRA) may be reused within the "area of contamination" and within 150 linear feet from its origin. Re-use of native soils must meet the engineering backfill and compaction requirements, is delineated with markers, documented, and meets the San Francisco Department of Public Health (SFDPH) requirements.
4. Principal Project Company shall notify the SAR group within City Public Works Department when and where the soils are used as backfill.
5. Surplus native soils shall be properly characterized and disposed of.

### **3.4 REUSE AND RECYCLING OF EXCAVATED SOILS AT OTHER FACILITIES**

- A. If Principal Project Company seeks to reuse or recycle surplus excavated soils at other projects or recycling facilities rather than dispose of them at a permitted landfill, Principal Project Company shall ensure the Contractor responsible for such reuse or recycle work, at its cost:
  1. Demonstrate that with the existing environmental test results that the soils can be reused or recycled. Principal Project Company at its expense may be allowed to conduct additional testing, and characterization of the soils, only with prior approval by the SAR group within City Public Works Department.
  2. Submit the acceptance criteria of the receiving facility or project.
  3. Submit a letter of acceptance from the receiving facility or project. The letter shall indicate the volumes of soils accepted. Submit a value engineering calculation demonstrating cost savings to the SAR group within City Public Works Department. Any savings that result from such reuse or recycle work will be a split 50/50 between the City and Principal Project Company.
- B. If the SAR group within City Public Works Department accepts the above, Principal Project Company shall in connection with such reuse or recycling:
  1. be responsible for, and indemnify the City from, any and all increased cost and future liability arising from the reclassification, recycling, or reuse or the surplus excavated soils if, upon reuse or recycling of such soils at any time thereafter, it is determined that the surplus excavated soils are in fact hazardous, and should not have been reused or recycled.
  2. Submit a copy of the letter of acceptance and all records, including the financial statements for the value engineering saving prior to the approval of the reuse or recycling of these soils.
  3. Bear all costs for any additional testing, characterization and profiling of the soils, including the value engineering cost.
  4. Bear all costs for the transportation, and any other associated cost for moving these soils to another project or to a recycling facility.
  5. Revise and retain its pollution liability insurance to cover this work.
  6. Repay any cost that the SAR group within City Public Works Department at its discretion will incur to conduct its own testing to confirm Principal Project Company's findings.

7. Submit a monthly reuse and recycling spreadsheet of all reused and recycled materials generated from the Project. The spreadsheet shall include information of the receiving facility or project, quantity transported (Cubic Yards), weight tags from the recycling facility.
8. The City will issue a Change Order for this work to effectuate any saving that may accrue from this Section.
9. Such work shall only be done as a Change Order after the acceptance and approval of the City and after the Change Order is processed.

**3.5 IMPORT SOIL (FILL)**

- A. Import soil (Fill) is soil or fill material received from sources outside of the Project right-of-way. Import soil (fill) includes import bedding sand and import recycled backfill sand used in the base and subbase layers of a pavement or roadway or sporting field.
- B. Environmental/chemical testing is required for each source and of the same soil classification type (based on the unified soil classification system) of the import soil (fill).
- C. In advance of hauling in and use of import soil (fill) Principal Project Company for each source of import soil (fill), shall provide the SAR group within City Public Works Department the original source of where the import soil (fill) is coming from, the name of the laboratory used to analyze the soils, and the date of chemical analysis. Laboratory results shall not be over 6 months old.
- D. Principal Project Company shall provide chemical analytical results for each source and of the same soil classification type (based on the unified soil classification system) of import soil (fill) in accordance with the Recommended Fill Material Sampling Schedule stated in the Department of Toxic Substances Control (DTSC) Advisory Note for Clean Imported Material (as shown below). If Principal Project Company brings import soils from different sources, then the "Sample per Volume" count re-starts for each of different source of import soil (fill) (as shown below).

Import Fill Volumes (for each source of import soil (fill) and of the same soil classification type)	Samples Per Volume for each source of import soil (fill) and of the same soil classification type
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for the first 1,000 yards + 1 sample per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for the first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

- E. Each source of import soil (fill), import bedding sand and import recycled backfill sand of the same type, shall be analyzed as a four-point composite. Each composite shall be analyzed for Total Petroleum Hydrocarbons-Gasoline/BTEX/MTBE (EPA Method 8015 mod/8021), TPH-Diesel/Motor Oil (EPA Method 8015 with silica gel cleanup), Volatile Organic Carbons VOC's (EPA Method 8260), Semi-Volatile Organic Carbons SVOC's (EPA Method 8270), Organochlorine Pesticides (EPA Method 8081), Polychlorinated Biphenyls (EPA Method 8082), Title 22 Metals (EPA Methods 6000/7000 Series), Asbestos (CARB Method 435), Chromium +6 (EPA Method 7199), and soluble Total Concentration Leaching Potential (TCLP) and Soluble Threshold Limit Concentration (STLC) metals (as warranted – 10x STLC & 20x TCLP).

- F. Import soils (fill) has to meet both the engineering backfill criteria and the chemical criteria of these contract specifications.
- G. Chemical Criteria: To be accepted, the chemical concentrations of the import soil (fill) has to be equal or less than the values set forth in the Regional Water Quality Control Board (RWQCB)'s Environmental Screening Levels (ESLs), Tier 1 levels. Soils (fill) with the following chemical levels shall not be accepted as import soils (fill).
1. Exceedance of the chemical values set forth in the Regional Water Quality Control Board (RWQCB)'s Environmental Screening Levels (ESLs), Tier 1 levels.
  2. Lead that exceeds 80 mg/kg.
  3. Serpentine (naturally occurring asbestos) and odorous soils
  4. Petroleum Hydrocarbons or Oil and Grease of any type that exceed 100 mg/kg.
  5. Asphalt, concrete, bentonite, bay mud, clay, bricks, cobblestones, rocks, rubble, scrap metal, railroad tracks and ties, debris, soils containing asbestos, imported contaminated soils, vegetation, wood, debris, slag, obstructions, and other organic, unsound, unsatisfactory, or deleterious matter.
- H. Environmental/chemical testing is not required of the base and subbase layers for the following materials that are used to build a pavement or roadway or sporting field: Base rock, Class II Aggregate Base (AB), Class II Recycled Base, Crushed Aggregate Base (CAB), Crushed Miscellaneous base (CMB), Processed Miscellaneous Base (PMB), Recycled Aggregate, Aggregate Subbase (ASB), reclaimed/recycled asphalt concrete (AC), and drain/crushed rock.
- I. Reclaimed/recycled asphalt concrete (AC) is acceptable for the base and subbase layers to build a pavement or roadway or sporting field.
- J. Crushed concrete is acceptable for the base and subbase layers to build a pavement or roadway or sporting field.
- K. Import material for backfill shall comply with the Section 714 Standard Specifications and Plans, Department of Public Works, City and County of San Francisco. The Standard Specifications and Standard Plans are accessible online at <http://www.sfpublicworks.org/services/standards-specifications-and-plans>; and the specifications of the Water Department for work under the jurisdiction of the SFPUC's Water Department.
- L. The SAR group within City Public Works Department reserves the right to spot check and analyze the import soils (fill) as it deems necessary, including prior to it being brought on to the project site, even after the approval of the submittal of analytical results from Principal Project Company, as well as after it is brought onsite.
- M. Should the analyses of the import soils (fill) test out to exceed the above criteria, then Principal Project Company shall be given a chance to re-sample, for re-analyses. Should the re-analyses import soils (fill) test out to exceed the above criteria, then Principal Project Company shall have to remove the import soils (fill) at its own expense and replace with clean import soil (fill). In such a case, Principal Project Company shall bear all the cost (including the City's cost) for re-analysis.
- N. For recreation and park projects, and community/urban gardens, Principal Project Company shall install a visual barrier (such as a plastic orange snow fence) in all areas between the native fill, backfill from other areas of the site, and the import (soil) fill. Principal Project

Company shall request the SAR group within City Public Works Department inspection of the visual barrier, and obtain their approval prior to Principal Project Company filling soil over it.

- O. Principal Project Company shall request inspection of the subbase placement for proper grades and depths by the SAR group within City Public Works Department, and obtain their approval prior to Principal Project Company filling soil over it.
- P. Analytical costs for imported fill (soil) shall be born by Principal Project Company.
- Q. Principal Project Company shall furnish the above analytical results at least 10 working days prior to bringing the import soil (fill) into the Project Site. The acceptance of import soil (fill) will be made by the SAR group within City Public Works Department and will depend on the results of the analytical testing, backfill requirements of the Contract Documents regardless if it meets the testing requirements of Division 31 Earthwork and Section 31 23 33 Trenching and Backfilling.
- R. Import soil (fill) shall not be brought on-site, prior to approval of the analytical results by the SAR group within City Public Works Department. Analytical results submitted shall be referenced on the import fill spreadsheet submittal.
- S. Import soil (fill) shall be brought on-site at a rate where it is immediately used in the excavation. If the SAR group within City Public Works Department allows for import material to be stored overnight (only, and not longer) on site, then such import material shall be covered and placed at Principal Project Company's soils management yard, approved soil stockpile staging area or an area within the project alignment authorized by the SAR group within City Public Works Department. Stockpiles being stored overnight shall be completely covered with 10 mil HDPE plastic and braced (weighted or tied down) securely.
- T. Import Fill Spreadsheet: As warranted, Principal Project Company shall submit five hardcopies or a digital copy of a monthly spreadsheet of all imported fill deposited at the Project Site to the SAR group within City Public Works Department. The spreadsheet shall include information on the project name, contract No., origin of import (street address, city), location of deposit (street address and depth range), quantity (cubic yards), soil type based on the unified soil classification system, the corresponding chemical, correspondent environmental analytical results submitted, truckers and trucking firm(s) used and trucking logs and invoices.

### **3.6 SECURING AREAS WITH EXPOSED, EXISTING SOIL**

- A. Wherever Construction Work exposes the existing soil or where existing soil is stockpiled, these areas shall be barricaded all around with continuous (no gaps greater than 4 inches) fencing (either metal wire or orange plastic), Triton barriers or other barricades at least 3 feet high. Principal Project Company shall ensure that barricades are installed taunt and secured against strong winds. Alternatively, the exposed, existing soil in excavation areas such as trenches, may be covered over with plates or other acceptable means. The intent is to secure the exposed, existing soil from public contact.

**END OF SECTION**

---

# Division 11: Make-Ready Requirements for Retail Space at 17<sup>th</sup> Hampshire

## **Division 11: Make-Ready Requirements for Retail Space at 17<sup>th</sup> Hampshire**

Principal Project Company shall plan for, design, and construct a retail space as part of the Infrastructure Facility at the corner of 17<sup>th</sup> Street at Hampshire Street. The retail space shall be approximately 600 square feet and be delivered in a 'warm shell' condition at Substantial Completion, enabling the permitted occupancy of a to-be-determined retail use.

The retail space must be operationally ready, which means it must meet the following requirements:

1. Receive a temporary certificate of occupancy from the City as Regulator;
2. Walls and ceilings are finished, furred as necessary and with the installation of drywall complete;
3. Flooring materials must be waterproof;
4. Life safety systems including fire alarm, fire suppression systems, and emergency signage must be installed, tested and operational;
5. Lighting and lighting controls must be installed and tested to meet minimum retail occupancy requirements required by code;
6. Electrical service and systems and water service are installed, operational, and metered separately from the Infrastructure Facility;
7. Potable water service and systems are installed, operational, and metered separately from the Infrastructure Facility;
8. Telecommunications systems are installed and tested and include at least three data drop locations with full internet and voice capabilities;
9. Security systems are installed and tested, including a card access control system and a surveillance system;
10. Mechanical systems for heating, cooling, and ventilation are installed and tested and meet minimum code requirements for a retail space of this size; and
11. Plumbing systems, including domestic cold/hot water, hot water heater, sanitary waste and venting, condensate drainage for lunchroom sink, and one adjacent multi-gender, single occupant restroom facility are installed, tested, and operational.