

MONTHLY MONITORING REPORT

August 2017

Central Subway Project

San Francisco Municipal Transportation Agency (SFMTA)
San Francisco, CA

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Task Order No. 5

Project No.: FTA-13-0294

Work Order Number: 002

OPs Referenced: 01 and 25

CLIN 0002B

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Time on project: 3 years

EXECUTIVE SUMMARY

Project Description

The Central Subway Project (CSP) involves construction of a 1.7-mile extension of Muni's T Third Line along 4th Street and Stockton Street in downtown San Francisco. The CSP is Phase 2 of the San Francisco Municipal Transportation Agency's (SFMTA) T Third Light Rail Transit (LRT) Project. Phase 1 of the project constructed a 5.1-mile LRT line along the densely populated 3rd Street corridor. Revenue service commenced on the T Third Line in April 2007. The CSP will extend the T Third Line from the 4th Street Caltrain Station to Chinatown, providing a direct, rapid transit link from the Bayshore and Mission Bay areas to South of Market, Union Square, and downtown.

Four new stations are being constructed as part of the project—an at-grade station at 4th and Brannan streets and three underground stations at Yerba Buena/Moscone Center (YBM), Union Square/Market Street (UMS), and Chinatown (CTS). Four light rail vehicles (LRVs) are included in the budget for the CSP as part of a larger procurement that will replace the entire LRV fleet. Average weekday boardings are projected to be 43,521 in 2030.

Project Status

The project has been under construction since February 2010. *At the end of July 2017, the project was 69.4% complete based on expenditures.* There was one active construction contract: 1300 Stations and Systems/Trackwork, *which was 58.0% complete based on incurred cost.* Substantial completion of this contract was originally scheduled for February 2018, but the latest master program schedule update forecasts substantial completion on June 26, 2019, a delay of 502 days. The contractor has submitted revised schedule updates through June 2017 *but the 16 most recent monthly updates from the contractor have been rejected by SFMTA. SFMTA has started withholding payments to the contractor for failure to provide schedule updates that meet contract requirements.* The master schedule information for the project is based on SFMTA's latest update of the construction schedule, which indicates a forecast Revenue Service Date (RSD) of December 10, 2019. This is 349 days later than the required RSD of December 26, 2018 in the Full Funding Grant Agreement (FFGA). **The Project Management Oversight Contractor (PMOC) notes that the forecast RSD has not changed over the past three reporting periods. The accumulation of delays appears to have been arrested, at least temporarily, which is a positive development.**

SFMTA and the contractor collaborated to start work on the CTS crossover cavern, which was on the critical path, early. *The substantial completion date remained unchanged due to the early start of this work. A risk of further delays to the completion of the mining work of up to four months remains, because the production rate remains below the planned rate.*

Placement of the invert slab at the UMS station box was completed in August and the last temporary support structures were being removed in September. Achievement of this milestone leaves CTS as the only station where mass excavation and the primary structural support system are incomplete.

Table 1 - Core Accountability Items

Project Status: <i>(as of July 31, 2017)</i>		Original at FFGA:	Current Estimate:
Cost	Cost Estimate	\$1,578,300,000	\$1,578,300,000
Contingency	Unallocated Contingency	\$74,722,000	\$9,005,903
	Total Contingency (Including Approved Contract Changes)	\$185,500,000	\$75,631,545
Schedule	Revenue Service Date	12/26/2018	12/10/2019 (SFMTA forecast)
Total Project Percent Complete	Based on Expenditures	69.37%	
	Based on Earned Value	70.64%	
Major Issues	Status	Comments/Planned Action	
Schedule Contingency	Based on the latest program master schedule, there is negative schedule float of nearly 12 months. <i>SFMTA's worst case forecast projects a further four months of delay.</i>	Schedule workshop held on July 26, 27. <i>Action item list prepared.</i> Several time-saving strategies under evaluation. SFMTA to identify range of potential RSDs and possible "Revenue Service Demonstration" that could include operation over a portion of the alignment with free fares.	
Cost Contingency	<i>The current Total Contingency is \$75.6 million. The Federal Transit Administration (FTA) recommends a minimum contingency level of \$60 million.</i>	<i>Accumulating delays will likely lead to an increase in project soft costs and the contractor has issued many claims. However, the contingency appears adequate for the current level of project completion</i>	
Technical Capacity and Capability	<i>Open positions filled. SFMTA plans further staff additions.</i>	<i>Contracts claims administrator, construction inspector, office engineer, and mechanical, electrical, plumbing coordinator positions may be filled.</i>	
Date of Next Quarterly Meeting:		November 16, 2017	

Earned Value (EV): \$1,114,900,424, an increase of \$20.73 million from June.

Planned Value (PV): \$1,434,613,519, a planned increase of \$13.89 million from June.

Actual Cost (AC): \$1,094,840,191, an increase of \$13.31 million from June.

Cost Performance Index (CPI): 1.02, indicating that the value of completed work is slightly higher than the cost.

Schedule Performance Index (SPI): 0.78, indicating that the amount of work completed is far less than planned and the project is well behind schedule.

Contingency

Cost Contingency

The total available contingency (approved contingency less approved contract changes) *as of July 31, 2017* was \$75,631,545, which is above the minimum required contingency of \$60 million *and about \$125,500 more than in June*. SFMTA's latest trend summary report estimates a total potential cost increase of \$61.14 million, which is \$14.5 million less than the available contingency.

Schedule Contingency

All contingency in the schedule has been consumed, and there is nearly 12 months of negative float. SFMTA has completed an initial assessment of schedule risk associated with the Sequential Excavation Method (SEM) work at CTS. The worst case scenario would result in an RSD of April 29, 2020, four months later than the current forecast. After further evaluation of schedule risks for station finishing work, SFMTA will establish a new RSD including appropriate schedule float.

PMOC Observations, Opinions, and Concerns

In the opinion of the PMOC, SFMTA and the contractor demonstrated effective collaboration to *arrest the accrual of delays* by advancing critical path work ahead of the baseline schedule.

The PMOC supports SFMTA's plans to establish a range of potential RSD achievement dates based on a refined project master schedule and recognizing the remaining schedule risks. *The PMOC recommends that SFMTA further define the requirements for a possible "Revenue Service Demonstration," which could involve opening a portion of the line early. The definition of requirements will help to confirm the feasibility and timing of the proposed demonstration.*

The PMOC notes that construction at UMS reached a significant milestone with the completion of the invert slab in the station box. With excavation and the main structural shell completed at YBM and UMS, the significant risks associated with excavation affect only CTS.

It appears likely that resolution of the large number of time-related contract disputes between SFMTA and the contractor will be challenging and time consuming since the contractor and SFMTA positions are far apart. *Unfortunately, the contractor has been unwilling to prepare a recovery schedule as required per contract, until responsibility for past delays is resolved.*

The PMOC notes that the total potential cost for the project has increased by about \$4.67 million from July 2017 to August 2017. The PMOC also notes that project management costs will likely increase due to the extended duration of the project and these costs are not included in SFMTA's current forecast. The PMOC notes that SFMTA is now recognizing that more than \$6 million in project cost increases will be covered by non-project funds.

The PMOC is concerned about the recent trend of the stations contractor submitting multiple change order requests and potential claims for work completed long ago. Despite the risks for increased project costs, it is likely that the actual cost increases will be lower than the current total cost potential. In the opinion of the PMOC, the available cost contingency for the CSP remains sufficient to address potential cost increases.

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A. PROJECT STATUS

Full Funding Grant Agreement (FFGA)

The FFGA was signed on October 11, 2012.

Design

Design is complete.

Construction

Contract 1250 (UR #1). This completed contract relocated utilities within the footprint of the proposed Yerba Buena/Moscone Center (YBM) Station.

Contract 1251 (UR #2). This completed contract included the relocation of utility lines within the footprint of the proposed Union Square/Market Street (UMS) Station and temporarily rerouted existing trolley coach lines around the construction zone.

Contract 1252 Tunnel. This completed contract included the construction of 1.5 miles of twin tunnels excavated by tunnel boring machines and construction of the tunnel portal, retrieval shaft, and five cross-passages. Final completion has been achieved, and financial close out is underway. San Francisco Municipal Transportation Agency (SFMTA) is still working to reach resolution on the amounts that are due to the stations contractor to cover extra costs related to non-conforming work by the tunnel contractor. *Only two issues regarding the tunnel work impacts on the station construction remain to be addressed. Both are related to construction at CTS for the platform and crossover caverns. The potential cost impact of these issues is less than the allocated contingency remaining in the budget for tunnel construction and the tunnel contractor will likely absorb the costs.* The tunnel contractor also must repair leaks in the tunnel and some of the cross passages before the contract can be closed out. Repairs for leaks at the portal were completed, but were not completely effective. Coordination of access to the tunnel for the leak repair work with ongoing station construction is underway.

It appears likely that this contract will close out with a final cost less than \$2 million over the original contract value, with change orders of less than 1% of the contract amount, which is very good cost control performance compared to typical infrastructure projects.

Contract 1300 (Combination of UMS, CTS, YBM, and STS). This contract includes the construction of three underground stations, one surface station, all surface works required for the installation of Light Rail Transit (LRT) between 4th and King streets and the tunnel portal, and all LRT track and systems components. *As of the end of July 2017, the construction of the Stations and Surface, Track, and Systems Contract was 57.97% complete based on cost and 60.44% complete based on the value of completed construction.*

The contractor and SFMTA have been establishing “Big Hairy Audacious Goals” (BHAGs) as a means of encouraging focus and collaboration between the contractor and agency project team members to maintain and enhance schedule performance. The BHAGs are established for critical path and other important activities in the schedule and are defined so as to be difficult to achieve.

Thus far, few of the identified BHAGs have been achieved and there is little evidence that the BHAGs have been effective in arresting schedule delays.

Union Square/Market Street Station (UMS): The *latest* BHAG for this work package was to *have the elevator in the Bay Area Rapid Transit (BART) annex ready for installation on September 1. This goal was not achieved as the submittals related to the installation were still under review as of September 12.*

*A significant milestone was achieved at UMS with the completion of the invert slab in the station box. Temporary shoring at the invert level is being removed and the permanent support structure will be completed in September. **With excavation and permanent structural support in place at UMS and YBM, CTS remains the only station where excavation and primary structure work remains to be completed.***

Additional BHAGs have been identified for the following UMS milestones:

- *Completion of utilities and surface restoration on Ellis Street by October 1, 2017. This work will be completed close to the target date, but water line work at the Market Street intersection will extend the completion date into October.*
- *Completion of plans for the 2017 construction moratorium (Winter Walk) by October 1. This BHAG is on track and the moratorium will go into effect on November 21.*
- *Completion of utilities on Geary and O'Farrell streets by November 21, 2017. On O'Farrell Street the critical work will be done by Pacific Gas & Electric Company (PG&E), which needs four weeks to schedule its crews. SFMTA is coordinating with the contractor and PG&E to develop a look-ahead schedule to manage this work. On Geary Street, the contractor needs to core two openings for water lines into the station structure. San Francisco Water Department (SFWD) can then install an 8-inch line for fire suppression and a 2-inch line for domestic water to the station. The contractor, Tutor Perini Corporation (TPC) noted that it has established the additional goal of completing all work for the emergency exit stairs that come to the surface in the O'Farrell Street sidewalk to the east of Stockton Street prior to November 21.*

Chinatown Station (CTS): *The latest BHAG for this station was to complete excavation of the platform cavern by September 30. The latest look-ahead schedule indicates that excavation of the top center drift of the northern portion of the platform cavern will extend beyond October 6. SFMTA was unable to provide a clear statement of the next BHAG for this station. The SFMTA scheduling team established a best case completion date of January 31, 2018 for all CTS mining work. **The PMOC suggests that this may be an appropriate BHAG for CTS. In the opinion of the PMOC, uncertainty regarding the future rate of advancement for the platform cavern and crossover cavern mining represents the greatest schedule risk for the project.***

*Excavation is underway for the northern top-center drift of the platform cavern and for both side drifts and the center drift of the crossover cavern. Early advancement of excavation of the crossover cavern has prevented further schedule erosion despite the slower than planned advancement of the work on each drift. **In the opinion of the PMOC, SFMTA and the***

contractor demonstrated effective collaboration to arrest ongoing schedule delays by advancing the crossover cavern work ahead of the baseline schedule.

Yerba Buena/Moscone Station (YBM): The previously defined BHAG for YBM was to have the escalators ready to install by September 1, 2017. *The work for this BHAG does not appear in the latest look-ahead schedule and the achievement of this or other BHAGs was not discussed at the weekly status meeting for YBM. In August, SFMTA and TPC had identified two additional BHAGs for completion of utility work, with utility work at 4th and Folsom streets to be completed August 22 and utility work at 4th and Howard streets to start by August 15 and finish by October 17. The Folsom Street work is now planned to continue through at least October 6 and may be further delayed due to crew shortages. The work at Howard Street started on August 11, and the latest look-ahead schedule does not indicate a completion date.*

Work to restore the streets and sidewalks along Clementina Street will be complete in mid-September. TPC also plans to complete the sidewalk along the west side of 4th Street from the Howard Street intersection to the Todco driveway in mid-September. Completion of the rest of the sidewalk to Clementina Street will be coordinated with the completion of construction of the hotel at the northwest corner of the Clementina Street intersection, now planned for November 2017. TPC is also scheduling completion of paving at the 4th and Folsom intersection in September.

Finishing work continued within the station. The platform level walls have been poured and preparations are underway to construct the platform. SFMTA and TPC discussed the quality control process for confirming that all equipment under the platform and all embedded items within the platform are in place prior to platform concrete pours. Meanwhile, track is being installed through the station during September and early October.

TPC plans to complete the first pour for the concourse level slab. In the headhouse on September 14 and will complete the concourse slab placement on September 28.

Surface, Track, and Systems (STS): The current BHAGs for this work package include:

- *Complete all utility work and pavement restoration from King Street through the Bryant Street/4th Street intersection to the tunnel portal by November 30—previously targeted for September 30.*
- *Complete all track installation on 4th Street by December 31, 2017.*

Several new and previously identified utility conflicts are impacting the start of trackway construction in the center of the street. At 4th and Brannan streets, water, gas, communications, and power ductbanks are located too close to the street surface in the south portion of the intersection. The planned track grade in this area is 5 to 7 inches lower than the current street surface in this area, compounding the issues with insufficient cover for the utilities. SFMTA is working with the designer of record to raise the track profile at this intersection while maintaining the relationship of the track to the platform at the nearby surface station.

Between Bryant and King streets, demolition of the roadway in the center of 4th Street revealed a number of communication, PG&E power, and Muni power ductbanks that are in conflict with the planned location of the track drainage system or the track slab. SFMTA is evaluating design

options and other measures to address the conflicts. **The PMOC notes that although new conflicts continue to arise, the overall number of critical utility conflicts for the STS work is declining over time.**

In the tunnel section of the project, TPC has completed track installation from the portal through YBM station. Work is underway in both tunnels to install the track between YBM and UMS. Installation of the tunnel walkway between the portal and YBM is scheduled to start in September.

Third Party Agreements Including Utilities, Railroads, Other Agencies, Etc.

Bay Area Rapid Transit (BART)

SFMTA is coordinating with BART for the completion and acceptance by BART of shared facilities at the south end of the UMS station.

California Department of Transportation (Caltrans)

SFMTA needs an Encroachment Permit to install electrical and traffic signal equipment at the I-280 off ramp. SFMTA delivered the permit application materials to Caltrans and is working to address Caltrans' comments on the application.

CPUC

The California Public Utilities Commission (CPUC) is participating in the various safety meetings, including the Safety and Security Certification Review Committee (SSCRC) and Fire and Life Safety Committee (FLSC) meetings. Representatives of the CPUC also regularly attend the SFMTA/Federal Transit Administration (FTA) Quarterly Progress Review Meetings (QPRM). The FLSC is working to approve items on the certifiable items list for the Stations Contract. Rail crossing permits from CPUC are required for the at-grade portion of the project alignment. CPUC has provided the permits but they will need to be extended as the permits call for the crossings to be in operation before the scheduled completion of the Central Subway Project (CSP) project.

San Francisco Public Utilities Commission (SFPUC)

Coordination is ongoing for the installation of new water and sewer facilities along 4th Street.

San Francisco Department of Public Works (SFPDW)

No updates to report.

San Francisco Parks and Recreation Department

No updates to report.

Private Property Owners

All real estate acquisitions are complete. There will be a need to extend the duration of some of the licenses for compensation grouting. A number of private property owners and businesses have issued claims for damage associated with the project construction. The builder's insurance policies maintained by the contractor cover the costs associated with these claims and the contractor has

demonstrated improved responsiveness to damage claims that are associated with ongoing construction work.

Status of Vehicle Design, Procurement, Testing, and Integration

Vehicle design and fabrication is underway by Siemens Corporation for four Light Rail Vehicles (LRVs) for the Central Subway, 20 LRVs for near-term fleet expansion, and 151 LRVs for fleet replacement. Options for up to 85 additional vehicles are available for fleet expansion. *The vehicle design process is complete, and the assembly process is reported to be ahead of schedule. SFMTA had received six cars as of August 3, which satisfies the vehicle requirement for operation of the CSP. SFMTA has completed testing on the cars delivered by the supplier, and system closures for testing have come to an end. Documentation of the test results has been provided to CPUC, which is expected to approve the use of the new vehicles in revenue service.*

Real Estate

SFMTA has acquired all project right-of-way, and all commercial and residential relocations are complete.

Labor Relations and Policies

Appendix G of the Project Monthly Report details the Small Business Enterprise (SBE) goals and actual participation on each contract as of *June 30, 2017*. SFMTA contract goals range from 6% to 30% on each of the contracts. The majority of the contracts have met these goals to date.

Compliance with Applicable Statutes, Regulations, Guidance, and FTA Agreements

The 1300 contractor had previously raised the possibility of Buy America compliance issues with cooling equipment for the three underground stations. In the case of the cooling equipment, the contract specifications for the Variable Refrigerant Flow (VRF) cooling units identify four manufacturers that are all foreign, and the contractor has not been able to identify a domestic supplier that can meet the specifications. SFMTA has indicated that it intends to seek a waiver of Buy America requirements for this equipment, citing examples from other FTA-funded projects where waivers were granted by FTA for similar equipment.

B. PROJECT MANAGEMENT PLAN AND SUB-PLAN IMPLEMENTATION

Project Management Plan (PMP)

SFMTA delivered an update of the PMP in April 2017.

Environmental Assessment/Mitigation Plan/Archaeological Plans

The PMOC received the First Quarter 2017 Mitigation Monitoring Reporting Program (MMRP) update from SFMTA on July 27, 2017.

Real Estate Acquisition Management Plan (RAMP)

SFMTA submitted RAMP Revision 5, dated September 26, 2013, to FTA on November 19, 2013. SFMTA has acquired all required real estate for the project in accordance with the RAMP.

Quality Assurance/Quality Control (QA/QC) Program Plan

See section F.

Safety and Security Management Plan (SSMP)

See section H.

Risk and Contingency Management Plan (RCMP)

See section I.

C. PROJECT MANAGEMENT CAPABILITY AND CAPACITY

Agency Staff

SFMTA has filled several of the vacant positions in the CSP project staff, including the vacant Assistant Resident Engineer (RE) position for UMS. Overall, the project team remains 12 members smaller than planned for in the staffing plan. Four of the unfilled positions are in the start-up and safety security portion of the team, which is ramping up later than planned due to delayed completion of station construction. The Construction Management (CM) staff for the 1300 Contract is understaffed by five of the planned 30 positions. SFMTA is seeking to add inspection staff with experience in mechanical, electrical, and plumbing systems. SFMTA has hired a new RE for the STS work package with experience in transit systems installation. This RE will take over leadership of the STS package in the coming weeks. The current RE will remain on board to address the completion of the utility and street work and resolution of pending contract changes for the STS work package.

In the opinion of the PMOC, the number of vacancies on the project team could cause challenges in meeting the management demands of the project. *The PMOC supports SFMTA's intent to add CM staff with building and transit systems experience as the project transitions away from heavy civil construction.*

The PMOC will continue to monitor the SFMTA's progress in clearing the backlog of pending change orders. The PMOC identified an action item for SFMTA to include metrics for the time needed to progress identified potential contract changes and change order requests from the contractor through the various stages of resolution.

The 1300 Contract includes a Dispute Review Board (DRB) as a resource for helping to achieve resolution of contract disputes. SFMTA and the contractor are planning to bring disputes that have reached the claims stage to the DRB. **In the opinion of the PMOC, this is an appropriate use of the DRB.**

Contractor Staff

There were no changes in the contractor's management staff.

D. PROJECT COST STATUS

Project Cost Control Systems

SFMTA continued to maintain the Trend Log and logs of Change Order Requests (COR), Proposed Contract Changes (PCC), Notices of Potential Claims (NOPC) and Certified Claims for Contract 1300 using CM13. The Trend Log includes all potential changes in contract value, including items that, in the opinion of the CSP staff, are not merited and new items for which merit has not been determined. The contract change management log includes CORs that have been determined to have merit as well as agency-initiated PCCs that are progressing through negotiations toward a contract modification (CMod). The NOPC log and the Claim log include CORs rejected by SFMTA for which the contractor expects to or has submitted a claim. **In the opinion of the PMOC, the trend log tracking should include the amount of time that has passed from the initial identification of the trend. An action item has been identified for SFMTA's response.**

The most recent versions of the Trend Log and Trend Summary documents are dated September 13, 2017. The Trend Summary indicates that 73 contract modifications had been executed for the 1300 Contract. The total value of executed CMods was \$7,726,806. The NOPC log indicates that there are now 72 potential claims. The Claim log shows that 54 of these potential claims have been certified and submitted by the contractor and two have been resolved and will be addressed through contract modifications.

Note that tables 2 and 3 reflect the project status as of the end of July 2017 and show substantially different values for potential contract changes because a large number of CORs and NOPCs/Claims were issued in August.

Project Cost (as of July 31, 2017)

Cost estimate: \$1.5783 billion.

Total contingency: \$75.63 million (minimum contingency is \$60 million), *slightly higher than in June.*

Actual Cost (AC): \$1,094,840,191, *an increase of \$13.31 million from June (69.387% of the total project budget).*

Current funding level: \$1,329,794,000 (84.3% of the total project budget).

Earned Value (EV): \$1,114,900,424, *an increase of \$20.74 million from June.*

Cost Performance Index (CPI): 1.02.

CPI is a measure of cost efficiency on a project. It is the ratio of EV to AC. A CPI equal to or greater than 1.0 indicates a cost underrun, and a value of less than 1.0 indicates a trend towards a cost overrun. A value of 0.9 or greater is considered acceptable, considering the margin of error in

estimating the value of completed work. *CPI has been trending upward in the past two reporting periods.*

Project Cost Trends

SFMTA tracks potential changes in project cost, calling these potential changes “trends.” Trends include all potential changes in the contract value. As the status of an identified trend changes, it may become a contract modification, it may become an item that is paid on a force account basis, or it may be denied/closed with no impact to the project cost. Extra cost items identified by the 1300 contractor that CSP management concludes have no merit are carried in the total trend amount at a lower value than the contractor’s estimate of extra costs, with the value reflecting SFMTA’s assessment of the likelihood that the change would ultimately be approved through the contract dispute resolution process.

Table 2 summarizes the trends for the two construction contracts that have not attained financial close out. The remaining contingency, less identified trends, represents about 54% of the potential left to spend for Contract 1252.

SFMTA significantly reduced its forecast of the potential cost impact of trends for the 1300 Contract between its June and July monthly progress reports. SFMTA estimated the total cost impact of potential contract changes at \$19.94 million in July and \$30.6 million in June. However, as noted elsewhere in this report, more recent trend tracking data indicates an increase in potential costs.

*After potential changes are accounted for, there was \$12.36 million in allocated contingency remaining for Contract 1300 at the end of July. **The resulting contingency of 3.5% of potential remaining spending after potential changes are accounted for is likely insufficient. However, unallocated contingency and excess contingency for other elements of the program are likely sufficient to allow on-budget completion of the CSP. In the opinion of the PMOC, the allocated contingency for the 1252 Contract is greater than the amount required to assure final close out of the contract within the budget. The allocated contingency for the 1300 Contract is probably insufficient given the pending contract changes and there is a significant likelihood that additional contingency will need to be allocated to this contract prior to completion.***

Table 3 shows the overall budget, trends, and contingency status for the entire Central Subway program. *The Budget Forecast Variance, which reflects the total remaining contingency after the cost of trends is accounted for, is 13.0% of the potential remaining spending. In the opinion of the PMOC, this contingency should be sufficient to provide reasonable confidence in an on-budget completion of the project. The PMOC notes that SFMTA’s latest claim log and trend summary show a significant increase in the cost of potential contract changes between July, which is the reporting period for tables 2 and 3, and early September.*

Table 2 - Contract, Budget, and Trends for Active Construction Projects¹

	1252 – Tunnel	1300 Stations, STS
Original Contract	233,584,015	839,676,400
Approved Contingency	2,329,485	40,000,000
Extra Budget for Non-Project Costs	6,173,508	
Approved Budget	235,913,500	879,676,400
Approved Changes	1,494,770	7,726,806
Current Contract (1252 does not include non-project costs)	235,078,785	847,403,206
Remaining Contingency	834,715	32,273,194
Potential Changes (SFMTA expected outcome)	20,000	28,896,064
Estimate at Completion	235,098,785	876,299,270
Contingency Less Trends	814,715	3,377,130
Spent to Date	233,589,322	525,906,747
Potential Left to Spend	1,509,463	350,392,523
Contingency Less Trends as % of Potential Cost to Complete	54.0%	1.0%

¹ As reported in the July 2017 Central Subway Project Monthly Progress Report – SFMTA (reformatted by the PMOC).

Table 3 - Budget and Contingency Status for Central Subway Project

SFMTA Central Subway Project, Budget, Costs and EAC by SCC July 31, 2017		FFGA Budget	Budget Transfers	Current Budget = Committed	Change	Base Budget	Contingency	Expenditures to Date		Remaining Budget	Cost to Complete	Estimate at Completion	Budget Forecast Variance
		\$	\$	\$	%	\$	\$	\$	%	\$	\$	\$	\$
10	Guideway and Track Elements	315,926,081	(30,698,202)	285,227,879	-10%			235,030,177	82%	50,197,702			
10.02	Guideway: At Grade, Semi-exclusive	2,395,143	464,857	2,860,000	19%			707,500	25%	2,152,500			
10.06	Guideway: Underground cut and cover	74,407,195	(4,590,788)	69,816,407	-6%			62,308,677	89%	7,507,730			
10.07	Guideway: Underground tunnel	224,933,257	(23,592,511)	201,340,746	-10%			165,822,484	82%	35,518,262			
10.09	Track: Direct fixation	7,293,157	(532,068)	6,761,089	-7%			3,572,916	53%	3,188,173			
10.10	Track: Embedded	1,601,763	(1,601,763)	-	-100%			-	0%	-			
10.12	Track: Special	5,295,566	(845,929)	4,449,637	-16%			2,618,600	59%	1,831,037			
20	Stations, Stops, Terminals, Intermodal	432,698,735	154,358,532	587,057,267	36%			344,860,083	59%	242,197,184			
20.01	At-grade station	774,913	6,827,944	7,602,857	881%			1,578,488	21%	6,024,369			
20.02	Aerial station, stop, shelter, mall, terminal, platform		2,901,013	2,901,013	NA			-	0%	2,901,013			
20.03	Underground station	412,084,888	142,766,672	554,851,560	35%			339,351,451	61%	215,500,109			
20.07	Elevators, escalators	19,838,934	1,862,903	21,701,837	9%			3,930,144	18%	17,771,693			
40	Sitework and Special Conditions	232,551,627	(18,255,597)	214,296,030	-8%			198,795,454	93%	15,500,576			
40.01	Demolition, clearing, earthwork	8,887,028	3,468,587	12,355,615	39%			11,938,516	97%	417,099			
40.02	Site utilities, utility relocation	29,562,587	30,862,739	60,425,326	104%			64,963,331	108%	(4,538,005)			
40.03	Haz. Material, contam'd soli removal, ground water treatment	2,957,442	4,576,686	7,534,128	155%			4,725,709	63%	2,808,419			
40.04	Environmental mitigation	3,146,216	(2,023,317)	1,122,899	-64%			619,100	55%	503,799			
40.05	Site structures, including retaining walls, sound walls	2,894,074	(187,643)	2,706,431	-6%			2,706,431	100%	-			
40.06	Pedestrian and bike access and accommodation, landscaping	14,393,910	(4,602,915)	9,790,995	-32%			2,894,608	30%	6,896,387			
40.07	Automobile, van, bus accessways, including roads and parking lots	11,919,550	(5,340,451)	6,579,099	-45%			3,899,264	59%	2,679,835			
40.08	Temporary facilities and other construction indirect costs	158,790,820	(45,009,283)	113,781,537	-28%			107,048,495	94%	6,733,041			
50	Systems	108,429,774	(13,087,948)	95,341,826	-12%			27,587,210	29%	67,754,614			
50.01	Train control and signals	37,447,116	(9,319,177)	28,127,939	-25%			7,391,039	26%	20,736,900			
50.02	Traffic signals and crossing protection	3,013,232	9,549,297	12,562,529	317%			10,427,978	83%	2,134,551			
50.03	Traction power supply	20,379,634	1,085,439	21,465,073	5%			8,072,750	38%	13,392,323			
50.04	Traction power distribution	16,239,951	(3,798,838)	12,441,113	-23%			1,502,939	12%	10,938,174			
50.05	Communications	28,545,305	(16,514,719)	12,030,586	-58%			192,503	2%	11,838,083			
50.06	Fare collection system and equipment	2,804,536	3,295,464	6,100,000	118%			-	0%	6,100,000			
50.07	Central Control		2,614,586	2,614,586	NA			1	0%	2,614,585			
Subtotal (10 - 50)		1,089,606,217	92,316,785	1,181,923,002	8%	1,146,595,092	35,327,910	806,272,924	68%	375,650,078	360,258,048	1,166,530,972	15,392,030
60	ROW, Land, Existing Improvements	37,398,029	(5,151,708)	32,246,321	-14%	32,246,321	-	30,732,020	95%	1,514,301	1,514,301	32,246,321	-
60.01	Purchase or lease of real estate	33,798,029	(3,732,219)	30,065,810	-11%	30,065,810	-	28,322,590	94%	1,743,220	1,514,301	29,836,891	228,919
60.02	Relocation of existing households and businesses	3,600,000	(1,419,489)	2,180,511	-39%	2,180,511	-	2,409,430	110%	(228,919)	-	2,409,430	(228,919)
70	Vehicles	26,385,653	-	26,385,653	0%	13,309,000	13,076,653	2,979,595	11%	23,406,058	10,329,405	13,309,000	13,076,653
70.01	Light Rail Vehicles	26,385,653	-	26,385,653	0%	13,309,000	13,076,653	2,979,595	11%	23,406,058	10,329,405	13,309,000	13,076,653
80	Professional Services	361,568,360	(32,829,239)	328,739,121	-9%	310,518,042	18,221,079	254,855,653	78%	73,883,468	55,662,389	310,518,042	18,221,079
80.01	Preliminary Engineering	46,317,094	(114,420)	46,202,674	0%	46,202,674	-	46,202,675	100%	(1)	-	46,202,675	(1)
80.02	Final Design	86,053,240	(24,734,909)	61,318,331	-29%	61,318,331	-	61,199,308	100%	119,023	-	61,318,331	-
80.03	Project Management for Design and Construction	191,025,800	(88,107,410)	102,918,390	-46%	89,012,545	13,905,845	68,539,599	67%	34,378,791	25,568,011	94,107,610	8,810,780
80.04	Construction Administration and Management	15,495,521	78,558,172	94,053,693	507%	91,096,881	2,956,812	67,218,332	71%	26,835,361	18,783,483	86,001,815	8,051,878
80.05	Professional Liability and Other Non-Construction Insurance	6,800,000	-	6,800,000	0%	6,800,000	-	6,340,196	93%	459,804	78,823	6,419,019	380,981
80.06	Legal, Permits, Review Fees by Other Agencies	7,242,340	970,264	8,212,604	13%	8,212,604	-	4,497,714	55%	3,714,890	3,254,766	7,752,480	460,124
80.07	Surveys, Testing, Investigation, Inspection	234,036	699,064	933,100	299%	933,100	-	857,829	92%	75,271	22,993	880,822	52,278
80.08	Start up	8,400,329	(100,000)	8,300,329	-1%	6,941,907	1,358,422	-	0%	8,300,329	7,835,290	7,835,290	465,039
Subtotal (10 - 80)		1,514,958,258	54,335,839	1,569,294,097	4%	1,502,668,455	66,625,642	1,094,840,192	70%	474,453,905	427,764,143	1,522,604,335	46,689,762
90	Unallocated Contingency	63,341,742	(54,335,839)	9,005,903	-86%			9,005,903	0%	9,005,903			9,005,903
Total Project Costs (10 - 100)		1,578,300,000	-	1,578,300,000	0%		75,631,545	1,094,840,192	69%	483,459,808	427,764,143	1,522,604,335	55,695,665

SCC Breakdown of Forecast Construction Costs Not Available

²Data reported in the July 2017 Central Subway Project Monthly Progress Report – SFMTA (reformatted by the PMOC).

Change Order Control

SFMTA continues to estimate that CMods with a net increase in contract value of only \$20,000 will be executed as part of contract close out for the 1252 Contract. Based on the expected final contract value, change orders for the base work are forecast to represent less than 1% of the original contract amount. This represents exceptionally good change order control compared to typical infrastructure projects.

SFMTA is maintaining its management tools for tracking potential contract changes for the 1300 Contract. *The latest CN1300 Trend Summary is dated September 20, 2017. This report shows that 73 contract modifications have been approved for a net increase in the contract value of \$7,726,806, which was unchanged from August 2. CORs (generated by the contractor) that have been determined to have merit and PCCs (generated by SFMTA) have a combined potential cost impact of \$26,960,223 in increased contract value, an increase of \$2.03 million since August 3. SFMTA expects to settle the outstanding CORs for less than the overall cost currently claimed by the contractor. SFMTA also expects to receive \$6,021,134 in non-project funds to cover the cost of these pending contract changes. The net impact of the CORs and PCCs on the potential project cost is \$20.94 million.*

An additional 658 items are being tracked in the Trend Log. Of these, SFMTA judged 306 items to be without merit and denied them. A further 267 items have been voided and are carried at no cost. There are 69 items covered by certified claims and NOPCs by the contractor (\$25.34 million total exposure, \$9.84 million greater than last month), and 16 items are “open” or “new” and awaiting a determination of merit.

*The potential exposure of the project to additional costs from the denied items, NOPCs, claims, and open items is \$32.48 million, which, when added to the \$20.94 million in increased project costs from merited contract changes, yields a worst-case exposure of the project to additional costs for the 1300 Contract of \$53.42 million. This compares to the remaining contingency for the project of \$75.63 million. **In the opinion of the PMOC, the available cost contingency for the CSP remains sufficient to address potential cost increases. The PMOC notes that the forecast of overall project costs is now more accurate since SFMTA is recognizing that some extra costs will be reimbursed by non-project funds.***

The Trend Log shows the following trend items with potential cost increases in excess of \$250,000:

1. # 24 - Change to grade 50 steel from specified grade 70 steel (due to availability issues) - \$572,884
2. # 36 - Extra trucking costs for contaminated soil at CTS - \$2,274,225
3. # 39 Harder rock than anticipated for CTS slurry wall excavation - \$1,880,379 (*down from \$2,820,600*)
4. # 61 - Delays to installation of tangent piles at UMS - \$1,082,380
5. # 160 - *Conflicting duct bank at UMS - \$581,837 (new)*
6. # 176 - UMS Garage underpinning requirements - \$732,157

7. # 192 - 12-inch waterline at UMS, added scope - \$336,236
8. # 193 - Utility conflicts with sewer line installation at UMS - \$744,465
9. # 239 - Changes in construction sequence for UMS Garage - \$500,000
10. # 246 - UMS art glass installation requirements - \$382,978
11. # 272 - Obstructions to jet grout placement at UMS - \$2,062,420
12. # 341 - Change in track switch machine manufacturer at STS - \$391,909
13. # 399 - Additional monitoring instruments at CTS - \$429,777
14. # 466 - Extra work to prepare existing tunnel - \$431,423
15. # 498 - Additional traffic control requirements at 4th and King - \$675,001
16. # 524 - *Changed requirements for pre-loading of UMS concourse level struts - \$1,319,593 (new)*
17. # 526 - Incomplete interface design at STS - \$300,001
18. # 528 - Additional traffic control requirements for STS work package - \$1,032,302
19. # 537 - Cost of changes to the design of CTS to accommodate the plaza requested by the community - \$4,618,428
20. # 543 - Change in vent for emergency generator at all stations - \$500,001
21. # 580 - Contractor delay claim for revised work sequence at CTS - \$250,001
22. # 636 - Missing conduit between manholes at UMS - \$250,001
23. # 644 - Contractor-claimed change in contract requirements for pre-loading permanent struts at UMS - \$1,853,352
24. #715 - Soil nail and shotcrete wall changes in Union Square Garage - *\$1,365,378 (up from \$1,337,776)*
25. # 775 - *Extra demolition at Union Square Garage - \$288,022 (new)*
26. # 814 - *Changes to electrical service locations for streetlights on 4th Street - \$282,638 (new)*
27. # 840 - Change in drain piping details at UMS - \$332,252
28. # 892 - Temporary drainage at Union Square Garage ramps - \$292,754
29. # 942 - Change in automatic train control system for reverse running - \$400,001
30. # 968 - Design changes for UMS vertical drainage slots - *\$603,910 (down from \$866,709)*
31. # 1022 - Claim for extra costs and time due to extremely hard ground claimed by TPC during the coring for the Sequential Excavation Method (SEM) mining work - \$862,720
32. # 1032 - Escalator raceways at UMS - \$492,065

33. # 1099 - Extra costs for SEM excavation at CTS due to tunnel segments being 5 feet wide - \$4,404,329
34. # 1117 - Extra costs due to concrete obstruction at CTS south platform cavern - \$583,623
35. # 1175 - Time impacts due to power pole conflict during demolition at CTS - \$3,516,164
36. # 1211 - Time impacts from extended submittal reviews and substitution request procedures - \$3,021,262
37. # 1217 - Claimed delays to SEM work at the platform invert due to compensation grout exclusion zone requirements in the contract specifications - \$900,889
38. # 1276 - Estimated extra costs of proposed scope increase to provide sidewalk bulb-outs at 4th and Bryant and 4th and Harrison - \$1,402,706 (down from \$1,500,000)
39. # 1299 - Claimed extra costs for a schedule delay to the train control subcontract - \$2,000,001
40. # 1311 - Claimed extra costs for delays to the CTS south platform center drift excavation due to restrictions caused by compensation grouting - \$675,952
41. # 1373 - Extra costs for jet grouting complications at Macy's basement at UMS - \$599,421
42. # 1378 - General claimed extra costs for SEM work at CTS - \$5,457,322 (new)
43. # 1424 - Extra work due to unconstructable roof to wall connection detail at YBM - \$305,906 (new)

The PMOC notes that there are several very large new trends and trends with increased costs.

In addition to these large potential cost increases, the Trend Log includes the following major cost savings:

1. Deletion of compensation grouting bid items at YBM - (\$1,833,869)
2. Deletion of the Air Replenishment System (ARS) - (\$4,689,000)
3. Replace specified CCTV equipment with alternate for all stations - (\$1,600,000)

Funding

Federal, state, and local project funding and expenditures are shown in Table 4. The awarded funding now represents 84.3% of the project budget.

Table 4 - Project Funding

Source	Committed (\$1,000)	Awarded (\$1,000)
Federal		
New Starts	942,200	769,196
Congestion Mitigation	41,025	41,025
<i>Federal Subtotal</i>	983,225	810,221
State		

Source	Committed (\$1,000)	Awarded (\$1,000)
TCRP	14,000	14,000
State RIP	88,000	12,498
Prop. 1B / PTMISEA	307,792	307,792
Prop. 1A / HSR	61,308	61,308
<i>State Subtotal</i>	471,100	395,598
Local		
Prop. K Sales Tax	123,975	123,975
<i>Local Subtotal</i>	123,975	123,975
Project Total:	1,578,300	1,329,794

E. PROJECT SCHEDULE STATUS

SFMTA prepared an update of the master program schedule in August representing progress on the project through July 2017. The contractor has submitted revised schedule updates through June 2017, but SFMTA rejected 16 of the contractor's latest schedule updates because the contractor failed to make requested corrections to schedule logic and also changed the durations of activities associated with the train control system, which resulted in the train control work being the critical path for the entire project. The contract does not allow the contractor to make changes to the durations of activities or work sequence in the baseline schedule without review and concurrence by SFMTA.

As of the end of July 2017, the project was 349 days late, based on the projected RSD of December 10, 2019. The projected substantial completion date for the 1300 Contract remained June 26, 2019, which is 502 days later than the original date (February 9, 2018). *There were no changes to these milestone dates over the past three schedule updates.*

The contractor has been executing critical path work on the crossover cavern in advance of the completion of the platform cavern. Advancing this work while the platform cavern excavation is still underway allowed the RSD to be maintained, despite excavation production rates that continued to be lower than assumed in the baseline schedule for the platform cavern. The contractor has been working two 12-hour shifts and 6 days per week at CTS to reduce the impacts of lower than planned production rates for the ongoing SEM mining work for the platform cavern.

TPC continues to issue major delay claims and NOPCs for CTS and the other work packages. SFMTA and TPC have been addressing the claims through the DRB process. The DRB was scheduled to issue an opinion regarding the merit of TPC-claimed delays to the start of the battered tangent pile work at UMS in September. TPC is asserting that this type of concurrent delay to work not on the critical path due to conditions beyond its control should reduce the liquidated damages that SFMTA can assess for overall project delays. The concept of concurrent delays is under dispute.

The schedule for installation and testing of the train control system is the subject of major delay claims that may impact the project critical path. The contractor also is asserting that conditions beyond its control are delaying the excavation of the platform cavern at CTS that is currently on the project critical path.

The PMOC is concerned that resolution of the outstanding claims will be challenging because the parties' respective positions are far apart. The PMOC is further concerned that TPC has refused to develop a recovery schedule as required per contract.

The critical path for the construction work continues to flow through the construction of CTS, but analysis by the PMOC indicates that there are other lines of work that are influencing the RSD for the project. *Schedule risks related to CTS work and the other near-critical lines of work may further extend the project completion date. SFMTA is conducting a risk assessment of the schedule to establish a range of possible construction completion dates and start dates for revenue service. SFMTA will also identify mitigation measures to reduce the potential effects of the major risks.*

SFMTA and TPC have been establishing BHAGs as a way to focus the project team's attention on advancing project work and to encourage teamwork among SFMTA and TPC staff to removing barriers to completion of the work.

Table 5 shows the latest BHAGs and the status for each work package in the 1300 Contract.

Table 5 - Interim BHAGs for CTS Construction Progress

Milestone	Target Date	Actual Date	Status
CTS Complete platform cavern excavation	September 30, 2017	Unknown	<i>Excavation ongoing. Early start of crossover cavern is mitigating effects of delayed completion. Latest optimistic target for completion of all cavern excavation is January 2018</i>
UMS Complete utilities and street restoration in Ellis Street Complete utilities in Geary Street and O'Farrell Street	<i>Delayed from July 15 to October 1, 2017</i> <i>Delayed until November 21, 2017</i>	TBD TBD	<i>Late, work forecast to extend into October</i> <i>In progress</i>
YBM Escalators ready to install Complete utilities at Folsom Street Complete utilities at Howard Street Complete headhouse roof slab	<i>September 1, 2017</i> <i>August 22, 2017</i> <i>Start 8/15 – finish 10/17</i> <i>November 30, 2017</i>	Unknown	<i>BHAGs not discussed at status meeting</i>
STS Complete all utility work along 4th Street Complete track installation on 4th Street	<i>Delayed from September 30 to November 30</i> <i>December 31, 2017</i>	TBD TBD	<i>In progress, multiple conflicts continue to delay work</i> <i>Not shown in look-ahead schedule</i>

In the opinion of the PMOC, setting of BHAGs has limited effectiveness, in part due to the inconsistent treatment of BHAG by the Resident Engineering teams for the work packages.

BHAGs were actively discussed for the UMS and STS packages at the weekly status meeting, while there was no mention of BHAGs during the CTS and YBM meetings.

The PMOC and SFMTA convened a schedule workshop on July 26 and 27, 2017 with the objective of agreeing on an approach to establishing a reliable forecast of the project RSD. *The PMOC issued a report documenting the results of the workshop and identifying action items relative to the schedule. SFMTA and the PMOC held a status review conference call for the actions on September 19. The action items and their current status include:*

1. *Confirm the schedule currently shown for Gap Breaker availability on 9/19/2018 relative to Gap Breaker activities that occur later (UMS. 34. 21. 0505 thru UMS. 34. 21. 1545) and STS (STS. 26. 05. 2120). Make any required corrections to the schedule to accurately reflect the availability of the Gap Breaker. SFMTA will correct the schedule in the next monthly update.*
2. *Review and confirm schedule for procurement of Advanced Train Control System (ATCS) hardware, software, and testing. The ATCS supplier is preparing an update of its schedule, which should be complete in September and incorporated into the master project schedule in October.*
3. *Fix schedule logic and errors in task status:*
 - a. *Remove lags with long duration from the schedule and replace with appropriate logic ties to controlling activities.*
 - b. *Correct misallocation of activities among work packages.*
 - c. *Correct logic to reflect completed work in the tunnel that is out of sequence compared to the baseline schedule.*
 - d. *Correctly show the completion of activities associated with 2016 and 2017 Chinese New Year Parades (should be 100% complete).*
 - e. *Change Mobilization activities from Task Dependent to Level of Effort type.*
 - f. *Change work calendar assignment for activities inappropriately assigned to the Chinatown moratorium calendar.*

All of these corrections have been provided to TPC, but TPC refuses to incorporate them in its ongoing schedule updates. SFMTA plans to implement them and maintain a parallel schedule to the contractor's schedule.

4. *Improve accuracy of completion status of activities in schedule updates. Corrections have been identified and will be implemented. No impact to the project completion date is expected.*
5. *Evaluate opportunities to revise the sequence of tasks to reduce overall project duration. Work with the contractor to implement changes in work sequence that will save time. SFMTA evaluated options for revising the work sequence. The most promising opportunity appears to be advancing work that would allow ATCS testing to commence sooner. This would likely not impact the overall completion date, but it could help to*

streamline the testing work and might support an early service start (Revenue Service Demonstration). SFMTA noted that TPC has been resistant to making changes to the sequence of work.

- 6. Evaluate the benefits, feasibility, and cost of allowing trackwork to advance through UMS while construction of upper level floors is underway. If effective and feasible, work with contractor to implement required contract modifications. SFMTA analyzed the possible benefits of advancing track installation through UMS and found that this would not have a significant impact on the project completion date, since CTS and ATCS testing are driving the completion date.*
- 7. Evaluate the benefits, feasibility, and cost of advancing the completion of traction power and station power supplies at YBM. If effective and feasible, work with contractor to implement required contract modifications. SFMTA found that the completion date for traction power at YBM could be moved up 3.5 months. This would not impact the overall project completion date but it could support the early start of testing, which could help to reduce the duration of later testing activities. It also could support the Revenue Service Demonstration.*
- 8. Define the scope and confirm the schedule for Building Systems Startup and Testing at each station. Determine if some of the work can start sooner than indicated in the current schedule. SFMTA is working with TPC to justify the durations of this work at each station. TPC is resisting changing the durations. In the PMOC's opinion, much of the work that would be in this activity will be completed under other activities in the schedule. If this is the case, when the work packages reach these tasks, there will be little to do and the durations will be much shorter than indicated in the schedule.*
- 9. Prepare an updated "base case" (as distinguished from baseline) schedule for completion of the project. This updated schedule would incorporate changes resulting from all of the previous action items. SFMTA is working to incorporate all of the appropriate schedule refinements to create the updated base case schedule, which will be maintained in parallel with TPC's schedule.*
- 10. Identify and quantify remaining significant schedule risks. This will be accomplished at the routine project risk mitigation meetings. This is underway through the CSP Risk Mitigation meeting process.*
- 11. Conduct a risk assessment to identify a reasonable range for the RSD recognizing the schedule risks. SFMTA requested PMOC assistance in conducting a quantitative risk assessment to establish the level of float appropriate to the current status of the project.*
- 12. If SFMTA intends to pursue a Revenue Service Demonstration, prepare a plan that identifies the work that must be complete in order to start such a demonstration. Identify a range of dates by which the required work is likely to be complete. SFMTA does intend to pursue a Revenue Service Demonstration and is identifying what work will need to be complete, including staff training, to implement such a demonstration.*

The PMOC supports SFMTA’s planned approach to identifying a range for the RSD for the project. The PMOC encourages SFMTA to complete its assessment according to the dates shown in Table 8.

Project Schedule Data

Earned Value (EV): \$1,114,900,424, an increase of \$20.74 million from June.

Planned Value (PV): \$1,434,613,519, a planned increase of \$13.89 million from June.

Schedule Performance Index (SPI): 0.78. SPI is a measure of schedule efficiency on a project. It is the ratio of earned value to planned value. An SPI equal to or greater than 1.0 indicates more work was completed than planned and a value of less than 1.0 indicates less work was completed than planned. A value of equal to or greater than 0.9 reflects satisfactory performance, considering the margin of error in estimating both earned value and planned value. The current value of 0.78 indicates that the project is significantly behind schedule *but is improved from 0.77 in June.*

Table 6 shows the status of the schedule milestones established for the project.

Table 6 - Schedule Milestones

(P = Planned Date, A = Actual Date, F = Forecast Date)	
Preliminary Engineering (PE):	Authorized in July 2002 (A)
Record of Decision:	Issued November 26, 2008 (A)
Final Design (FD):	Authorized in January 2010 (A)
FFGA Request:	Submitted September 2011 (A)
FFGA Executed:	October 11, 2012 (A)
Ground Breaking: (Utility Relocation Contract)	February 9, 2010 (A)
Tunnel excavation complete (hole through):	June 2, 2014 (SB); June 11, 2014 (NB) (A)
Cross passages complete:	December 20, 2014 (P); April 15, 2015 (A)
Tunneling substantial completion:	April 15, 2015 (A)
Station construction Notice to Proceed (NTP):	June 17, 2013 (A)
Station construction substantial completion:	February 24, 2018 (P); June 26, 2019 (F)
RSD:	December 26, 2018 (P); December 10, 2019 (F)

Schedule Contingency Management criteria were developed from the FTA Risk Assessment prior to entry into Final Design (FD). Minimum schedule contingency levels at various project milestones or “Hold Points” were agreed to with SFMTA at Risk Workshop #4, held on February 24 through 27, 2009. The FTA recommended schedule contingency for the current stage of the project is 6.0 months. As noted above, the current schedule reflects *nearly 12 months* of negative buffer float.

Critical Path Summary (*Baseline Schedule*)

CTS Install Guidewalls, Slurry Walls, and Install Surface Deck (complete)

CTS Excavate Headhouse and Bracing (complete)

CTS SEM and Install Supports (underway)
CTS Headhouse Structural Concrete/Remove Bracing
CTS Install Mechanical, Electrical, and Plumbing (M/E/P) Equipment
CTS Start-up and Testing
CTS P-1254R Commissioning of Station
Safety and Security Certification/Pre-Revenue Activities
RSD on December 26, 2018 (currently forecast December 10, 2019)

Three Month Look-ahead

The following activities are planned over the next 3 months:

1300 Contract

UMS

Complete utility placement, backfill, and paving of Ellis Street, *Geary Street, and O'Farrell Street*

Complete emergency exit stairs at O'Farrell Street

Continue exterior finishing work at the plaza level of the Union Square Garage and the north entrance

Complete the fan-level trench in the north concourse

Complete platform construction and platform level walls

Install elevator in the BART annex

Construct the mezzanine level floor slab in the station box

Start construction of interior walls in the south concourse

CTS

Complete excavation of the station platform cavern

Continue excavation of the crossover cavern

Provide compensation grouting as needed

YBM

Continue bottom-up construction of the concourse and mezzanine floor slabs in the headhouse

Continue M/E/P rough-in and interior work mezzanine and concourse levels

Continue interior wall construction and M/E/P rough-in at the platform level

Complete utilities in 4th Street above the station box and restore the street pavement

Complete street work on Clementina Street

Install escalators

STS

Continue utility work and street restoration along 4th Street

Construct trackway and start track installation along 4th Street

Install track from YBM to UMS

The PMOC expects to attend the following meetings:

- Weekly Management (*October 16* and November 13)
- Weekly Contract 1300 Construction Progress Meetings (*October 17/18* and November 14/15)
- Weekly Configuration Management Board (CMB) (*October 18* and November 15)
- CSP PMOC Status Meetings (*October 17* and November 14)
- FTA/QPRM (November 16, 2017)

F. QUALITY ASSURANCE AND QUALITY CONTROL

QA/QC Plan Implementation

The 1300 contractor's staff includes a Contractor's Quality Manager (CQM), who reports to the Contractor's Management at an organization level superior to the contractor's Project Manager. The CQM is provided by a subcontractor. The reporting structure is to provide the CQM with direct access to the contractor's Principal Officers. A Contractor Non-conformance Report (CNCR) Log for identifying, correcting, documenting, and controlling non-conformances is maintained by the contractor and reviewed at weekly status meetings for each work package. Subsequent work may not progress for work that is the subject of a Corrective Action Request (CAR) until conditions averse to quality are corrected. In the event that the contractor does not issue a CNCR, SFMTA may issue a Non-conformance Notice (NCN) where non-conforming work is identified by SFMTA's quality assurance staff.

The quality concerns for the 1300 Stations Contract identified in the SFMTA *June* monthly report included:

- As is typical to similar projects, work performed prior to receipt of approval status of required submittals/Requests for Information (RFI) remains a potential area of concern.
- *Also as is typical, timely identification and response to construction problems such as too little concrete cover for reinforcing steel due to close proximity of adjacent objects remains a challenge.*

As of August 28, TPC's Quality Manager had filed 310 CNCRs (10 new since the last report). Twelve new items were under review, 17 other items had responses identified but not yet approved, the proposed responses to 16 items were disapproved, and 19 items had approved responses that were not yet implemented. In addition, 208 items were closed (8 more than in late July) and 38 items had been voided. None of the open or disapproved items is delaying progress of the work.

G. AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE

There are no ADA issues for the project at this time.

H. SAFETY AND SECURITY

Safety and Security Management Plan

An updated SSMP Revision 2, dated February 2, 2014, was submitted to FTA on May 2, 2014. The SSMP outlines the plans needed prior to revenue operations. These plans include the Rail Activation Plan (RAP), the System Integration Test Plan, the Safety and Security Certification Plan (SSCP), and the Pre-Revenue Operations and Start-up Plan. SFMTA has completed the SSCP, which is being used to guide safety certification activities. The initial draft of the RAP was completed with the latest update of the PMP. The System Integration Test Plan and the Pre-Revenue Operations and Start-up Plan are expected to be provided with the next PMP update.

Fire and Life Safety/Safety and Security Issues

The Construction Specification Conformance Checklists have been completed and approved for all construction packages. In September 2013, the CPUC staff began attending monthly as-built meetings to review the completed items. All items related to the tunnel construction have been certified and accepted by SFMTA's safety staff. The certification work started to address the station construction items in 2016. *As of September 11, 2017, 109 of the 1660 items on the Safety and Security Conformance Checklist were approved, with 16 items approved in the previous month.* The San Francisco Fire Department (SFFD) regularly attends the now combined FLSC and SSCRC meetings. The SFFD will continue to coordinate with the Stations Construction Project to identify issues of importance during construction.

Construction Safety

The 1300 Contract is maintaining an excellent safety record, with a total of six recordable and four lost time incidents since the project start. *No recordable incidents occurred in the month of June 2017.* The performance metrics relating to accidents per working hour are well below the OSHA goals for similar construction. The current accident records for the 1300 Contract are shown in Table 7.

Table 7 - Construction Safety Data

<i>Through June 2017</i>	No. of Incidents	Incident Rate ¹	Goal
1300 Contract			
OSHA Recordable Accidents	6	0.49	<3.4
Job Transfer/Restricted Duty Incidents	0	0	NA
Lost Time Incidents	1	0.08	<1.6
Total Incidents	7	0.58	NA
Hours Worked	2,428,896		

¹OSHA incident rate = incidents x 200,000/hours worked.

I. PROJECT RISK, RISK MANAGEMENT, AND RISK MITIGATION

The PMOC received RCMP Revision 3 on April 30, 2013. The outgoing PMOC provided its final Spot Report to FTA on July 19, 2013. SFMTA submitted a CSP “Contingency Management – Schedule 2012 Update” on May 22, 2013. SFMTA provided a further update of the schedule risk assessment in June 2015 that recommended a reduction of the minimum schedule contingency after demobilization of the tunnel work to 4.0 months. The updated risk assessment was conducted on the approved baseline schedule for the 1300 Contract without updates to reflect the then status of the construction work and the accumulated construction delays.

SFMTA conducts monthly meetings to review the status of identified risks, monitor the implementation of mitigation measures, identify new risks, and evaluate the probability and potential impacts of existing and newly identified risks. The current major risk to the project is the potential for further delays to the construction of the stations, which cannot be mitigated or recovered, resulting in further delays to the RSD.

The most recent risk mitigation meeting attended by the PMOC was the August 2, 2017 Risk Mitigation Meeting for the CSP, which included a review of the status of selected existing risks, a review of risks identified for retirement, and the start of a more detailed definition of the potential risks that could cause further schedule delays. Over the next two months, SFMTA plans to expand and refine the schedule risk assessment in order to identify the likely range of project completion dates. The PMOC noted the following significant items of discussion:

- The risk of damage to structures in the CTS construction area due to settlement and subsequent failure of utilities remains (risk 52). SFMTA is evaluating what amount of settlement could be sustained without high risk of damage to the utility lines. SFWD has installed gate valves on the two major water mains that traverse the construction zone. These valves facilitate quick shut-off of water in the event that one of the water lines fails, thereby preventing collateral damage due to water intrusion.
- The risk that execution of contract modifications takes an extended period of time, resulting in poor working relationships between the contractor’s field management and SFMTA REs remains. Two aspects of the process are taking longer than they should, including REs’ review of CORs to determine if changes are merited and the final price negotiations for CMods once merit has been determined. The contractor is taking an unreasonably long time to prepare and deliver price proposals that provide the basis for negotiation of CMods.
- Two risks related to delays in testing, commissioning, and system start-up remain. The first risk is that the contractor’s testing and acceptance process will take longer than planned. SFMTA noted that a schedule for testing has been prepared and that SFMTA is evaluating options for adjusting the schedule to start some testing work sooner. The second risk is that SFMTA’s internal acceptance and start-up tasks take longer than planned. SFMTA CSP staff members have started coordinating with Muni Operations staff members to plan the testing, acceptance, and start-up work. SFMTA noted that an

early service start (demonstration) is being considered. Such a strategy will require its own plan and schedule.

- Risk 234, which is the risk that the SEM work at CTS will result in settlement and damage to adjacent buildings, will continue until the SEM work is complete.
- Risk 238, which is the risk that SFMTA's quality program will be ineffective in processing non-conforming work causing schedule delays, continues. The SFMTA Quality Manager (QM) described the quality program's recent efforts to assure that all work conforms to contract requirements. There have been some challenges with the contractor QCM not identifying field conditions that do not match the contract drawings.
- Risks that have been identified for possible retirement include:
 - Damage to adjacent buildings from compensation grouting at UMS (#36). This risk will continue to have a low probability of occurrence until the invert slab is poured and the temporary excavation support is removed.
 - Difficulty in obtaining required permits (#103). SFMTA still needs to obtain an Encroachment Permit from Caltrans and is working to address questions and concerns raised by Caltrans regarding the permit application.
 - Risk that station end walls will leak due to faulty work by the tunnel contractor that is not revealed until the station contractor has completed its work (#115). This risk remains active until the dewatering wells are shut down at each station. The risk is nearly retired at YBM.
 - Delayed receipt of long-lead items results in delays to project completion (#100). Elevators and escalators have not yet been delivered.

The previously identified risk of being unable to recover schedule delays has occurred. All parties agree that the planned RSD of December 2018 will not be achieved. Mitigation strategies will now focus on establishing an achievable completion date for construction and RSD and then aggressively managing to achieve the revised dates. The revised RSD (to be expressed as a range of dates) will be identified using an updated base case schedule and applying risks to specific activities or lines of work in that schedule. The following types of risk could lead to longer durations for the remaining work tasks.

- Risk that the production rates assumed in the baseline schedule cannot be achieved. The most important activity affected by this risk is the completion of SEM work for the platform and crossover caverns at CTS.
- Risk that all of the elements of the contract scope of work are not reflected in the baseline schedule. There have been some examples of preparatory work required prior to the start of activities not being identified in the baseline schedule.
- Risk that the time included in the baseline schedule does not reflect the actual sequence of work required to complete the activity. A possible example of this risk is that the baseline schedule for the installation of the final lining of the CTS platform cavern

assumes shotcrete installation while the contract specifications require formed and poured concrete.

Specific risk events and their associated probabilities and potential schedule impacts will be identified at the next Risk Mitigation meeting in September.

In the opinion of the PMOC, the risk mitigation meeting continues to be an effective forum for identifying threats to the success of the CSP and for developing mitigation measures to reduce the threats, although some risks, such as schedule-related risks, are impacting the project's performance. The project team continues to engage in meaningful discussions during the risk mitigation meetings that help focus attention on the most important issues that could affect project cost, quality, and the completion schedule.

A list of the top risks discussed at the August 2017 Risk Mitigation Meeting is included in Appendix D.

J. ACTION ITEMS

Table 8 on the following page shows the current action items for SFMTA.

Table 8 - SFMTA Action Items for Central Subway Project

Category	NO.	ACTION	DATE OPENED	DUE DATE	DATE CLOSED	COMMENTS
S, RA	166	Update schedule risks based on recovery schedule	12/10/15	<i>10/31/17</i>		Use regular risk mitigation meetings to identify and evaluate schedule risks
S	169	Review and address logic errors and acceleration strategies in the schedule	6/23/16	<i>10/31/17</i>		<i>Confirm logic changes and strategies identified at schedule workshop. SFMTA to maintain parallel schedule with these corrections.</i>
S	171	Provide a range of dates for the Revenue Start Date	6/23/16	<i>1/31/18</i>		<i>Based on results of 166, 169, and a quantitative risk assessment</i>
CH	174	Revise trend tracking process to include the amount of time that has passed since the trend was originally identified.	3/24/17	<i>TBD</i>		
S	176	<i>Accurately detail status completed and started activities in the schedule</i>	<i>7/27/17</i>	<i>8/31/17</i>	<i>9/19/2017</i>	<i>CLOSED</i>
S	177	<i>Develop plan, confirm feasibility of "Revenue Service Demonstration"</i>	<i>7/27/17</i>	<i>TBD</i>		<i>SFMTA identifying requirements for the demonstration</i>

(Note: All closed items are removed a month after being closed. Changes to open items since last update are indicated in *italics*.)

Category Key: C – Cost
 FMP – Fleet Management Plan
 IRP – Independent Review Panel
 PMP –Project Management Plan
 QA – Quality Assurance
 RA – Risk
 RE – Real Estate
 S – Schedule
 SC – Scope
 SS – Safety
 T – Tech. Cap. & Cap.
 CH – Change Mgmt.

APPENDIX A. LIST OF ACRONYMS

AC	Actual Cost
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ARS	Air Replenishment System
ATCS	Advanced Train Control System
BART	Bay Area Rapid Transit
BCE	Baseline Cost Estimate
BHAG	Big Hairy Audacious Goal
BRT	Bus Rapid Transit
Caltrans	California Department of Transportation
CAR	Corrective Action Request
CFR	Code of Federal Regulations
CLIN	Contract Line Item Number
CM	Construction Management
CMB	Configuration Management Board
CMod	Contract Modification
CNCR	Contractor Non-Conformance Report
COR	Change Order Request
CPI	Cost Performance Index
CPUC	California Public Utilities Commission
CQM	Contractor's Quality Manager
CSP	Central Subway Project
CTS	Chinatown Station
DF	Designated Function
DRB	Dispute Review Board
EV	Earned Value
FD	Final Design
FEIR	Final Environmental Impact Report
FEIS	Final Environmental Impact Statement
FFGA	Full Funding Grant Agreement
FLSC	Fire and Life Safety Committee
FMP	Fleet Management Plan
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IRP	Independent Review Panel
LONP	Letter of No Prejudice
LRT	Light Rail Transit
LRV	Light Rail Vehicle
M/E/P	Mechanical, Electrical, and Plumbing

MMRP	Mitigation Monitoring Reporting Program
MOU	Memorandum of Understanding
MPS	Master Project Schedule
Muni	Common Public Reference to SFMTA
NCN	Non-conformance Notice
NCR	Non-conformance Report
NEPA	National Environmental Policy Act
NOPC	Notice of Potential Claim
NTP	Notice to Proceed
O&M	Operations & Maintenance
OHA	Operational Hazard Analysis
OP	Oversight Procedure
PCC	Proposed Contract Changes
PE	Preliminary Engineering
PG&E	Pacific Gas & Electric Company
PHA	Preliminary Hazard Analysis
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
PTMISEA	Public Transportation Modernization, Improvement, and Service Enhancement Account
PV	Planned Value
QA/QC	Quality Assurance/Quality Control
QM	Quality Manager
QPRM	Quarterly Progress Review Meeting
QTR	Quarter
RAMP	Real Estate Acquisition Management Plan
RAP	Rail Activation Plan
RCMP	Risk and Contingency Management Plan
RE	Resident Engineer
RFI	Request for Information
ROD	Record of Decision
RSD	Revenue Service Date
SBE	Small Business Enterprise
SCIL	Safety Certifiable Item List
SCP	Safety Certification Plan
SEIS	Supplemental Environmental Impact Statement
SEM	Sequential Excavation Method
SEPP	Security and Emergency Preparedness Plan
SFDPW	San Francisco Department of Public Works
SFFD	San Francisco Fire Department

SFMTA	San Francisco Municipal Transportation Agency
SFPUC	San Francisco Public Utilities Commission
SFWD	San Francisco Water Department
SIT	Systems Integration Test
SOP	Standard Operating Procedure
SPI	Schedule Performance Index
SSCP	Safety and Security Certification Plan
SSCRC	Safety and Security Certification Review Committee
SSCVR	Safety and Security Certification Verification Report
SSMP	Safety and Security Management Plan
SSO	State Safety Oversight
SSP	System Security Plan
SSPP	System Safety Program Plan
STS	Surface, Track, and Systems
TBD	To Be Determined
TBM	Tunnel Boring Machine
TPC	Tutor Perini Corporation
TSA	Transportation Security Administration
TVA	Threat and Vulnerability Analysis
U.S.C.	United States Code
UMS	Union Square/Market Street Station
VRF	Variable Refrigerant Flow
YBM	Yerba Buena/Moscone Center Station
YOE	Year of Expenditure

APPENDIX B. SAFETY AND SECURITY CHECKLIST

Central Subway Project Overview			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
Project Plans	<i>Version</i>	<i>Review by FTA/FRA</i>	Status
Safety and Security Management Plan	2014	2011	Revision 1 Update submitted to FTA 02/25/2011. Not submitted to FRA. Revision 2 submitted to FTA on May 2, 2014.
Safety and Security Certification Plan (SSCP)	2011		SSCP was revised 10/2011. Revision 1 was developed in November 2011. Not submitted to FRA.
System Safety Program Plan (SSPP)	2009	2009	SSPP dated 03/13/2009 submitted to FTA 07/31/2009. Not submitted to FRA.
System Security Plan (SSP) or Security and Emergency Preparedness Plan (SEPP)	2009		Not submitted to FTA. Not submitted to FRA.
Construction Safety and Security Plan	2012		Health and Safety. Construction Safety Standards Revision 3, June 27, 2012.
Safety and Security Authority	<i>Y/N</i>		Notes/Status
Is the grantee subject to 49 CFR Part 659 state safety oversight requirements?	Y		
Has the state designated an oversight agency as per Part 659.9?	Y		California Public Utilities Commission (CPUC) Consumer Protection & Safety Division 505 Van Ness Avenue San Francisco, CA 94102 (415) 703-1017 phone (415) 703-1758 fax Point of contact: Arun Mehta

Central Subway Project Overview			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
Project Plans	<i>Version</i>	<i>Review by FTA/FRA</i>	Status
Has the oversight agency reviewed and approved the grantee's SSPP as per Part 659.17?	Y		SFMTA currently operates its LRT system in compliance with an SSPP approved by the CPUC. These plans will be revised, as required, to incorporate the addition of the CSP during the late construction and early testing phase and submitted to the CPUC for approval prior to the planned start of revenue operations.
Has the oversight agency reviewed and approved the grantee's Security Plan or SEPP as per Part 659.21?	Y		See above.
Did the oversight agency participate in the last Quarterly Program Review Meeting?	Y		
Has the grantee submitted its safety certification plan (SCP) to the oversight agency?	Y		SFMTA submitted the SSCP to CPUC staff for review and Commission approval during the preliminary engineering phase. The plan was approved in March 2009. The SSCP revised in November 2011 was submitted to the CPUC and was approved. <i>CPUC attends monthly certification review meetings conducted by SFMTA.</i>
Has the grantee implemented security directives issues by the Department Homeland Security, Transportation Security Administration?	N/A		Currently, there are no TSA directives or programs applicable to the project. If any arise during the course of the project, the activities to comply will be developed and shown on a revision of the project safety and security activities schedule.
SSMP Monitoring			

Central Subway Project Overview			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
Project Plans	<i>Version</i>	<i>Review by FTA/FRA</i>	Status
Is the SSMP project-specific, clearly demonstrating the scope of safety and security activities for this project?	Y		The PMOC reviewed the CSP SSMP and provided a spot report to FTA in May 2011. FTA approved the CSP SSMP on May 16, 2011. A follow-up Adherence Audit was conducted September 14-16, 2011. The audit found that CSP is conducting its activities in accordance with the SSMP.
Grantee reviews the SSMP and related project plans to determine if updates are necessary?	Y		SSMP Revision 2 was submitted to FTA on May 2, 2014.
Does the grantee implement a process through which the Designated Function (DF) for Safety and DF for Security are integrated into the overall project management team? Please specify.	Y		Safety and security are under the direction of the SFMTA Safety and Security Manager and supplemented by Project Management/Construction Management consultant staff, including a Safety and Security Certification professional who has been dedicated to supervise project Safety and Security Certification.
Does the grantee maintain a regularly scheduled report on the status of safety and security activities?	Y		Safety and security certification status and activities are reported in the weekly construction progress meetings and the CSP Monthly Progress Report.
Has the grantee established staffing requirements, procedures, and authority for safety and security activities throughout all project phases?	Y		
Does the grantee update the safety and security responsibility matrix/organizational chart as necessary?	Y		The PMOC found the revised matrix in the SSMP, Rev. 1, 02/08/11, to be compliant.
Has the grantee allocated sufficient resources to oversee or carry out safety and security activities?	Y		

Central Subway Project Overview			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
Project Plans	<i>Version</i>	<i>Review by FTA/FRA</i>	Status
Has the grantee developed hazard and vulnerability analysis techniques, including specific types of analysis to be performed during different project phases?	Y		CSP has prepared a Preliminary Hazard Analysis Report, Rev. 0, April 23, 2009. Corrective actions and analysis for different project phases have been identified in the report.
Does the grantee implement regularly scheduled meetings to track to resolution any identified hazards and/or vulnerabilities?	Y		
Does the grantee monitor the progress of safety and security activities throughout all project phases? Please describe briefly.	Y		Safety and Security is an ongoing agenda item for the current construction contract (1300) work package status meetings. <i>The status of safety and security certifications is reviewed at weekly project management meetings.</i>
Does the grantee ensure the conduct of preliminary hazard and vulnerability analyses? Please specify analyses conducted.	Y		
Has the grantee ensured the development of safety design criteria?	Y		Design is complete and construction is underway.
Has the grantee ensured the development of security design criteria?	Y		Design is complete and construction is underway.
Has the grantee ensured conformance with safety and security requirements in design?	Y		<i>Certification checklists have been developed. Certification is achieved through monthly meetings.</i> Design is complete and construction is underway.

Central Subway Project Overview			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
Project Plans	<i>Version</i>	<i>Review by FTA/FRA</i>	Status
Has the grantee verified conformance with safety and security requirements in equipment and materials procurement?	Y		Safety and Security Conformance checklists have been prepared for each of the construction contracts. All certifiable elements of the Tunnel work have been certified and accepted by SFMTA Safety. Certification reviews are underway for the stations contract.
Has the grantee verified construction specification conformance?	Y		This is on-going as construction progresses and verified through the Safety and Security Certification process
Has the grantee identified safety and security critical tests to be performed prior to passenger operations?	N		Currently being developed.
Has the grantee verified conformance with safety and security requirements during testing, inspection, and start-up phases?	N		Project is in construction, with RSD more than 2 years in the future.
Does the grantee evaluate change orders, design waivers, or test variances for potential hazards and/or vulnerabilities?	Y		
Has the grantee ensured the performance of safety and security analyses for proposed work-arounds?	N/A		Currently no work-arounds have been identified.

Central Subway Project Overview			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
Project Plans	<i>Version</i>	<i>Review by FTA/FRA</i>	Status
<p>Has the grantee demonstrated through meetings or other methods, the integration of safety and security in the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Activation Plan and Procedures <input type="checkbox"/> Integrated Test Plan and Procedures <input type="checkbox"/> Operations and Maintenance Plan <input type="checkbox"/> Emergency Operations Plan 	<i>In Process</i>		Second draft of Rail Activation Plan has been completed. An Integration Matrix has been implemented for all disciplines including safety and security concerns.
Has the grantee issued final safety and security certification?	N		Project is in the construction phase.
Has the grantee issued the final safety and security verification report?	N		Project is in the construction phase.

Central Subway Project Overview			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
Project Plans	<i>Version</i>	<i>Review by FTA/FRA</i>	Status
Construction Safety			
Does the grantee have a documented/implemented Contractor Safety Program with which it expects contractors to comply?	Y	Health and Safety Construction Safety Standards Revision 3, June 27, 2012.	
Does the grantee's contractor(s) have a documented companywide safety and security program plan?	Y		
Does the grantee's contractor(s) have a site-specific safety and security program plan?	Y	The remaining active contractor has a plan. Contract documents require that the contractor follows an Environmental Health and Safety Program, specific to the contract work.	
Provide the grantee's OSHA statistics compared to the national average for the same type of work?	Y	Provided in the Central Subway Monthly Progress Report.	
If the comparison is not favorable, what actions are being taken by the grantee to improve its safety record?	N/A	Statistics are favorable. No action needed.	
Does the grantee conduct site audits of the contractor's performance versus required safety/security procedures?	Y	Safety walks are routinely conducted at each construction site.	
Federal Railroad Administration			
If shared track: has grantee submitted its waiver request application to FRA? (Please identify specific regulations for which waivers are being requested.)	N/A	No shared track. No waivers are anticipated.	

Central Subway Project Overview			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
Project Plans	<i>Version</i>	<i>Review by FTA/FRA</i>	Status
If shared corridor: has grantee specified specific measures to address shared corridor safety concerns?	N/A		
Is the CHA underway?	N/A		
Other FRA required Hazard Analysis – Fencing, etc.?	N/A		
Does the project have Quiet Zones?	N		
Does FRA attend the Quarterly Review Meetings?	N		

N/A = Not applicable.

APPENDIX C. PROJECT MAP AND OVERVIEW

CENTRAL SUBWAY PROJECT: Project Overview and Map

Date:	<i>September 13, 2017</i>
Project Name:	Central Subway Project (CSP) New Starts Light Rail Transit
Grantee:	San Francisco Municipal Transportation Agency (SFMTA)
FTA Regional contact:	Mr. Jeffrey S. Davis
FTA Headquarters contact:	Ms. Kim Nguyen

Scope

Description:	The CSP will extend the Third Street Light Rail line from the Caltrain station at Fourth and King streets to Chinatown. It was incorporated in the FEIS/FEIR on the Third Street Light Rail project published in December 1998, but FTA did not include the CSP in the Record of Decision (ROD) issued in March 1999. A ROD for the CSP, however, was issued by FTA on November 26, 2008, and the U.S. Department of Transportation and FTA determined that the requirements of the National Environmental Policy Act (NEPA) of 1969 were satisfied for the CSP. The environmental record for the CSP is included in the Final Supplemental Environmental Impact Statement (SEIS), Volume II, dated July 11, 2008 and the Final SEIS, Volume I, dated September 23, 2008. These documents present the detailed statement required by NEPA and U.S.C. 5324 (b). SFMTA requested authority to enter Preliminary Engineering (PE) in March 2002 and submitted a Project Management Plan (PMP) in June 2002. FTA approved entry into PE in July 2002. Approval to enter Final Design (FD) was granted by FTA on January 7, 2010. The Full Funding Grant Agreement (FFGA) was signed on October 11, 2012.
Guideway:	The length of the CSP will be 1.7 miles of double-tracked line.
Stations:	The CSP includes three subway stations and one surface station.
Additional Facilities:	The CSP does not include any ancillary facilities.
Vehicles:	The CSP Service Plan dated October 2009 clarified that four vehicles will be required.
Ridership:	43,521 Average Weekday Boardings are projected in 2030.

Schedule

07/02	Approval Entry to PE	2016	Estimated Rev Ops at Entry to PE
01/10	Approval Entry to FD	2018	Estimated Rev Ops at Entry to FD
10/11/12	FFGA	2018	Estimated Rev Ops at FFGA
12/10/2019			Revenue Operations Date at date of this report

70.6% *Percent Complete Based on Progress (July 2017 data)*

Cost

\$764 million	Total Project Cost (\$YOE) at Approval Entry to PE
\$1,578 million	Total Project Cost (\$YOE) at Approval Entry to FD
\$1,578 million	Total Project Cost (\$YOE) at FFGA signed
\$TBD million	Total Project Cost (\$YOE) at Revenue Operations
\$1,578 million	Total Project Cost (\$YOE) at date of this report including \$0.00 in Finance Charges
<i>\$1,094.8 million</i>	Amount of Expenditures at date of this report from Total Project Budget of \$1,578 million
<i>69.4%</i>	Percent Complete based on Expenditures at date of this report
<i>\$9.00 million</i>	Unallocated Contingency remaining
<i>\$75.63 million</i>	Total Project Contingency (allocated and unallocated contingency as reported by CSP)
\$60 million	Minimum Total Project Contingency revised on September 5, 2012 PMOC review of Contingency Management Plan

	AT HOLD POINTS	QTR	Minimum Contingency Levels	Revised Levels
1A	Hold Point 1a – Tunnels 100% designed February 2011 (Actual)	1Q11	280	280
1B	Hold Point 1b – CTS 100% designed June 2012 (Actual)	4Q11	250	240
1C	Hold Point 1c – 40% Bid (Tunnel and CTS)	2Q12	225	200
1D	Hold Point 1d – FFGA Award October 2012 (Actual)	3Q12	-	180
2	Hold Point 2 – Commence CTS / UMS construction (Actual June 17, 2013)	2Q13	160	160
3	Hold Point 3 – Demobilize Tunnels (Actual April 15, 2015)	2Q15	140	140
4	Hold Point 4 – Stations to platform levels (CTS / YBM) November 2016	4Q16	60	60
5	Hold Point 5 – Complete CTS / Tunnels systems inst. April 2018	2Q18	25	25
RSD	PMOC / FTA RSD	4Q19		
CURRENT TOTAL CONTINGENCY \$75.63 Million				



APPENDIX D. TOP PROJECT RISKS

The Project Risk Register was updated in 2016. Top risks and selected risks that had not been reviewed in several months were discussed at the August 2017 meeting as noted below.

Top Risks Discussed in the Previous Month:

#52 – The risk of settlement of older utilities above the CTS cross-cut cavern and platform cavern excavations. The ground above and near the excavation is extensively instrumented, and daily meetings are being held to review the recorded data from the instruments. Some settlement of subsurface utilities has been detected. *Gate valves have now been installed on the water lines above the excavation.* These allow immediate shut-off of water in the event of a failure in one of the lines or ground settlement that could damage the lines and cause a leak. SFMTA is negotiating the cost of these valves with SFWD.

#205 – The risk that the prolonged process for approval and execution of CMods results in bad blood between SFMTA and the contractor. CMods are now being processed more quickly and the backlog of unresolved changes is being reduced. SFMTA continues to try and streamline the CMod process. *The largest sources of delay are extra time required to establish merit by SFMTA REs and delays in receipt of formal price proposals from the contractor for merited changes.*

#229 – Risk that acceptance testing takes longer than planned, resulting in delays to the RSD. A more detailed schedule for testing is included in the updated RAP. Some testing may be advanced at YBM, as that station will be completed earlier than the other subway stations.

#230 – Insufficient time for Muni Operations involvement in commissioning results in delays and an impact to the RSD. Muni Operations and Management are reviewing the RAP. *CSP staff has started more intensive coordination with Muni staff to plan and schedule the necessary tasks.*

#232 – Unable to recover accumulated delays, resulting in late RSD. This risk has occurred and the RSD is very likely to be delayed. *A schedule containment workshop was held in July 2017. More specific schedule risks will identified and evaluated in order to establish a range of likely project completion dates.*

#234 – This risk that the contractor's proposed alternative SEM excavation method would cause subsidence will continue to be monitored until all SEM operations are completed. Settlement that is occurring is within the expected range and compensation grouting has been completed to arrest the settlement.

#238 – This risk is that the Quality Program may be ineffective in processing the nonconformance issues causing schedule impacts. The process of tracking and processing the NCR through improved tracking logs is continuing. The CNCR log is being updated as appropriate. CNCRs are being identified timely and processed appropriately. The rating of this risk has been reduced.

#36 – Risk of damage to adjacent buildings from compensation grouting at UMS. This very low risk can be retired once the invert slab is placed in the UMS station box and the temporary struts are removed.

#103 – Risk that obtaining required permits will take longer than planned. SFMTA still needs an encroachment permit from Caltrans for work at the I-80 off-ramp on 4th Street. The application has been submitted and SFMTA is answering questions from Caltrans regarding the application

#115 – Risk of water intrusion at the station headwalls due to non-conforming work by the tunnel contractor that has been accepted by the stations contractor. This risk is low but remains until dewatering equipment is decommissioned at all of the stations.

#100 – Risk that late delivery of long-lead items results in delayed completion of the project. This risk will remain until escalators and elevators are delivered.

Discussion to begin identifying more specific schedule risks followed the review of existing risks. More detail will be developed at the next risk mitigation meeting.

APPENDIX E. ROADMAP TO REVENUE OPERATIONS

Roadmap to Revenue Operations - Central Subway Project, San Francisco Municipal Transportation Agency – DRAFT				
Description	Estimated Start Date	Estimated Completion Date	Actual Completion Date	Notes
Testing				
Finalize/update Systems Integration Test (SIT) Plan	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Prepare Schedule for Testing	1/1/2017	3/1/2017	3/21/2017	Initial testing, commissioning, and start-up schedule has been completed.
Finalize Test Procedures	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Conduct System Integrated Testing with trains, including procedures and reports	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Complete Testing Reports	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Operating Plan, Rules, and Training				
Finalize Operating Plan	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Finalize/revise SOPs, manuals, and rulebook as applicable	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Operations Manuals	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Staffing and Operations Plan	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Training of O&M personnel	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Emergency response plan, training, and drills	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Vehicle Maintenance Plan, Equipment, Facilities, and Training				
Rail Fleet Management Plan	TBD	TBD	TBD	

Roadmap to Revenue Operations - Central Subway Project, San Francisco Municipal Transportation Agency – DRAFT				
Description	Estimated Start Date	Estimated Completion Date	Actual Completion Date	Notes
Maintenance Schedules and Procedures	TBD	TBD	TBD	The LRV fleet is being replaced and expanded through a separate project. The CSP requires an expansion of the fleet of four vehicles.
Spare Parts Requirements	TBD	TBD	TBD	The LRV fleet is being replaced and expanded through a separate project. The CSP requires an expansion of the fleet of four vehicles.
Maintenance Manuals	TBD	TBD	TBD	The LRV fleet is being replaced and expanded through a separate project. The CSP requires an expansion of the fleet of four vehicles.
Maintenance Training	TBD	TBD	TBD	The LRV fleet is being replaced and expanded through a separate project. The CSP requires an expansion of the fleet of four vehicles.
Facility and Right-of-way Maintenance Plan, Equipment, Facilities, and Training				
Maintenance Schedules and Procedures	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Spare Parts Requirements	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Maintenance Manuals	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Maintenance Training	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Pre-Revenue Operations				
Finalize and/or update RAP and/or Pre-Revenue Operations Plan	4/2/2015	4/2017	4/27/2017	The second draft with additional detail and a schedule for testing and pre-revenue activities was submitted with the 2017 update of the PMP.
Implement Rail Activation Committee	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Shadow operations	NA	NA	NA	Project will be operated by the established MUNI operations division.

Roadmap to Revenue Operations - Central Subway Project, San Francisco Municipal Transportation Agency – DRAFT				
Description	Estimated Start Date	Estimated Completion Date	Actual Completion Date	Notes
Develop/revise SSPP & Security Plan (approved by State Safety Oversight (SSO))	<i>Ongoing</i>	10/31/2015	10/31/2015	CPUC triennial review conducted in October 2015 concluded that SFMTA “has a comprehensive System Safety Program Plan (SSPP) and has made significant progress in executing that plan.”
FTA Office of Safety & Security Readiness Review	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
PMOC OP-54 Readiness for Revenue Operations Review Report, Phase I	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Conduct Operational Hazard Analysis (OHA) and resolve other hazards/vulnerabilities	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Pre-Revenue Operations	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Public Outreach				
Develop Safety Outreach Plan	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Provide Community Outreach	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Grand Opening Plan	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Construction Close Out				
Close Out of Non-Conformance Reports	Ongoing	09/24/2019	TBD	NCRs are tracked and closed prior to follow-on work. Final closure of NCRs expected as of final completion date of 1300 Contract.
Punch List Complete	12/17/2018	09/24/2019	TBD	Punch list completion expected at final completion of 1300 Contract.
Certificates of Occupancy/Substantial Completion	TBD	06/26/2019	TBD	

Roadmap to Revenue Operations - Central Subway Project, San Francisco Municipal Transportation Agency – DRAFT				
Description	Estimated Start Date	Estimated Completion Date	Actual Completion Date	Notes
<i>Safety, Security, and Fire-life Safety Certifications</i>				
Update/Finalize SSMP			2/18/2014	Revision 2 completed.
Finalize and/or update SCIL and SSCP			10/10/2008	Revision 0.
Implement Safety and Security Certification Committee			8/1/2010	Committee meets monthly to review certifiable items.
Implement Fire Life Safety Committee			8/1/2010	
Preliminary Hazard Analysis (PHA)				Need dates.
Threat and Vulnerability Analysis (TVA)				Need dates.
Design Criteria Reflecting Safety and Security Requirements	NA	NA	NA	Design is complete and construction is underway.
Review status of quality non-conformances	Ongoing	09/24/2019	TBD	
Close Out of non-safety critical items	Ongoing	Ongoing	TBD	
Close Out of safety critical items	Ongoing	Ongoing	TBD	
Complete Safety & Security Certification Verification Report (SSCVR)	TBD	10/11/2019		60 days before RSD - Check against latest regulations.
Document Workarounds/Open Items List	TBD	TBD	TBD	
Verify emergency drills, tabletops, training, etc. are completed	TBD	TBD	TBD	
SSO final certification/signature	TBD	11/19/2019		21 days before RSD - Check against latest regulations.
<i>Third Party and Agency Agreements</i>				
Third Party/Agency Agreements Necessary for Revenue Service	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.
Third Party/Agency Approvals Necessary for Revenue Service	TBD	TBD	TBD	Project is in construction, with RSD 2+ years in the future.

Roadmap to Revenue Operations - Central Subway Project, San Francisco Municipal Transportation Agency – DRAFT				
Description	Estimated Start Date	Estimated Completion Date	Actual Completion Date	Notes
<i>Revenue Service</i>				
Target Revenue Service Date	-	12/10/2019		Current forecast RSD. Recovery schedule to be prepared.
FFGA Revenue Service Date	-	12/23/2018		

APPENDIX F. LESSONS LEARNED

LL#	Date	Phase	Category	Subject	Lesson Learned
1	09-30-10	FD	Management	Consultant Contracts	The project must have a full understanding of the agency and other approving governmental authorities to avoid delay of contract approval and consequential delay of the Master Project Schedule (MPS).
2	09-30-10	FD	Cost	Staffing Plan	The project staffing plan needs to be formulated during PE and updated at least quarterly during FD to manage Standard Cost Category 80 costs and monitor design production.
3	09-30-10	FD	Scope	Letter of No Prejudice (LONP)	A defined scope of grantee and PMOC responsibilities needs to be provided for content and acceptability of LONP requests.
4	09-30-10	FD	Management	SSMP	FD consultants should be trained, shortly after mobilization, in the format and their responsibility regarding the System Safety Consultant.
5	10-30-10	FD	Cost	Baseline Cost Estimate (BCE) Update	The BCE should be updated with current costs as soon as they are known by the project to allow mitigation of cost contingency usage.
6	02-21-12	FD	Management	Program Controls	Program Controls system/software selected for use for the duration of the project should be in place and functional prior to approval to enter FD. Doing so will avoid a transition during FD that could create a lag in timely reporting of cost and schedule status.
7	02-21-12	FD	Management	Risk Mitigation	Oversight Procedure (OP) 40 needs to be revised to establish minimum requirements for secondary mitigation at different phases of the project, similar to those for cost and schedule contingency. The PMOC recommends 5% of project cost at Entry into FD and 3% at execution of an FFGA.

LL#	Date	Phase	Category	Subject	Lesson Learned
8	02-21-12	FD	Scope	Third Party Agreements	All third party agreements need to be identified as soon as possible, but no later than 65% design completion. This includes leases, both temporary and permanent; MOUs; and licenses, specifically for preconstruction property surveys and settlement monitoring instruments (especially important for underground construction). These third party agreements need to be secured no later than the advertisement date of the construction that they affect. Third party agreements need to be tracked by the project continuously, reported monthly, and updated in a third party agreement matrix submitted quarterly to FTA.
9	02-21-12	FD	Cost	Cost Estimating Procedures	During the preliminary design phase, the project should establish the cost estimating procedures, format, and software to be used by all estimating entities for the entire duration of the project.
10	02-21-12	FD	Cost	Allocated Cost Contingency	In the BCE submitted to FTA for Entry into FD, the project should identify percentages of allocated cost contingency contained in the BCE that are apportioned for design risk, market risk, and construction risk.
11	02-28-12	FD	QA	Design Management Action Log	Design Management should develop a matrix as a tracking tool to document, track, and close out known elements that are missing from design submission packages.
12	08-15-12	FD	Environmental Mitigations	MMRP	Numerous mitigations identified in the MMRP are to be handled by incorporating specific design details and/or statements in the contract drawings and technical specifications. The grantee should note on the MMRP the relevant drawings and/or technical specifications.

LL#	Date	Phase	Category	Subject	Lesson Learned
13	08-31-12	FD	Management	Risk Contingency Levels and Hold Points	It became apparent, during the monitoring of the cost contingency drawdown curve for the project that the contingency levels and hold points no longer represented the current stage of project development and risk reduction/contingency usage related to project development. The project advanced through 100% project design; however, the project did not receive credit for the cost contingency usage established by the risk model. The PMOC recognized this deficiency and participated with the grantee in developing a cost contingency drawdown that reflects current project development and reduced risk.
14	06-30-13	Const.	Management	Change Order Process	Perform an audit of the project's procedures related to Change Orders and processing. The project should train staff and inform contractor of their obligations in the process.
15	1-30-14	Const.	Management	Independent Review Panel (IRP) Decision-makers	At the request of SFMTA, the American Public Transportation Association (APTA) formed a panel of geotechnical and tunnel experts to perform a peer review of the BART Undercrossing. Prior to crossing under the BART tunnels, the Independent Review Panel (IRP), contractor, SFMTA, and BART representatives convened at predetermined tunnel boring machine (TBM) locations to discuss the TBM progress and determine whether the tunneling should proceed. It is critical that decision makers from each organization attend these meetings. It was noted that BART Senior Management did not attend and instead deferred decisions to lower level staff.
16	6-30-14	Const.	Bid documents	Pre-Classification for Soil and Groundwater Disposal	Soils and groundwater generated from construction activities should be pre-classified with appropriate sampling and testing required by potential disposal facilities. Coordinate with the disposal facilities to get materials accepted.

LL#	Date	Phase	Category	Subject	Lesson Learned
17	4-10-15	Const.	Quality Control/Safety	Monitoring of Soil Conditions during Underground Construction	There was a breach of the excavation of frozen ground during construction of a cross passage between the twin bored tunnels followed by water and soil flowing into the tunnels, resulting in subsidence of the ground above and damage to underground utilities. Apparently the flow of materials into the tunnels went on for quite some time before the problem was detected and actions could be taken to arrest the flow. The construction site was not staffed when the breach started and there was no external warning system in place to notify the contractor or the agency of the condition. When the safety and structural integrity of a construction site depends on maintain soil conditions with the use of mechanical systems, the site should be continuously staffed or monitoring devices at the site should be continuously monitored from a remote location to assure that the expected soil conditions are maintained.
18	4-10-15	Const.	Environmental	Archeological Data Recovery Protocols	Sensitive archeological materials were uncovered during the excavation of the roof area at YBM. The Program Manager took immediate action to notify the appropriate state officials and implemented protocols for protection of the materials. The most likely descendent of the remains was quickly identified and a representative was engaged and brought to the site to supervise the ongoing excavation. The quick action to involve the appropriate parties resulted in satisfactory handling of the artifacts with minimal delays to the construction schedule.

LL#	Date	Phase	Category	Subject	Lesson Learned
19	5-11-15	Const.	Quality Control	Use of Latest Design Information for Field Inspection	After two roof pours were completed, it was discovered that required reinforcing steel was missing. Changes to the arrangement of the reinforcing steels were made as part of the submittal review and response process. Notes from the designer were included on the approved shop drawings but not in the contract design drawings. Field inspectors were using only the design drawings to confirm the proper installation of reinforcing steel prior to concrete placement. In the future, the latest design information, including submittals and related designer notes, will be used to inspect reinforcing steel prior to concrete placement.
20	9-28-15	Const.	Schedule	Maintenance of Updated Construction Schedule and Master Program Schedule	SFMTA was unable to obtain an acceptable baseline schedule from the station construction contractor for over a year. Then, SFMTA could not obtain acceptable updated status schedules from the contractor for another 8 months. As a result, the construction status and completion date could not be accurately determined for the first 20 months of the contract. This made schedule control impossible. SFMTA finally created its own schedule updates for the first 12 months of the construction contract using the pay applications and 4-week look-ahead schedules from the contractor. Lesson learned – owners should aggressively assert the need for accurate schedule updates from contractors and should withhold payment if such updates are included in the contract terms or specifications and are not forthcoming. If schedule updates are not received within the first few months of the project, the owner should create its own updates for the purpose of progress monitoring and schedule control.

LL#	Date	Phase	Category	Subject	Lesson Learned
21	11-30-15	Const.	Construction Planning	Installation of Special Trackwork in Operating Systems	SFMTA needed to install special trackwork to provide the connection to the new alignment for Central Subway portion the T Third LRT line. The original plan was to install the special trackwork at the intersection in eight extended weekend shutdowns. Working with the contractor, the plan was revised to accomplish the necessary trackwork installations in two shutdowns. After considering the outcome of the first shutdown, where a portion of the special trackwork did not fit properly and needed adjustment during the shutdown, SFMTA decided to pre-assemble the second, more complex, special trackwork assembly at an off-site facility. The assembly was completed and the resulting track was surveyed to confirm the geometry and to assure that the assembly would fit into the existing field conditions. While conducting the assembly and disassembly of the track components, the contractor identified an approach that would reduce the time required to reassemble the trackwork in the field. As a result of the pre-planning and assembly of the complex trackwork, the final assembly was completed without the need for field adjustments and in less time than planned. This was an effective approach to mitigate the risks associated with the installation of complex custom track components in an operating transit line.
22	3-1-17	Const.	Legal/Claims	Preparation for Mediation	A contractor for advance utility relocation issued a multi-million-dollar claim for extra costs due to delays and unforeseen conditions. SFMTA believed the claim had no justification. After several years, the claim was referred for mediation prior to going to trial. The contractor made a very compelling presentation regarding the extra costs. However, due to careful preparation by SFMTA management, the agency was able to provide specific and detailed rebuttals to the contractor's major arguments. The mediation resulted in a settlement for less than 15% of the original claim amount. SFMTA chose to accept the settlement amount, recognizing that the costs to pursue the claim in court would likely exceed the settlement value.

APPENDIX G. CONTRACT STATUS

The following sections provide the status of ongoing contracts associated with the CSP. Note that the DBE participation percentages are updated by SFMTA on a quarterly basis. The current values are through *June 2017*.

Contract No.	1250	
Contract Description:	UR #1 (YBM)	
Status:	Completed June 2011.	
Cost:	Original Contract Value	\$9,273,939
	Approved Change Orders	\$2,694,211
	Current Contract Value	\$11,968,150
	Expended to Date	\$11,968,150
	% Expended	100%
	SBE Participation	97%
Schedule:	NTP issued January 2010. Substantial completion in June 2011.	
Issues or Concerns:		

Contract No.	1251	
Contract Description:	UR #2 (UMS)	
Status:	Work is complete.	
Cost:	Original Contract Value	\$16,832,550
	Approved Change Orders	\$3,962,031
	Current Contract Value	\$20,794,581
	Expended to Date	\$20,794,581
	% Expended	100%
	SBE Participation	87%
Schedule:	NTP issued January 2011. Substantial completion in August 2012.	
Issues or Concerns:	Final total cost claim by contractor has been settled.	

Contract No.	1252	
Contract Description:	Tunnels	
Status:	Final completion achieved. Financial close out underway.	
Cost:	Original Contract Value	\$233.58 million
	Approved Change Orders	\$8.26 million
	Current Contract Value	\$241.84 million
	Expended to Date	\$234.88 million; \$6.2 million is paid from non-project funds
	% Expended	97.1%
	SBE Participation	5.8%
Schedule:	Final completion achieved May 15, 2015.	
Issues or Concerns:	None.	

Contract No.	1277	
Contract Description:	Pagoda Palace Demolition	
Status:	Construction is complete; contract is in close out.	
Cost:	Original Contract Value	\$498,995
	Approved Change Orders	\$149,981
	Current Contract Value	\$648,976
	Expended to Date	\$648,976
	% Expended	100%
	SBE Participation	100%
Schedule:		
Issues or Concerns:	None.	

Contract No.	1300	
Contract Description:	Three subway stations (YBM, UMS, and CTS) and STS	
Status:	Mass excavation complete at one station and well underway at two other stations.	
Cost:	Original Contract Value	\$839.68 million
	Approved Change Orders	\$7.73 million
	Current Contract Value	\$847.40 million
	Expended to Date	\$501.39 million
	% Expended	59.2%
	SBE Participation	19.9%
Schedule:	NTP issued June 17, 2013. Substantial Completion planned February 2018 and forecast June 2019.	
Issues or Concerns:	The work on this contract is behind schedule.	

Contract No.	CS-155-1	
Contract Description:	Design Package 1 for Contracts 1250, 1251, and 1252. PB/Telemon	
Status:	Design is complete. Construction support is nearly complete for Contract 1252.	
Cost:	Original Contract Value	\$5,795,000 (includes exercised options)
	Approved Change Orders	\$2,145,159
	Current Contract Value	\$7,940,159
	Expended to Date	\$7,937,601
	% Expended	100.0%
	SBE Participation	30.2%
Schedule:		
Issues or Concerns:		

Contract No.	CS-155-2	
Contract Description:	Design Package 2 for UMS, CTS, and YBM. CSDG prime	
Status:	Designs are complete for all of the station contracts. Construction support of Contract 1300 is underway.	
Cost:	Original Contract Value	\$35,428,038
	Approved Change Orders	\$1,626,722
	Current Contract Value	\$37,054,760
	Expended to Date	\$36,570,001
	% Expended	98.7%
	SBE Participation	35.5%
Schedule:		
Issues or Concerns:		

Contract No.	CS-155-3	
Contract Description:	Design Package 3 for STS. HNTB-B&C Prime	
Status:	Design is complete. Construction support of Contract 1300 is underway.	
Cost:	Original Contract Value	\$16,822,238
	Approved Change Orders	\$312,814
	Current Contract Value	\$17,232,252
	Expended to Date	\$14,365,430
	% Expended	83.4%
	SBE Participation	24.5%
Schedule:		
Issues or Concerns:		

Contract No.	CS-149	
Contract Description:	Central Subway Partnership (Project Manager/Construction Manager)	
Status:	On-going.	
Cost:	Original Contract Value	\$85,139,092
	Approved Change Orders	\$0
	Current Contract Value	\$85,139,092
	Expended to Date	\$62,684,498
	% Expended	73.6%
	SBE Participation	32.6%
Schedule:		
Issues or Concerns:		

Contract No.	CS 156	
Contract Description:	Project Controls Consultant	
Status:	On-going.	
Cost:	Base Contract Value	\$17,112,873
	Approved Change Orders	\$0
	Current Contract Value	\$17,112,873
	Expended to Date	\$9,820,243
	% Expended	57.4%
	SBE Participation	29.1%
Schedule:		
Issues or Concerns:		