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Risk Mitigation Meeting Minutes #69

DATE:	July 02, 2015
MEETING DATE:	**April 02, 2015**
LOCATION:	821 Howard Street, 2nd Floor – Main Conference Room
TIME:	10:00am
ATTENDEES:	John Funghi, Albert Hoe, Mark Latch, David Broussard, Vivian Chow, Eric Stassevitch, Beverly Ward, Bill Byrne
COPIES TO:	Attendees: Roger Nguyen, Alex Clifford, John Lackey, Jane Wang, Sanford Pong, Luis Zurinaga, Jeffrey Davis File: M544.1.5.0820
REFERENCE	Project No. M544.1, Contract No. 149 Task 1-4.01 Program/Construction Management
SUBJECT:	**Risk Management – Risk Mitigation Meeting** **Risk Mitigation Report No. 69**

RECORD OF MEETING

ITEM #	DISCUSSION	ACTION BY DUE DATE
1 -	**Report on Red Risk and – (Risk rating ≥ 6)**	
	Risk 225: Ellis Street Utilities (unknown underground utilities) Discussion: The Contractor encountered a differing site condition this morning. Potentially could contain asbestos. Mitigation measures are in place. Once the slab is poured, beams installed and waterproofing is done, we can retire this risk. The risk probability has been lowered to a 3 and schedule to a 1. The new risk rating is now a 5. **Risk Rating 5** **Risk 226**: 4th and King Street - Potential time for planned work shutdown - Contractor not able to perform the work in the manner prescribed Discussion: The Contractor submitted his proposal for 2 shutdown days in May. One as a 3-day and the other for 6-day shutdown. SFMTA will send a letter notifying the Contractor their proposal will be rejected due to them not meeting the 90 day in advance notification requirement to send their proposal. **Risk Rating 9**	
2 -	**Report on Remaining Requirement Risks (Risk rating ≤ 6)**	
	Risk 79 & 104: No new information was reported on the two remaining requirement risk. Visibility of these risks will continue to be present on future agendas until they have been completely mitigated.	

ITEM #	DISCUSSION	ACTION BY DUE DATE
3 -	**Active Construction Risks**	
	Risk 52: Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL) Discussion: The RE still needs to drill down and investigate the 12-inch/100-yr old water line. What additional precautions have to be done? The RE believes he can convince SFPUC to pay for this. This issue was addressed in the settlement report and found to be ok. The risk is not as significant as when it was originally written because of the Station lowering. The Program has told SFPUC, the water line would be protected in place, if CS damages it, then it will be replaced. The risk description should be revised to be accurate for the current condition. **Risk Rating 6** **Risk 72:** Interface new Signaling and Train Control system to existing at Fourth and King Discussion: To obtain an understanding of what was the design intent, S. Pong and HNTB (DP3) met to discuss the issue relating to the train control system. It is believed the designer was relying on the existing design and the Contractor to design the interim phase. A solution to this issue is still pending. The question of how they will demonstrate the similar track phasing design needs to be addressed related to signaling. **Risk Rating 5** **Risk 204**: Relocation of AT&T Vault and other utilities delays Work south of Bryant Discussion: Final connection is still pending. Contractor's relocation work of the ductbank and vaults has not been completed. **Risk Rating 3** **Risk 216:** Olivet building potential construction impact Discussion: A coordination meeting will be held today with the Developers. **Risk Rating 2** **Risk 231**: Implement 4th Street closure - minimize impact to traffic flow on Perry & Stillman Streets Discussion: The lane impacting Perry & Stillman Street is now open. This item is no longer considered a risk. **This Risk will be retired. Risk Rating 0**	
4 -	**Other Business - Potential Risk**	
	Risk 232: Schedule Mitigation - Ways to mitigate potential delays Discussion: D. Broussard and E. Stassevitch presented a draft time impact analysis report. The written comparison analyzes the baseline schedule activities versus what actually occurred in the January schedule update. To demonstrate how real the Contractor's claim of schedule delays are, allegedly caused by SFMTA. The Committee requested the presentation be revised using a side-by-side schedule comparison of one example for a specific delay item to be presented at the next CMB meeting on 04/8/2015. A standardize work document will be created for reporting the Contractor's work activities against the baseline schedule activities. **Risk Rating TBD** **Risk 233:** Shotcrete Substitution - in the Stations for final lining Discussion: SFMTA is still waiting for the Contractor to submit their response to	

ITEM #	DISCUSSION	ACTION BY DUE DATE
	SFMTA comments, requesting they demonstrate the design parameters performance base for concrete by using the shotcrete method. **Risk Rating TBD** **Risk 234:** Sequential Excavation Method at CTS (SEM) Sequence - Contractor proposes to build the north and south platform simultaneously Discussion: The Designer is looking at the Contractor's proposed sequence method and is working on responding to the question, of whether or not they can perform the work in the manner they have proposed. **Risk Rating TBD**	
	Risk 236: UMS North Concourse Roof Issues - 12-inch waterline relocation Discussion: The issue concerning the water line has been resolved. A PCC will be forwarded to the Contractor requesting a price quote. **Risk Rating TBD**	
	New Risk: Quality Control Program - work not being installed properly Discussion: The Program expressed concerned the work may not be being installed properly. Non-conforming work could delay the program schedule. Mitigation Description: 1. Quality Assurance (greater surveillances) 2. Stand down meeting with the Contractor 3. Look at augmentation of management Staff to bring in line with the contract 4. Correction Action Plan from Contractor (what steps will be taken to address the issues) 5. Implementing higher cross checking standards - (tick off on dwgs. what has been checked) to be demonstrated to QA 6. Bring on additional personnel within the Smith-Emery organization. **Risk Rating TBD**	

ACTION ITEMS –

ITEM #	MTG DATE	Task #	DESCRIPTION	BIC	DUE DATE	STATUS
4	12/13/12		**Risk 72 – 4th & King (SSWP)**	S. Pong C. Morganson	05/07/15	Open

Meeting adjourned at 12:00pm

These meeting minutes have been prepared by B. Ward and reviewed by E. Stassevitch, and are the preparer's interpretation of discussions that took place. If the reader's interpretation differs, please contact the author in writing within four (4) days of receipt of these minutes.

Signed: BW ES [initials of preparer & reviewer] **Date:** 7 Jul 15 [Date review completed.

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Meeting Agenda

Project No. M544.1, Contract No. CS-149
Program/Construction Management
Risk Mitigation Management Meeting No. 69
April 02, 2015
10:00am– 12:00pm
Central Subway Project Office
821 Howard St. 2nd Floor
Main Conference Room

Attendees:

William Byrne		Mark Latch		Beverly Ward	
John Funghi		Roger Nguyen		Luis Zurinaga	
Albert Hoe		Eric Stassevitch			

1. **Schedule Time Impact Report (Draft)**

2. **Report on Red Risks (Risk Rating 6 and above)**
   - **Construction Risks** (225, 226)

3. **Report on Remaining Requirement and Design Risks**
   - **Requirement Risks** (79, 104)

4. **Active Risks**
   - **Construction Risks** (52, 72, 204, 216, 231)

4. Risk Mitigation/Assessment
- 232- Schedule Mitigation - Ways to mitigate potential delays
- 233 - Shotcrete Substitution for final lining
- 234 - Sequential Excavation Method at CTS (SEM) - No. & So. simultaneously
- 236 - UMS North Concourse Roof Issues - 12-inch waterline relocation

Note: **Bolded** numerals indicate that risk is recommended to be retired.

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Meeting Attendance Sheet

Project No. M544.1, Contract No. CS-149
Program/Construction Management
Risk Management Meeting No. 69
April 02, 2015
10:00 a.m. – 12:00 p.m.
Central Subway Project Office
821 Howard Street, 2nd Floor
Main Conference Room

Deliver Meeting Attendance Sheet with original signatures/initials to Document Control.

NAME	AFFILIATION	PHONE	E-MAIL (for minutes)	INITIALS
Bill Byrne	DEA/PMOC	720-225-4669	BByrne@deainc.com	BB
Jeffrey Davis	FTA	415-744-2594	Jeffrey.s.davis@dot.gov	
John Funghi	SFMTA	415-701-4299	John.funghi@sfmta.com	
Albert Hoe	SFMTA	415-701-4289	Albert.hoe@sfmta.com	
John Lackey	DEA/PMOC	503-499-0596	jal@deainc.com	
Mark Latch	CSP	415-701-5294	Mark.latch@sfmta.com	MDL
Roger Nguyen	SFMTA	415-701-4312	Roger.Nguyen@sfmta.com	
Eric Stassevitch	CSP	415-660-5407	Eric.stassevitch@sfmta.com	
Beverly Ward	CSP	415-701-5291	Beverly.ward@sfmta.com	
Luis Zurinaga	SFCTA	415-716-6956	luis@sfcta.org	
DAVID BROUSSARD	CSP	6192086641	DAVID.BROUSSARD2@SFMTA.COM	DAB
Vivian Chow	SFMTA	415 701 5264	VivianChow@SFMTA.com	VC

Time Impact Analysis – Contract CN-1300 Preliminary

The CN-1300 Baseline Schedule was approved on 12/13/14. The January 2015 Update Schedule was submitted on 2/19/15, but was returned "Revise and Resubmit". There are 19 months of missing progress updates between the approved Baseline Schedule and the January 2015 Update Schedule. Typically the Time Impact Analysis is performed on the latest approved schedule closest to the time of the schedule impact. The Update Schedules for June 2013 thru November 2014 are not available at this time. However, the Contractor is planning to create these missing schedule updates to analyze potential schedule impacts going forward.

The CN-1300 Contractor has submitted the following Time Impact Schedules (TIAs).

- 458 Change Order Request (COR#034) Time Adjust Proposal - UMS Tangent Pile Work Delays
- 443 PCC#026 - Time Adjust Proposal - CTS Plaza Surface Level Structural Modification
- 472 COR#033 Time Adjustment Proposal - CTS Hard Rock @ Slurry Wall Panel Global
- 486+TPC+Protest+CMOD+08+-+PCC+006+-+AT&T Ductbank Design Change

The Contractor's TIAs shows only proposed Owner caused delays and fails to show Contractor caused delays that have potential impacts to the overall delay. The following examples are types of Contractor delays that have potential schedule impacts.

- Poor planning and lack of contract required predecessor logic relationships
- Late starts and slow production
- Slow response to submittals and excessive submittal cycle time
- Failure to follow Baseline plan and Critical Path
- Out of sequence work that has altered the Critical Path
- Lack of resources and manpower

In all cases the Contractor's TIAs lack merit because it bases their delays on the potential Owner delays and does not consider Contractor delays that may have contributed to the schedule impacts. The overall schedule impact between January 2015 Update and Baseline exceeds the schedule impact identified in their TIAs. Proper analysis will require TIAs that address all factors that affect schedule impacts such as late starts, production rates, actual start/finish dates, workday calendar, percent completes, and assigned resources.

A- UMS Tangent Pile Work Delays

TPC is showing a 65-day delay due to the Battered Pile Design & Tolerance Clarifications which they propose causes a negative 56 day impact to the Critical Path. Contractor was not prepared with their submittals and did not get approval for key submittals until late April 2014. The late start of B-Piles was the result of lack of planning to obtain approval of key submittals to start the work.

The TIA #458 schedule dates activities with January 2015 Update Schedule and Baseline Schedule shows the following.

		Approved Baseline		JAN15 Update Schedule		Var. (cal. Days)
Activity Id	Activity Name	Start	Finish	Start	Finish	Finish (JAN15 - BL)
UMS.31.62.060.2b	UMS_Construct Pile Casing Rotator Guide - West Side Stockton - Rig #2	27-Jan-14	11-Feb-14	20-Jul-14 A	12-Sep-14 A	213
UMS.31.62.100.4b	UMS_ Install (9ea) Battered Piles in Stockton St West Side - Sta 133+06 to 133+44 - Rig #2	27-May-14	9-Jun-14	06-Oct-14 A	22-Oct-14 A	135

The January 2015 Update Schedule shows the TIA #458 activities impacted by other factors that are unrelated to the Battered Pile Design.

B-CTS Plaza Surface Level Structural Modification

The Baseline shows this planned work to take place on **26AUG14**. Activity, Place Concrete Surface level Deck – Pour #1 has an Original Duration of 1 day. TPC proposed TIA shows Steel Corp Letter dated 2/17/15, that added rebar will require 3 days to fabricate, deliver, and install. The TPC Letter #443 requests the addition of 3 days for CTS Plaza Surface Level Structural Modifications. However, the January 2015 Update Schedule shows the work has not started and is 142 days late. The January Update Schedule shows the work is projected to start on **25FEB15**.

C-CTS Hard Rock @ Slurry Wall Panel Global

The TPC TIA #472 shows a 55-day schedule impact due to additional time for Hard Rock Conditions in Slurry Wall Construction for a 55 day (78 Cal. Days) impact to the Critical Path. However, the late start of the Slurry Wall Construction represents 90 Calendar Days (Start Slurry Wall: 07-APR-14 – 08-JAN-14 = 90 days) schedule impact to the Critical Path. The planned duration of Slurry Wall Construction was 192 Calendar Days. The projected completion duration of CTS Slurry Wall Construction is 324 Calendar days based on the January Update Schedule. Hard Rock conditions will be evaluated by Engineers and the findings will be based on GBR. This late start and lack of Slurry Wall production has contributed to this overall delay.

The TIA #472 schedule dates activities with January 2015 Update Schedule and Baseline Schedule shows the following.

		Approved Baseline		JAN15 Update Schedule		Var. (cal. Days)
Activity Id	Activity Name	Start	Finish	Start	Finish	Finish (JAN15 - BL)
CTS.31.66.070	Install Slurry Wall - North Side	8-Jan-14	8-Jan-14	07-APR-14A	12-JUL-14A	185
CTS.31.20.080	Excavate For Surface Level Deck	7-Jul-14	18-Jul-14	11-Feb-15	24-Feb-15	221

D-AT&T Duct bank Design Change (PCC 006)

Tutor Perini Corporation (TPC) sent Letter #486 requesting a 117-day compensable time extension for delay associated with the AT&T Ductbank Design Change that occurred under the STS Package. The Baseline Schedule shows the AT&T Duct Work Activities have Total Float (134 to 194 days). Potential delays due to PCC No. 6 were not raised duration negotiations. The TPC TIA #486 lack merit since the estimated time to complete the contract and change order work is about 3 months.

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Attachment A

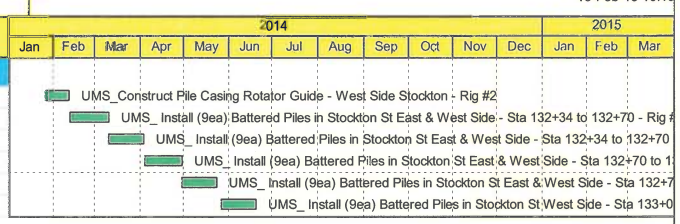
TIA SCHEDULE REPORTS

SFMTA - CSP Phase 2 #1300 - TIA-3 Battered Piles

Exhibit 1

18-Feb-15 16:19

Activity ID	Activity Name	Original Duration	Total Float	Start	Finish	Late Start
Battered Piles		104	4	27-Jan-14	19-Jun-14	03-Feb-14
UMS.31.62.060.2b	UMS_Construct Pile Casing Rotator Guide - West Side Stockton - Rig #2	10	3	27-Jan-14	11-Feb-14	03-Feb-14
UMS.31.62.100.2b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+34 to 132+70 - Rig #2	19	4	12-Feb-14	10-Mar-14	18-Feb-14
UMS.31.62.110.2b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+34 to 132+70 - Rig #2	18	4	11-Mar-14	03-Apr-14	17-Mar-14
UMS.31.62.100.3b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+70 to 133+06 - Rig #2	18	4	04-Apr-14	29-Apr-14	10-Apr-14
UMS.31.62.110.3b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+70 to 133+06 - Rig #2	18	4	30-Apr-14	23-May-14	06-May-14
UMS.31.62.100.4b	UMS_ Install (9ea) Battered Piles in Stockton St West Side - Sta 133+06 to 133+44 - Rig #2	18	4	27-May-14	19-Jun-14	30-May-14



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

SFMTA Contract #1300

UMS - Battered Piles

Baseline Activities

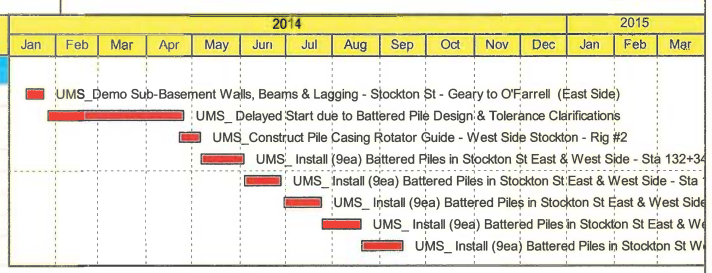
Tutor Perini Corp.

SFMTA - CSP Phase 2 #1300 - TIA-3 Battered Piles

Exhibit 2

20-Feb-15 16:19

Activity ID	Activity Name	Original Duration	Total Float	Start	Finish	Late Start
Battered Piles		176	-58	13-Jan-14	15-Sep-14	14-Oct-13
UMS.02.41.0350	UMS_Demo Sub-Basement Walls, Beams & Lagging - Stockton St - Geary to O'Farrell (East Side)	10	-39	13-Jan-14	24-Jan-14	14-Oct-13
UMS.TIA3.0	UMS_ Delayed Start due to Battered Pile Design & Tolerance Clarifications	65	-60	27-Jan-14	25-Apr-14	28-Oct-13
UMS.31.62.060.2b	UMS_Construct Pile Casing Rotator Guide - West Side Stockton - Rig #2	10	-56	23-Apr-14	06-May-14	03-Feb-14
UMS.31.62.100.2b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+34 to 132+70 - Rig #2	19	-56	07-May-14	03-Jun-14	18-Feb-14
UMS.31.62.110.2b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+34 to 132+70 - Rig #2	18	-56	04-Jun-14	27-Jun-14	17-Mar-14
UMS.31.62.100.3b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+70 to 133+06 - Rig #2	18	-56	30-Jun-14	24-Jul-14	10-Apr-14
UMS.31.62.110.3b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+70 to 133+06 - Rig #2	18	-56	25-Jul-14	19-Aug-14	06-May-14
UMS.31.62.100.4b	UMS_ Install (9ea) Battered Piles in Stockton St West Side - Sta 133+06 to 133+44 - Rig #2	18	-56	20-Aug-14	15-Sep-14	30-May-14



Remaining Level of Effort ◆ Milestone
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work

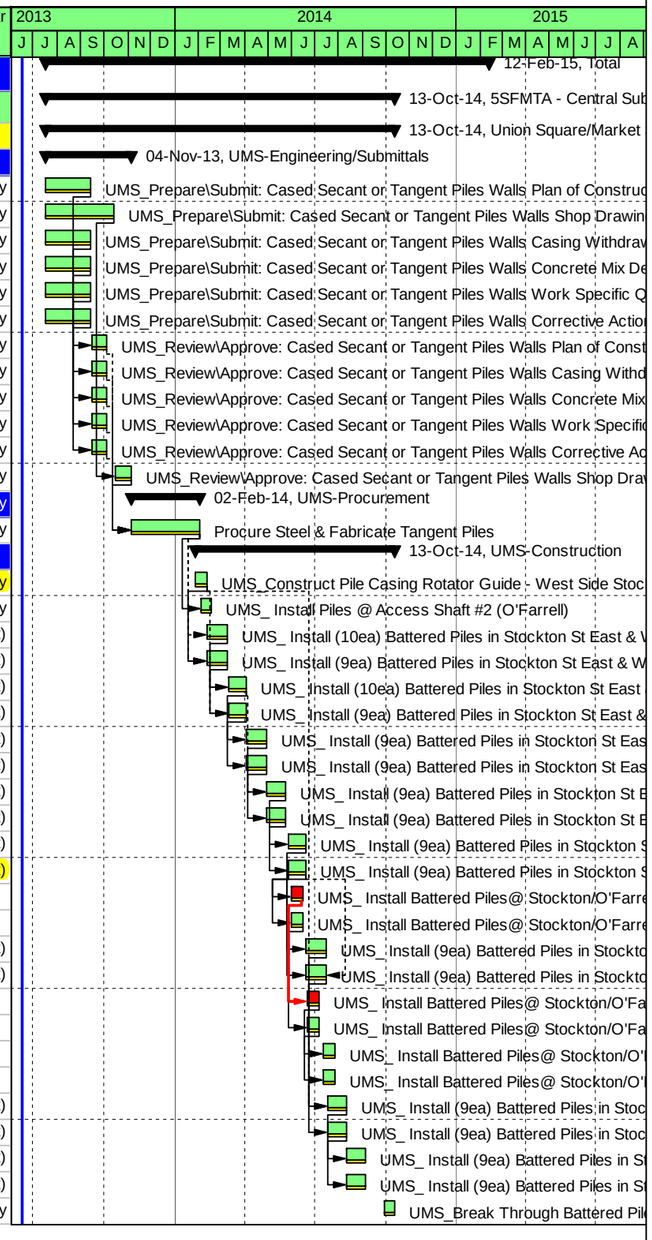
SFMTA Contract #1300

UMS - Battered Piles

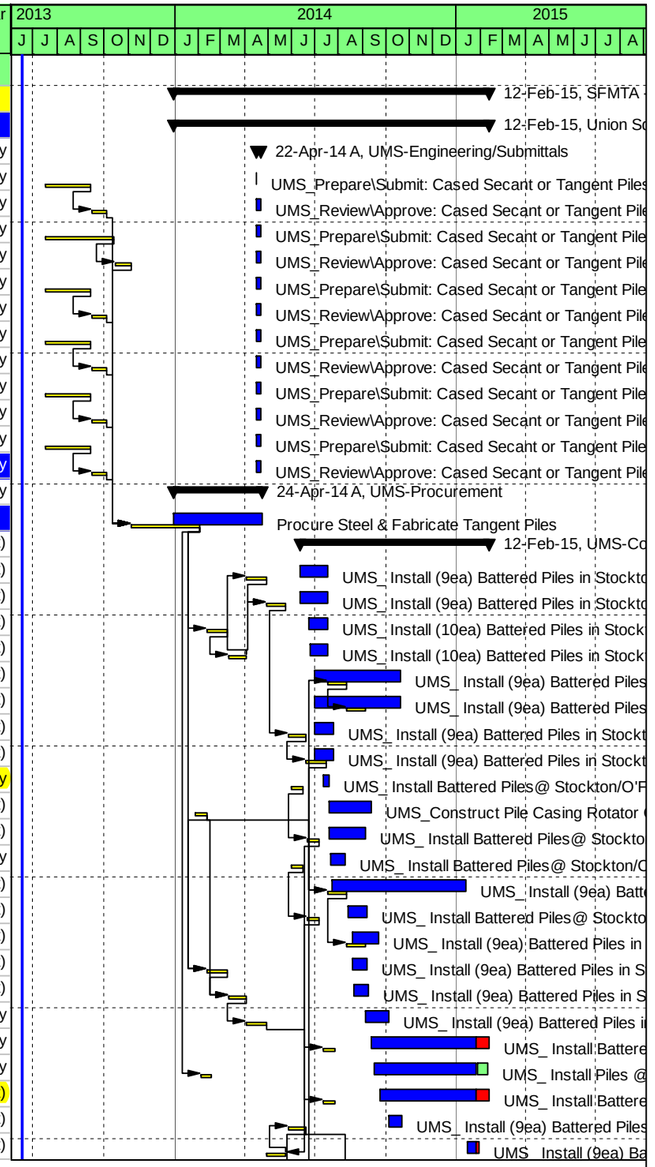
Delay Activityadded to TIA Schedule

Tutor Perini Corp.

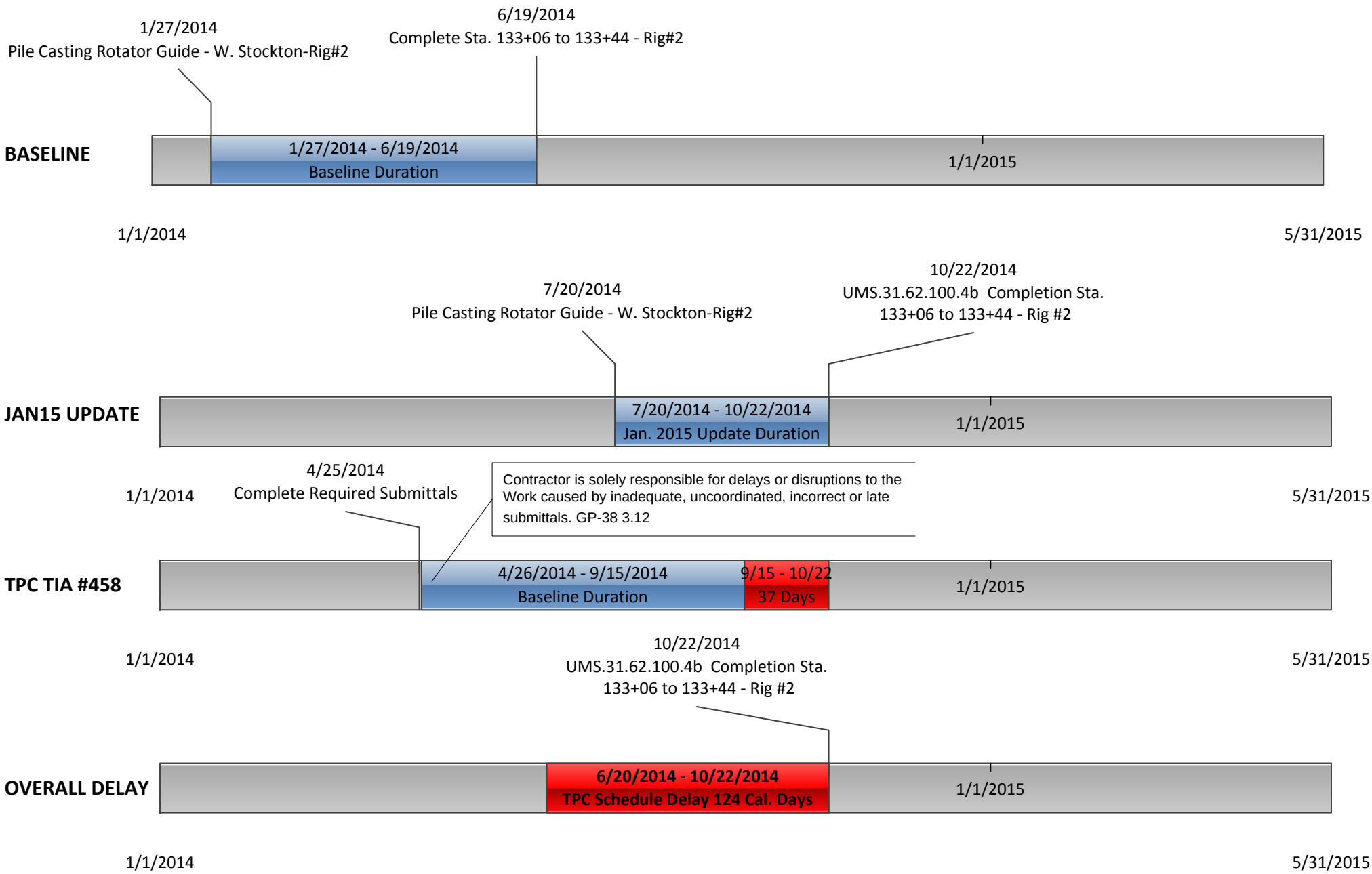
Activity ID	Activity Name	At Completion Duration	Org Dur	BL Project Duration	Start	Finish	Total Float	Calendar
Total		394	419	313	17-Jul-13 A	12-Feb-15	100	
5SFMTA - Central Subway Project Phase 2 Contract No.1300 - Baseline (Revised Comment		321	321	321	17-Jul-13	13-Oct-14	191	
Union Square/Market Street Station Contract P-1253 (UMS)		321	321	321	17-Jul-13	13-Oct-14	191	
UMS-Engineering/Submittals		78	78	78	17-Jul-13	04-Nov-13	11	
UMS 31 62 13 a1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Plan of Construction Operations	60	60	60	17-Jul-13	14-Sep-13	44	13-7-Day
UMS 31 62 13 b1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Shop Drawings & Calculations	90	90	90	17-Jul-13	14-Oct-13	14	13-7-Day
UMS 31 62 13 c1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Casing Withdrawal Method	60	60	60	17-Jul-13	14-Sep-13	44	13-7-Day
UMS 31 62 13 d1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Concrete Mix Designs	60	60	60	17-Jul-13	14-Sep-13	44	13-7-Day
UMS 31 62 13 e1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Work Specific QC Plan	60	60	60	17-Jul-13	14-Sep-13	44	13-7-Day
UMS 31 62 13 f1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Corrective Action Plan	60	60	60	17-Jul-13	14-Sep-13	44	13-7-Day
UMS 31 62 13 a2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Plan of Construction Operations	15	15	15	16-Sep-13	04-Oct-13	31	13-5-day
UMS 31 62 13 c2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Casing Withdrawal Method	15	15	15	16-Sep-13	04-Oct-13	31	13-5-day
UMS 31 62 13 d2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Concrete Mix Designs	15	15	15	16-Sep-13	04-Oct-13	31	13-5-day
UMS 31 62 13 e2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Work Specific QC Plan	15	15	15	16-Sep-13	04-Oct-13	31	13-5-day
UMS 31 62 13 f2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Corrective Action Plan	15	15	15	16-Sep-13	04-Oct-13	31	13-5-day
UMS 31 62 13 b2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Shop Drawings & Calculations	15	15	15	15-Oct-13	04-Nov-13	10	13-5-day
UMS-Procurement		90	90	90	05-Nov-13	02-Feb-14	15	13-7-Day
U1.31.62.420	Procure Steel & Fabricate Tangent Piles	90	90	90	05-Nov-13	02-Feb-14	15	13-7-Day
UMS-Construction		186	186	186	27-Jan-14	13-Oct-14	191	
UMS.31.62.060.2b	UMS_Construct Pile Casing Rotator Guide - West Side Stockton - Rig #2	10	10	10	27-Jan-14	11-Feb-14	3	13-5M-day
UMS.31.50.0200	UMS_ Install Piles @ Access Shaft #2 (O'Farrell)	10	10	10	03-Feb-14	17-Feb-14	285	13-5M-day
UMS.31.62.100.1a	UMS_ Install (10ea) Battered Piles in Stockton St East & West Side - North Headwall to Sta 131+26 - Rig	19	19	19	12-Feb-14	10-Mar-14	28	13-5M-day(2 Shift)
UMS.31.62.100.2b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+34 to 132+70 - Rig #2	19	19	19	12-Feb-14	10-Mar-14	4	13-5M-day(2 Shift)
UMS.31.62.110.1a	UMS_ Install (9ea) Battered Piles in Stockton St East & West Siide - North Headwall to Sta 131+26 - Rig	18	18	18	11-Mar-14	03-Apr-14	28	13-5M-day(2 Shift)
UMS.31.62.110.2b	UMS_ Install (10ea) Battered Piles in Stockton St East & West Siide - North Headwall to Sta 131+26 - Rig	18	18	18	11-Mar-14	03-Apr-14	4	13-5M-day(2 Shift)
UMS.31.62.100.2a	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 131+26 to Sta 131+62 - Rig #1	18	18	18	04-Apr-14	29-Apr-14	28	13-5M-day(2 Shift)
UMS.31.62.100.3b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+70 to 133+06 - Rig #2	18	18	18	04-Apr-14	29-Apr-14	4	13-5M-day(2 Shift)
UMS.31.62.110.2a	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 131+26 to Sta 131+62 - Rig #1	18	18	18	30-Apr-14	23-May-14	28	13-5M-day(2 Shift)
UMS.31.62.110.3b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+70 to 133+06 - Rig #2	18	18	18	30-Apr-14	23-May-14	4	13-5M-day(2 Shift)
UMS.31.62.100.3a	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 131+62 to 131+98 - Rig #1	18	18	18	27-May-14	19-Jun-14	28	13-5M-day(2 Shift)
UMS.31.62.100.4b	UMS_ Install (9ea) Battered Piles in Stockton St West Side - Sta 133+06 to 133+44 - Rig #2	18	18	18	27-May-14	19-Jun-14	4	13-5M-day(2 Shift)
UMS.31.62.100.1w1	UMS_ Install Battered Piles@ Stockton/O'Farrell St West Side - 6ea Piles Rig #1 - Weekends #1-3	6	6	6	31-May-14	15-Jun-14	0	13-2M-W/E
UMS.31.62.100.2w1	UMS_ Install Battered Piles@ Stockton/O'Farrell St East Side - 6ea Piles Rig #2 - Weekends #1-3	6	6	6	31-May-14	15-Jun-14	1	13-2M-W/E
UMS.31.62.110.3a	UMS_ Install (9ea) Battered Piles in Stockton St East & west Side - Sta 131+62 to 131+98 - Rig #1	18	18	18	20-Jun-14	16-Jul-14	28	13-5M-day(2 Shift)
UMS.31.62.110.4b	UMS_ Install (9ea) Battered Piles in Stockton St East Side - Sta 133+06 to 133+44 - Rig #2	18	18	18	20-Jun-14	16-Jul-14	48	13-5M-day(2 Shift)
UMS.31.62.100.1w2	UMS_ Install Battered Piles@ Stockton/O'Farrell St West Side - 6ea Piles Rig #1 - Weekends #4-6	6	6	6	21-Jun-14	06-Jul-14	0	13-2M-W/E
UMS.31.62.100.2w2	UMS_ Install Battered Piles@ Stockton/O'Farrell St East Side - 6ea Piles Rig #2 - Weekends #4-6	6	6	6	21-Jun-14	06-Jul-14	1	13-2M-W/E
UMS.31.62.100.1w3	UMS_ Install Battered Piles@ Stockton/O'Farrell St West Side - 6ea Piles Rig #1 - Weekends #7-9	6	6	6	12-Jul-14	27-Jul-14	1	13-2M-W/E
UMS.31.62.100.2w3	UMS_ Install Battered Piles@ Stockton/O'Farrell St East Side - 6ea Piles Rig #2 - Weekends #7-9	6	6	6	12-Jul-14	27-Jul-14	1	13-2M-W/E
UMS.31.62.100.1b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 131+98 to 132+34 - Rig #1	18	18	18	17-Jul-14	11-Aug-14	28	13-5M-day(2 Shift)
UMS.31.62.100.4a	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - South Headwall to Sta 134+26 - Rig	18	18	18	17-Jul-14	11-Aug-14	48	13-5M-day(2 Shift)
UMS.31.62.110.1b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 131+98 to 132+34 - Rig #1	18	18	18	12-Aug-14	05-Sep-14	35	13-5M-day(2 Shift)
UMS.31.62.110.4a	UMS_ Install (9ea) Battered Piles in Stockton St East &West Side - South Headwall To Sta 134+26 - Rig	18	18	18	12-Aug-14	05-Sep-14	48	13-5M-day(2 Shift)
UMS.31.20.0710	UMS_Break Through Battered Piles & Frame Construction Access #2	10	10	10	30-Sep-14	13-Oct-14	158	13-5M-day



Activity ID	Activity Name	At Completion Duration	Org Dur	BL Project Duration	Start	Finish	Total Float	Calendar
SFMTA - Central Subway Project Phase 2 Contract No.1300 - Live Sch (DD01-26-15)		294	435	295	30-Dec-13 A	12-Feb-15	63	
Union Square/Market Street Station Contract P-1253 (UMS)		294	435	295	30-Dec-13 A	12-Feb-15	63	
UMS-Engineering/Submittals		4	78	78	16-Apr-14 A	22-Apr-14 A		
UMS 31 62 13 a1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Plan of Construction Operations	0	60	60	16-Apr-14 A	16-Apr-14 A		13-7-Day
UMS 31 62 13 a2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Plan of Construction Operations	4	15	15	16-Apr-14 A	22-Apr-14 A		13-5-day
UMS 31 62 13 b1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Shop Drawings & Calculations	6	90	90	16-Apr-14 A	22-Apr-14 A		13-7-Day
UMS 31 62 13 b2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Shop Drawings & Calculations	4	15	15	16-Apr-14 A	22-Apr-14 A		13-5-day
UMS 31 62 13 c1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Casing Withdrawal Method	6	60	60	16-Apr-14 A	22-Apr-14 A		13-7-Day
UMS 31 62 13 c2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Casing Withdrawal Method	4	15	15	16-Apr-14 A	22-Apr-14 A		13-5-day
UMS 31 62 13 d1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Concrete Mix Designs	6	60	60	16-Apr-14 A	22-Apr-14 A		13-7-Day
UMS 31 62 13 d2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Concrete Mix Designs	4	15	15	16-Apr-14 A	22-Apr-14 A		13-5-day
UMS 31 62 13 e1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Work Specific QC Plan	6	60	60	16-Apr-14 A	22-Apr-14 A		13-7-Day
UMS 31 62 13 e2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Work Specific QC Plan	4	15	15	16-Apr-14 A	22-Apr-14 A		13-5-day
UMS 31 62 13 f1	UMS_Prepare\Submit: Cased Secant or Tangent Piles Walls Corrective Action Plan	6	60	60	16-Apr-14 A	22-Apr-14 A		13-7-Day
UMS 31 62 13 f2	UMS_Review\Approve: Cased Secant or Tangent Piles Walls Corrective Action Plan	4	15	15	16-Apr-14 A	22-Apr-14 A		13-5-day
UMS-Procurement		115	90	90	30-Dec-13 A	24-Apr-14 A		13-7-Day
U1.31.62.420	Procure Steel & Fabricate Tangent Piles	115	90	90	30-Dec-13 A	24-Apr-14 A		13-7-Day
UMS-Construction		176	311	160	12-Jun-14 A	12-Feb-15	63	
UMS.31.62.100.2a	UMS_ Install (9ea) Battered Piles in Stockton St East Side - Sta 131+26 to Sta 131+62 - Rig #1	25	18	18	12-Jun-14 A	18-Jul-14 A		13-5M-day(2 Shift)
UMS.31.62.110.2a	UMS_ Install (9ea) Battered Piles in Stockton St East Side - Sta 131+26 to Sta 131+62 - Rig #1	25	18	18	12-Jun-14 A	18-Jul-14 A		13-5M-day(2 Shift)
UMS.31.62.100.1a	UMS_ Install (10ea) Battered Piles in Stockton St East Side - North Headwall to Sta 131+26 - Rig #1	17	19	19	24-Jun-14 A	18-Jul-14 A		13-5M-day(2 Shift)
UMS.31.62.110.1a	UMS_ Install (10ea) Battered Piles in Stockton St East Side - North Headwall to Sta 131+26 - Rig #1	16	18	18	25-Jun-14 A	18-Jul-14 A		13-5M-day(2 Shift)
UMS.31.62.100.4a	UMS_ Install (9ea) Battered Piles in Stockton St West Side - South Headwall to Sta 134+26 - Rig #2	77	18	18	01-Jul-14 A	20-Oct-14 A		13-5M-day(2 Shift)
UMS.31.62.110.4a	UMS_ Install (9ea) Battered Piles in Stockton St West Side - South Headwall To Sta 134+26 - Rig #2	77	18	18	01-Jul-14 A	20-Oct-14 A		13-5M-day(2 Shift)
UMS.31.62.100.3a	UMS_ Install (9ea) Battered Piles in Stockton St East Side - Sta 131+62 to 131+98 - Rig #1	16	18	18	02-Jul-14 A	25-Jul-14 A		13-5M-day(2 Shift)
UMS.31.62.110.3a	UMS_ Install (9ea) Battered Piles in Stockton St East Side - Sta 131+62 to 131+98 - Rig #1	16	18	18	02-Jul-14 A	25-Jul-14 A		13-5M-day(2 Shift)
UMS.31.62.100.1w1	UMS_ Install Battered Piles@ Stockton/O'Farrell St West Side - 6ea Piles Rig #1 - Weekends #1-3	5	10	6	13-Jul-14 A	20-Jul-14 A		13-5M-day(2 Shift)
UMS.31.62.060.2b	UMS_Construct Pile Casing Rotator Guide - West Side Stockton - Rig #2	38	10	10	20-Jul-14 A	12-Sep-14 A		13-5M-day
UMS.31.62.100.1w2	UMS_ Install Battered Piles@ Stockton/O'Farrell St West Side - 6ea Piles Rig #1 - Weekends #4-6	33	8	6	20-Jul-14 A	05-Sep-14 A		13-5M-day(2 Shift)
UMS.31.62.100.2w1	UMS_ Install Battered Piles@ Stockton/O'Farrell St East Side - 6ea Piles Rig #2 - Weekends #1-3	14	9	6	22-Jul-14 A	09-Aug-14 A		13-5M-day(2 Shift)
UMS.31.62.100.1b	UMS_ Install (9ea) Battered Piles in Stockton St East Side - Sta 131+98 to 132+34 - Rig #1	143	49	18	24-Jul-14 A	14-Jan-15 A		13-6-day
UMS.31.62.100.2w2	UMS_ Install Battered Piles@ Stockton/O'Farrell St East Side - 6ea Piles Rig #2 - Weekends #4-6	17	8	6	13-Aug-14 A	07-Sep-14 A		13-5M-day(2 Shift)
UMS.31.62.110.1b	UMS_ Install (9ea) Battered Piles in Stockton St West Side - Sta 131+98 to 132+34 - Rig #1	23	18	18	19-Aug-14 A	22-Sep-14 A		13-5M-day(2 Shift)
UMS.31.62.100.2b	UMS_ Install (9ea) Battered Piles in Stockton West Side - Sta 132+34 to 132+70 - Rig #2	12	19	19	20-Aug-14 A	08-Sep-14 A		13-5M-day(2 Shift)
UMS.31.62.110.2b	UMS_ Install (9ea) Battered Piles in Stockton St West Side - Sta 132+34 to 132+70 - Rig #2	12	18	18	21-Aug-14 A	09-Sep-14 A		13-5M-day(2 Shift)
UMS.31.62.100.3b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+70 to 133+06 - Rig #2	21	18	18	05-Sep-14 A	06-Oct-14 A		13-5M-day(2 Shift)
UMS.31.62.100.2w3	UMS_ Install Battered Piles@ Stockton/O'Farrell St East Side - 6ea Piles Rig #2 - Weekends #7-9	125	10	6	13-Sep-14 A	11-Feb-15	-118	13-6-day
UMS.31.50.0200	UMS_ Install Piles @ Access Shaft #2 (O'Farrell)*	79	10	10	16-Sep-14 A	10-Feb-15	61	13-5M-day
UMS.31.62.100.1w3	UMS_ Install Battered Piles@ Stockton/O'Farrell St West Side - 7ea Piles Rig #1 - Weekends #7-9	116	10	6	25-Sep-14 A	12-Feb-15	-151	13-6-day
UMS.31.62.100.4b	UMS_ Install (9ea) Battered Piles in Stockton St West Side - Sta 133+06 to 133+44 - Rig #2	12	18	18	06-Oct-14 A	22-Oct-14 A		13-5M-day(2 Shift)
UMS.31.62.110.3b	UMS_ Install (9ea) Battered Piles in Stockton St East & West Side - Sta 132+70 to 133+06 - Rig #2	12	19	18	15-Jan-15 A	30-Jan-15	-50	13-5M-day(2 Shift)
UMS.31.62.110.4b	UMS_ Install (9ea) Battered Piles in Stockton St East Side - Sta 133+06 to 133+44 - Rig #2	7	7	18	02-Feb-15	10-Feb-15	-50	13-5M-day(2 Shift)



UMS B-Piles Timeline Comparison Jan-2015 Update vs Approved Baseline



Note: January 2015 Update schedule dates based on dates from TPC January 2015 Update Schedule.

Risk Mitigation Status
Risk Reference: 225

Risk	Mitigation Strategy
Ellis Street Utilities (unknown underground utilities)	1. Proactive investigation into identify the issue 2. Engineers should review and make a recommendation 3. Early review of potholing information for potential conflicts 4. Put utilities on red alert

Initial Assessment: 5 (2, 2, 2)
Current Assessment: 5

Risk Owner: A. Hoe/E. Stassevitch

Status Log:

July 2014:

1. The Contractor has verbally mentioned some utility issue on Ellis Street, but has not submitted any documentation concerning the issue.
2. The Engineering team will review the issue and make a determination.

October 2014:

1. Contractor has notified SFMTA of DSC however, no official letter notification has been submitted.
2. Additional mitigation strategies were added to this risk.
    a. Review Contractor's potholing plan for inconsistently
    b. Determine what TPC issues are
    c. Investigate the Contractor DSC claims, what have they found

November 2014:

1. Contractor has not submitted any information concerning their DSC claim.

December 2014:

1. No further notice has been received from the Contractor on any issues.
2. Ellis Street has been closed to help the Contractor mitigate the risk area.
3. A. Hoe will take the lead in focusing on the investigation of the utilities in the area.

January 2015:

1. There was an issue with a vault which could possibly impact sheeting. The issue has now gone away.

February 2015:

1. A. Hoe contacted DPW requesting information, none was provided. Additionally A. Hoe met with Utility representatives for PG&E and AT&T. No information was obtained regarding the unknown underground utilities.
2. This risk item will remain open until the Contractor has reached the bottom.

March 2015:

1. Contractor is now in the process of jack hammering the shaft.

Risk Mitigation Status
Risk Reference: 225

Risk		Mitigation Strategy
Ellis Street Utilities (unknown underground utilities)		1. Proactive investigation into identify the issue 2. Engineers should review and make a recommendation 3. Early review of potholing information for potential conflicts 4. Put utilities on red alert

April 2015:

1. Contactor just encountered a differing site condition 04/02/15, that could potentially contain asbestos. Mitigation measures are in place to address this DSC.
2. This risk will remain open until work is finished in this area.
3. Risk rating has been reduced to a 5.

Risk Mitigation Status
Risk Reference: 226

Risk		Mitigation Strategy
4th and King Street - Potential time for planned work shutdown - Contractor not able to perform the work in the manner prescribed		1. Identify schedule of potential time for planned work shutdown 2. Identify better traffic patterns 3. Pursue 4th & King option to achieve additional 3-6mos on the schedule 4. Review Giants and Warriors schedule for home games

Initial Assessment: 3, 3, 3 **Risk Owner:** M. Acosta
Current Assessment: Risk Rating 9 – Construction Risk

Status Log:

November 2014:

1. Contractor has yet to submit a proposal for the 4th and King planned shutdown.

December 2014:

1. Contractor has yet to submit a complete proposal for the traffic system. SFMTA Operations is willing to discuss (internally) alternative shutdown periods.
2. A dedicated team needs to be establish to focus on this 8wk sequence of shutdown activity.
3. Item to be elevated for discussion at Partnering session.

January 2015:

1. Letter will be sent to the Contractor rejecting their incomplete proposal.

February 2015:

1. The RE reported the Contractor has already planned the 8-week shutdown in the schedule. However, the Contractor has yet to provide a master work plan. The RE will a send a letter to the Contractor requesting information:
    a. Provide the status of the site specific work plans for the proposed 10-day shutdown.
    b. Per spec sect requirement 34 11 00 3.04. Contractor is required to provide a detail of the schedule showing activities with a planned duration.
    c. Identify the location for where the portable cross-over will go.
    d. Provide the name (contact person) of the Contractor's System Integration Manger.

March 2015:

1. The Contractor schedule demonstrates they are already behind in activities involving the three full weekend shutdowns.
2. A letter was sent to TPC reminding them they are required by contract to provide SFMTA their schedule 90 days in advance of the work.

April 2015:

1. In latest correspondence, TPC proposed 2 shutdowns in May 2015 (a 3 day and a 6 day shutdowns).
2. The May 2015 proposed shutdown does not meet contract requirements including the 90 day advance notice, therefore, will be rejected.

Risk Mitigation Status
Risk Reference: 52

Risk		Mitigation Strategy
Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)		1. Evaluate effect of potential settlement on utilities. 2. Slip-lined sewer by CTS contractor. 3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed. 4. Contractor to correct impact of settlements by repair. 5. Have contingency repair/restoration plan. 6. Utility contact information and procedure will be on plans. 7. Develop an allowance for utility repair. 8. Include probable costs in estimate.

Initial Assessment: 4, 2, 8 **Risk Owner:** M. Kobler
Current Assessment: Risk Rating 6 – Construction Risk

Status Log:

December 8, 2009 Meeting:
1. R. Edwards was identified as risk owner.
2. A. Hoe will status the mitigation strategy.
3. Mitigation strategy needs to establish metrics for acceptable settlement criteria.
4. Eliminated Mitigation Strategy Item 6: “Cistern at Washington St. will be repaired at the completion of construction and damaged pavements replaced” from this risk and will make a new Risk 52a to address the risk to the cistern.(Done)

January 21, 2010 Meeting:
1. An action from the last risk mitigation meeting to “move Mitigation Strategy Item No. 6 to a new Risk 52a” was not done. R. Rocco will update the register accordingly.

November 2011:
1. Revised mitigation strategy 1 to indicate slip-lining of sewer by CTS contractor, not TBM contractor.
2. Removed mitigation strategy 2 “will pre-install tubamachettes for compensation grouting”.
3. Revised mitigation strategy 4 to eliminate use of compensation grouting to correct impact of settlement.
4. Sewers will be slip-lined prior to cavern construction.
5. Affected utilities requiring monitoring are listed in BP drawings.
6. Technical specifications address requirement for leak detection and mitigation plans to repair leaks.

January 2012 Meeting:
1. SFPUC submitted comments on the Effects of Settlement on Utilities report.
2. SFMTA will respond to comments.

February 2012:
1. Mitigation strategy added to “Develop an allowance bid item for utility repair”.
2. SFMTA responded to comments. None of the responses change the mitigation strategy for this risk.

Risk Mitigation Status
Risk Reference: 52

Risk		Mitigation Strategy
Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)		1. Evaluate effect of potential settlement on utilities. 2. Slip-lined sewer by CTS contractor. 3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed. 4. Contractor to correct impact of settlements by repair. 5. Have contingency repair/restoration plan. 6. Utility contact information and procedure will be on plans. 7. Develop an allowance for utility repair. 8. Include probable costs in estimate.

Initial Assessment: 4, 2, 8 **Risk Owner:** M. Kobler
Current Assessment: Risk Rating 6 – Construction Risk

3. Leak detection requirements added to contract.
4. Allowance for utility repair included in contract.

September 2012 Meeting:
1. CTS has been resolved

October 2012 Meeting:
1. UMS & YBM yet to be closed out

May 2012:
1. **Recommend reducing this risk rating to 3 (2, 2, 1)** (reduce probability and cost impact)
    a. Current probability (3), >50%, recommend reduce probability to (2), 10-50%
    b. Current cost impact (3), $1m - $3m, recommend reduce cost impact to (2), $250k - $1m (CN 1300 CTS AL-8 = $250k)
    c. Current schedule impacts (1), <1 month, maintain schedule impact
2. Risk rating to remain at 6

January 2014:
1. Comments regarding UMS and YBM are still to be closed out with SFPUC.
2. A letter responding to the outstanding comments will be sent to SFPUC the week of January 13th

March 2014:
1. Letter was sent to SFPUC. Response from SFPUC is still pending.
2. SFPUC previous contact Betsey Eagon has left the division. SFMTA needs to identify the new contact person.

April 2014:
1. Response from SFPUC of outstanding comments is still pending.

Risk Mitigation Status
Risk Reference: 52

Risk		Mitigation Strategy
Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)		1. Evaluate effect of potential settlement on utilities. 2. Slip-lined sewer by CTS contractor. 3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed. 4. Contractor to correct impact of settlements by repair. 5. Have contingency repair/restoration plan. 6. Utility contact information and procedure will be on plans. 7. Develop an allowance for utility repair. 8. Include probable costs in estimate.

Initial Assessment: 4, 2, 8 **Risk Owner:** M. Kobler
Current Assessment: Risk Rating 6 – Construction Risk

February 2015:

1. Slip lining brick sewers scheduled to begin After Chinese New Year. Prior to work commencement the risk owner is to meet with utility owner (PUC) and identify existing obstructions that are preventing slip lining work and request funding to relocate or eliminate obstructions.

2. 12 inch 100 year old water line identified as a risk. Prepare a conceptual waterline layout and present to utility owner (PUC) and request funding to upgrade their line.

March 2015

1. Slip lining between Washington and Jackson installed, backfilling on going. Determined that there would be no additional cost. Clay to Washington not yet scheduled.

2. No progress update for the 12-inch 100yr. old water line.

April 2015:

1. The 12inch/100 year old water line issue was addressed in the settlement report. No issues were found, the settlement report was not revised during the lowering of the tunnel.
2. The RE needs to drill down and investigate the issue. Are there additional precaution that need to be done?

Risk Mitigation Status
Risk Reference: 72

Risk	Mitigation Strategy
Interface new Signaling and Train Control system to existing at Fourth and King	New system will be connected in parallel with existing system until the new system has been tested and safety certified for operation.

Initial Assessment: 2, 3, 5
Current Assessment: Risk Rating 5 – Design Risk

Risk Owner: S. Pong

Status Log:

October 2011 Meeting:
1. Recommend to retire this risk from the project.
2. Risk not retired. Systems contract drawings need approval of Muni Operations.

November 2011:
1. Functional requirements for the interface have been approved by Muni Operations.
2. 90% design drawings for Systems contract will be forwarded to Muni Operations for their review and comment.

January 2012 Meeting:
1. Concept design with SFMTA Operations recommended safety enhancements have been approved.
2. ECP for recommended safety enhancements prepared and will be submitted to CMB for approval.

February 2012:
1. CMB approved ECP for Operational & Safety Upgrades.
2. SFMTA Muni Operations signed off on ECP.
3. ECP being implemented by design team.
4. Recommend to reduce this risk rating.

September 2012 Meeting:
1. Update to be provided next meeting.
2. New plan to be advised, mitigation strategy to be revised.

October 2012 Meeting:
1. Central Subway have sent a letter to Ops including contract specifications, temporary and permanent requirements seeking concurrence
2. Ross/Carlos to provide a briefing next meeting regarding how signaling interface design has ensured functionality at the end of each weekend shutdown.

November 2012 Meeting:

1. Technical specifications now approved.

Risk Mitigation Status
Risk Reference: 72

Risk		Mitigation Strategy
Interface new Signaling and Train Control system to existing at Fourth and King		New system will be connected in parallel with existing system until the new system has been tested and safety certified for operation.

2. A presentation is to be given at the December Risk meeting to demonstrate that the signaling design has confirmed functionality can be maintained where required, and reinstated following the 6 weekend shutdowns.

December 2012 Meeting:

1. Clarification system will not be parallel
2. System train control will not be done during track and OCS construction
3. New switch machine have similar controls as the old machine.
4. Expansion of the Site Specific Work Plan will be established for review by the Risk Committee.

July 2013 Meeting:

1. SFMTA to begin discussions with CN 1300 Contractor – Tutor Perini to develop site specific work plans and identify weekend work windows.

October 2014:

1. Review of the designs constructability needs additional evaluation.
2. A swat team to include Program Management, RE and ARE will be created to address the interface issues between trackwork, signaling and train control system.

February 2015:

1. S. Pong to setup a meeting with the Designer (HNTB) to respond to outstanding questions related to signal and train control.

March 2015:

1. The meeting with HNTB (DP3) has yet to take place. S. Pong is still working on coordination.

April 2015:

1. Meeting took place between SFMTA and HNTB (DP3). A solution is still pending. The Designer needs to demonstrate their signaling phasing design similar to the track design.

Risk Mitigation Status
Risk Reference: 204

Risk	Mitigation Strategy
Relocation of AT&T Vault and other utilities delays Work south of Bryant	1. Continue negotiations/ coordination with utility owners. 2. Contract 1300 is required to coordinate with utility companies for relocations 3. SWAT team established to address utilities south of Bryant Street 4. Initiate utility coordination meetings 5. Proactively schedule AT&T resources

Initial Assessment: 2, 2, 4
Current Assessment: Risk Rating 3 – Construction Risk

Risk Owner: M. Acosta

Status Log:

December 2012:

1. Identified Risk and refined risk statement together with development of mitigation strategies.

January 2013:

1. Need to setup a meeting with AT&T and a representative from the Design side to walk them through what will be done in the 1300 contract.

February 2013:

1. Risk description refined.
2. AT&T were made aware of the potential need for relocation of the vault and duct bank in November 2012.
3. A meeting has been arranged between CSP and AT&T for Tuesday 2/19/13 to follow up on the November meeting and confirm that the vault and duct bank will need to be relocated.
4. Relocation of the vault has been included in the D&B element of the 1300 contract and is the responsibility of the contractor.
5. The 1300 contract requires the contractor to allow 12 months for AT&T to cut over new services from the existing duct bank into a new duct bank proposed within the eastern sidewalk of 4th Street between Bryant and Brannan Streets.

March 2013:

1. Increase scope of this risk to include other utilities; Level 3, PG&E, MRY, ASB, SFWD, SFDT, Comcast.
2. Contractual execution of the trench installation to be discussed.
3. AT&T have not been contacted during 1300 bid.
4. It was discussed that the schedule impact of this risk rating should be increased to 4 (6-12 months), this increased the risk rating to 6

April 2013:

1. Utility relocations may require a joint trench under the Contract 1300 design build scope.
2. If a joint trench is required under the contract the 1300 contractor would manage the implementation of the joint trench, SFMTA would manage the Form B process for reimbursement of the joint trench costs.

Risk Mitigation Status
Risk Reference: 204

Risk	Mitigation Strategy
Relocation of AT&T Vault and other utilities delays Work south of Bryant	1. Continue negotiations/ coordination with utility owners. 2. Contract 1300 is required to coordinate with utility companies for relocations 3. SWAT team established to address utilities south of Bryant Street 4. Initiate utility coordination meetings 5. Proactively schedule AT&T resources

3. Mitigation strategy added that the 1300 contractor is required to coordinate with private utility companies.
4. A SWAT team has been established comprising DP-3 and the Design Oversight manager who are meeting weekly to address utilities south of Bryant. DP3 are preparing Notice of Intent letters for utilities to relocate.

May 2013:

1. Final Notice of Intent letters were sent to private utilities Friday 5/3/13.
2. Final Notice of Intent letters will be sent to AT&T and PG&E the week commencing 5/6/13.

July 2013:

1. Revisit following Tutor baseline submittal.
2. It is noted that the Tutor schedule submitted 5 days following bid closure allowed a 12 month period to cutover to the new AT&T duct but did not appear to allow adequate time for construction of the AT&T duct along 4th Street.
3. Utility coordination meeting will be held to ensure the contract requirements are understood by the contractor.

October 2013:

1. DP-3 Tech memo being finalized
2. Relocation design and construction schedule to be developed

November 2013:

1. Coordination meetings with utility owners to occur on a regular basis, Tutor Perini are to be invited
    a. AT&T plan for resource allocation, confirmation of assets and scheduling of work is to be confirmed as AT&T have very few resources who can complete cutover work
2. SFMTA are currently working with AT&T to establish a feasible location to relocate Vault 2081
3. The importance of this work is to be discussed at the next executive partnering meeting with Tutor

December 2013:

1. Letter was sent notifying the contractor of the criticality of this work and requesting a completion schedule
2. Potential vault location has been identified with AT&T. Feasibility is being confirmed via potholing

January 2014:

1. Potholing to confirm locations of utilities to commence the week of January 20th
2. AT&T are to be put on notice of the expected installation and cut over dates.

Risk Mitigation Status
Risk Reference: 204

Risk	Mitigation Strategy
Relocation of AT&T Vault and other utilities delays Work south of Bryant	1. Continue negotiations/ coordination with utility owners. 2. Contract 1300 is required to coordinate with utility companies for relocations 3. SWAT team established to address utilities south of Bryant Street 4. Initiate utility coordination meetings 5. Proactively schedule AT&T resources

3. Proactively requesting and scheduling AT&T resources added to mitigation strategy.

February 2014:

1. Potholing of utilities has commenced.
2. At the last executive partnering meeting Tutor Perini were tasked with commencing utility coordination meetings.
3. 1/31/14 Letter (CN 1300 Misc. Letter No. 0023) a letter was sent to AT&T notifying them of key dates from Tutor Perini's baseline schedule and requesting AT&T schedule it's resources to meet Tutor Perini's dates.

March 2014:

1. Potholing of utilities is 99% complete. Potholing work at 4th and Townsend remains.
2. Current AT&T ductbank relocation design is constructible but will include relocation of a 20' segment of 12" waterline and shifting of existing AT&T cables.
3. Tutor Perini is projected to start installation of AT&T ductbank by early April 2014 pending completion of soil profile work.

April 2014:

1. Potholing of utilities is 100% complete.
2. There seem to be enough space for a new AT&T manhole and a 36" sewer force main without having to relocate a 20' segment of 12" waterline. Shifting of existing AT&T cables is still necessary at 4th/Bryant; the project team including AT&T Engineer have finalized the workplan to safely accomplish this task.
3. Tutor Perini's subcontractor, Abbett Electric started installation of AT&T ductbank. Abbett decided to temporarily stockpile excavated soils to its yard to be re-used as backfill. Surplus materials to be off hauled pending completion of soil profiling.
4. Risk probability has been reduced to a 1.

May 2014:

1. Installation of AT&T ductbank work continues. Surplus materials to be off hauled pending completion of soil profiling.
2. Expected completion of ductbank and vault installation is July 2014.

June 2014:

1. Installation of AT&T ductbank work continues. Surplus materials to be off hauled pending completion of soil profiling.
2. Expected completion of ductbank and vault installation is September 2014.

Risk Mitigation Status
Risk Reference: 204

Risk	Mitigation Strategy
Relocation of AT&T Vault and other utilities delays Work south of Bryant	1. Continue negotiations/ coordination with utility owners. 2. Contract 1300 is required to coordinate with utility companies for relocations 3. SWAT team established to address utilities south of Bryant Street 4. Initiate utility coordination meetings 5. Proactively schedule AT&T resources

October 2014:

1. Installation of AT&T ductbank work continues. Surplus materials to be off hauled pending completion of soil profiling.
2. Expected completion of ductbank and vault installation is October 31, 2014 for the main trunk. At this time, AT&T can start cut-over process. Note that AT&T had recently requested to install six 4" conduits across Bryant Street. This request does not delay the cut-over start or extend the cut-over duration.

November 2014:

1. Installation of AT&T ductbank work continues. Surplus materials to be off hauled pending completion of soil profiling.
2. Expected completion of ductbank and vault installation is November 26, 2014 for the main trunk.
3. RE sent Miscellaneous City Letter #37 to put AT&T on notice of completion of main ductbank and start of cut-over work. AT&T had requested to install six 4" conduits across Bryant Street; PCC 23 was issued to Tutor. This request does not delay the cut-over start or extend the cut-over duration.

December 2014:

1. Installation of AT&T ductbank work continues. Surplus materials to be off hauled pending completion of soil profiling.
2. Expected completion of ductbank and vault installation is January 30, 2015 for the main trunk.
3. RE sent Miscellaneous City Letter #37 to put AT&T on notice of completion of main ductbank and start of cut-over work. AT&T had requested to install six 4" conduits across Bryant Street; PCC 23 was issued to Tutor. This request does not delay the cut-over start or extend the cut-over duration. RE has not received Tutor's cost proposal

January 2015:

1. No new update from December's report out.

February 2015:

1. Provide a price for BKF Design
2. Set up meeting with PUC

March 2015:

1. Completion of the ductbank work is almost done.
2. Discussions are taking place with AT&T requesting them to meet the original cut-over date. 12months form the date which was prior to any contract changes.

Risk Mitigation Status
Risk Reference: 204

Risk	Mitigation Strategy
Relocation of AT&T Vault and other utilities delays Work south of Bryant	1. Continue negotiations/ coordination with utility owners. 2. Contract 1300 is required to coordinate with utility companies for relocations 3. SWAT team established to address utilities south of Bryant Street 4. Initiate utility coordination meetings 5. Proactively schedule AT&T resources

April 2015:

1. Completion of the ductbank work by April 10, 2015.
2. Discussions are taking place with AT&T requesting them to meet the original cut-over date. 12months from the date which was prior to any contract changes.
3.

May 2015:

Risk Mitigation Status
Risk Reference: 216

Risk	Mitigation Strategy
Olivet building potential construction impact	1. 1. Reach out to building owner and keep him abreast of CS construction activities.

Initial Assessment: 2 (1, 1, 2)
Current Assessment: Risk Rating 2 - Construction Risk

Risk Owner: M. Vilcheck

Status Log:

May 2013:

1. Maintain communication with DPT to make sure that they aren't approving work which will affect our project.

July 2013:

1. A meeting was held with the owner and engineering consultants of the 250 Fourth Street Development.
    a. Overview and extent of YBM station structure and construction staging was explained.
    b. Demolition of existing Olivet University building expected early 2014
    c. 250 Fourth Development advised that Clementina (via 5th Street) is likely to be the only access available to their site.

October 2013:

1. Discuss increasing cost impact to rating (2) $250k to $1m due to potential impact on building protection and compensation grouting program
2. Staff are working with the City Attorney's office, Planning, and Department of Building Inspection to confirm the Cities rights in this situation
3. Permitting status of development to be confirmed
4. TPC to submit street space permits as soon as possible
5. Communication protocol with developer to be established

November 2013:

1. 10/23/13 conference call held with developer.
    a. The developer is preparing a pile foundation design to minimize impact on Station Structure
    b. This will be forward to Central Subway to allow its designers to assess the impact of the design on the station
    c. Central Subways consultant time will be reimbursed by the developer (agreement currently with developer for review)
    d. Tutor Perini have established Phase 1 Traffic Management which occupies part of Clementina Street and the West side of 4th street

January 2014:

1. Central Subway are still waiting for the Owner of the development to return the signed cost reimbursement agreement to reimburse Central Subway staff and consultant time spent reviewing any 250 Fourth Street Development information

Risk Mitigation Status
Risk Reference: 216

Risk	Mitigation Strategy
Olivet building potential construction impact	1. 1. Reach out to building owner and keep him abreast of CS construction activities.

June 2014:

1. Demolition Permit issued 4/21/14
2. No change to this risk rating
3. Compensation grouting bid item has been eliminated
4. Risk owner has transferred from A. Clifford to M. Vilcheck

July 2014:

1. Latest communication from developer is demolition is planned to begin ~07/15/14.

October 2014:

1. Developer has been non-responsive to requests for information. Demolition pending.
2. Suggest putting the Developer in contact with TPC, to see if an agreement could be reached. The Contractor could demo the building in exchange for use of the site as a temporary laydown area.

December 2014:

1. The building remains standing. There is no change to this risk.

January 2015:

1. The building remains standing. Attempts to contact the developer have been unsuccessful. There is no change to this risk.

April 2015:

1. A meeting to discuss coordination with the property developer for 250 4th St has been scheduled for 04/02/15.

May 2015:

1.

Risk Mitigation Status
Risk Reference: 231

Risk		Mitigation Strategy
Implement 4th Street closure - minimize impact to traffic flow on Perry & Stillman Streets		1. Obtain agreement of Closure

Initial Assessment: 1, 1,1 **Risk Owner:** A. Clifford
Current Assessment: Risk Rating 0 – Construction Risk

Status Log:

November 2014:
1. This risk is included in the mitigation monitoring and reporting action table (MMRP).

December 2014:
1. There have been no complaints from the other businesses, thus far.

January 2015:
1. Street closure took place in December. Currently they have reopened the street at Perry. Stillman is expected to be reopened on February 1st and eastbound before 03/1/15.

February 2015:
1. Correction to January update. One lane of 4th Street was opened on 2/2 to allow Golden Gate buses to access the GGT lot via their usual route. The next Phase (3) is to open one lane of fourth street from Harrison to Bryant allowing access to Stillman Street.
2. Only minor complaints (i.e. housekeeping) have been received from Stillman Street Neighbors.

March 2015:
1. Phase 3 (open one lane of 4th Street from Harrison to Bryant Streets) will be implemented from 7am Wednesday March 11th. This is 8 days later than planned however Central Subway conducted outreach to Stillman Street businesses and received no objection.
2. BIH extended their agreement for the use of an unoccupied portion of Golden Gate Transits lot to accommodate access for Stillman Street traffic.
3. Only minor housekeeping complaints received from project neighbors.

April 2015:
1. The lane impacted Perry and Stillman Street has been reopened.
2. Risk retired by unanimous consent of the Risk Assessment Committee 4/02/15

Risk Mitigation Status
Risk Reference: 232

Risk		Mitigation Strategy
Schedule Mitigation - Ways to mitigate potential delays		1.

Initial Assessment: X, X,X
Current Assessment: Risk Rating X – Construction Risk

Risk Owner: E. Stassevitch

Status Log:

January 2015:

1. Contractor's schedule update has not been submitted.

February 2015:

1. Contractor has submitted their schedule update on February 04, 2015. The update shows an approximate six month delay. A time impact analysis has not been submitted to justify this claim.
2. To pick up time, the Contractor should be put on notice that activities on the schedule which the Contractor can work two shifts, they should do so.
3. SFMTA needs to perform an in-house analysis on the schedule.

March 2015:

1. SFMTA will perform an in-house analysis of the Contractor's time impacts submitted to validate the actual durations.
2. SFMTA will meet with the PMOC to discuss activities on the Contractor's schedule for ways to gain recovery.

April 2015:

1. A draft analysis was done to compare the Contractor's baseline activities against actual work which occurred in January update.
2. Additional analyses will be ran to demonstrate a side by side comparison for each delay the Contractor is claiming.
3. A standardize word document will be created for reporting the Contractor's work progress versus what is shown in the baseline schedule activity.

Risk Mitigation Status
Risk Reference: 233

Risk	Mitigation Strategy
Shotcrete Substitution - in the Stations for final lining	1. Meet and discuss with TPC's senior management what the issues are and the status for clarification.

Initial Assessment: X, X, X
Current Assessment: Risk Rating X **-**

Risk Owner: M. Kobler

Status Log:

December 2014:

1. SFMTA and TPC have a different interpretation of the contract specification language for where shotcrete may be used for the final lining of the Cross Cut, Platform and Crossover Cavers at CTS in the tunnel lining.

January 2015:

1. The Program received a resubmittal of the shotcrete plan. The new submittal deletes the phrase "in lieu of". Allowing the content of the submittal to be reviewed as a mix design for shotcrete.

February 2015:

1. CSDG has been authorize to review the shotcrete resubmittal.

March 2015:

1. Receipt of the Contractor's response to SFMTA letter CS CN 1300 No. 0556 requesting the Contractor demonstrate in his submittal how the performance specifications will be met for concrete by using the shotcrete is still pending.

April 2015:

1. The Contractor has yet to respond to SFMTA's request to demonstrate performance criteria will be met.

May 2015:

1.

Risk Mitigation Status
Risk Reference: 234

Risk		Mitigation Strategy
Sequential Excavation Method at CTS (SEM) - Sequence and in the - Contractor proposes to build the north and south platform simultaneously		1. Designers concurrence on variation of options 2. Presented four options to the Contractor for going forward

Initial Assessment: X, X,X
Current Assessment: Risk Rating X – Construction Risk

Risk Owner: M. Kobler

Status Log:

January 2015:

1. The Program is awaiting the Contractor's SEM re-submittal. Anticipating their response to SFMTA's letter providing them with 4 options to choose from to perform the work.

February 2015:

1. No new update on this risk.

March 2015:

1. Contractor has yet to submit a response to SFMTA letter providing them with alternatives for the excavation sequences.

April 2015:

1. The Designer of record will be contracted to review the Contractor's submittal for (scope and delivery) to determine if the proposed is viable.

Risk Mitigation Status
Risk Reference: 236

Risk		Mitigation Strategy
UMS North Concourse Roof Issues - 12-inch waterline relocation		1.

Initial Assessment: X, X,X
Current Assessment: Construction Risk Rating X

Risk Owner: S. Wilson

Status Log:

February 2015:

1. Four issues have been identified in the area for work done by the previous 1251Contractor. Those issues work will be address in three phases.
2. The first phase will issue the Contractor a change to raise the MRY duct bank. The realignment of the 12" waterline has been identified.

March 2015:

1. SFMTA has given direction to TPC to encase the waterline in concrete.

April 2015:

1. The 12" waterline issue has been resolved. A PCC will be issued to the Contractor for a price quote to encase the waterline.

PROJECT RISK REGISTER

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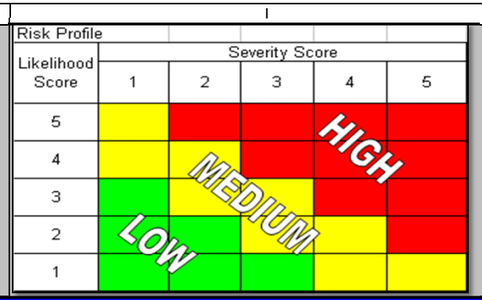

	Low (1)	Medium (2)	High (3)	Very High (4)	Significant (5)	Legend
Probability	< 10%	<> 10-50%	> 50%	<> 75% & 90%	>90%	<3 Low
Cost Impact	< $250K	<>$250K - $1M	<> $1M - $3M	<> $3M - $10M	>$10M	3-9 Medium
Schedule Impact	< 1 Month	<> 1 - 3 Months	<> 3-6 Months	<> 6 - 12 Months	> 12 Months	>10 High

RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)
2
SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)

Final Risk ID	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date
Underground Tunnel												
115	Jet grouted station end walls are installed by Tunnel contractor. Station Contractor assumes risk of possibly leakage problems due to insufficiently qualify of end walls.	1. In the 1252 contract, have tunnel contractor set aside a pre-determined amount of money in escrow that can be used to repair any leaks encountered by the station contractors after the in the jet grout end walls are excavated. 2. Alternatively, place an allowance in the station contracts for end wall leakage repair.	C	3	1	1	1	50%	3			5/26/15 UMS1295
Track Embedded												
Track: Special												
MOS Station												
21	Incomplete cutoff of groundwater at MOS	1. Require additional grouting to limit leakage to permissible level. 2. Include probable grouting work in cost & schedule estimates.	C	1	1	-	1	10%	1	1	Mitigation measure to be made part of the contract documents	4/28/15 MOS1150
22	Public complaints result in unanticipated restrictions on construction at UMS	1. Public outreach. 2. Maintain regular and open communications so Public knows construction plans and progress at all times. 3. Require Contractor to assist Public Outreach efforts, maintain access to businesses and assist with deliveries and pick-ups, control noise and vibration, continuously cleanup site, and provide pedestrian and vehicle traffic and protection plans, informational signage, ADA ramps and minimum sidewalk widths. 4. Work with MOED to increase cleanup of the area and assist pedestrians across streets, as needed. 5. Monitor and enforce noise, vibration, ADA, traffic, and cleanup requirements. 6. Quickly process and resolve damage and accident claims from the Public. 7. Assumed this work in cost & schedule estimates.	C	1	1	-	1	10%	1	1	Implementation of mitigation measures part of Communication/Outreach plan and certain aspects to be included in the contract documents.	9/16/16 MOS1230
F	Underground obstructions Stations (MOS)	1. Provide adequate allowance for differing site conditions to address unknown underground obstructions. 2. Show field verified obstructions discovered during previous contracts on contract drawings. 3. Make as-built drawings of structures adjacent to the work available to the contractor as reference drawings.	C	4	2	2	2	80%	8	16	Mitigation measures have been implemented.	4/28/15 MOS1150

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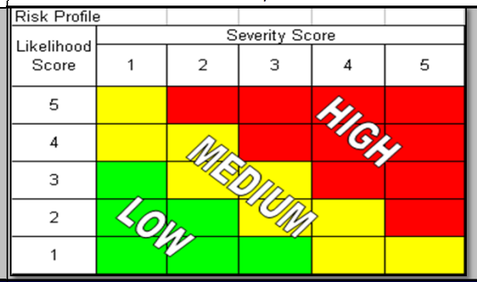

	Low (1)	Medium (2)	High (3)	Very High (4)	Significant (5)	Legend
Probability	< 10%	<> 10-50%	> 50%	<> 75% & 90%	>90%	<3 Low
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Schedule Impact	< 1 Month	<> 1 - 3 Months	<> 3-6 Months	<> 6 - 12 Months	> 12 Months	>10 High

RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)
2

SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)

Final Risk ID	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date
27	Loss of business results in unanticipated restrictions on construction at YBM	1. Public outreach. 2. Maintain regular and open communications so Merchants know construction plans and progress at all times. 3. Require Contractor to coordinate with merchants, maintain access to businesses and assist with deliveries and pick-ups, continuously cleanup site, and provide pedestrian and vehicle traffic and protection plans, informational signage, and minimum sidewalk widths. 4. Require barriers to protect pedestrians and shield them from noise and dirt from construction. 5. Work with MOEWD to increase cleanup of the area and assist pedestrians across streets. 6. Include this work in cost & schedule estimates.	C	1	2	1	2	10%	2	3	Mitigation measures to be implemented and to the extent possible requirements will be written into contract documents to minimize disruptions to businesses.	4/28/15 MOS1150
F	Underground obstructions Stations (UMS)	1. Provide adequate allowance for differing site conditions to address unknown underground obstructions. 2. Show field verified obstructions discovered during previous contracts on contract drawings. 3. Make as-built drawings of structures adjacent to the work available to the contractor as reference drawings.	C	4	2	2	2	80%	8	16	Mitigation measures have been implemented.	8/12/15 UMS 1320
28	Incomplete cutoff of groundwater at UMS	1. If needed, perform grouting to mitigate the intrusion of groundwater. 2. Include in cost & schedule estimates.	C	1	2	1	2	10%	2	3	Mitigation measures in the form of consolidation grouting to be included in contract documents	8/12/15 UMS1320
33	Damage to utilities at UMS causes delay to construction and/or consequential cost. (very close to walls adjacent to relocated utility trenches)	1. Intensive utility coordination and investigation. 2. Relocate utilities out of the way of construction wherever possible. 3. Show utilities on reference plans. 4. Have utility contact information and procedure on plans. 5. Have contingency repair/restoration plans. 6. Include probable impacts to schedule & cost in estimates.	C	2	1	1	1	35%	2	4	Although mitigation measure have been fully implemented, Increased probability due to proximity of new pile design to existing relocated utilities.	7/19/16 UMS1410
34	Loss of business results in unanticipated restrictions on construction at UMS	1. Public outreach. 2. Work closely with Merchant's Association. 3. Maintain regular and open communications so Merchants know construction plans and progress at all times. 4. Advertise that Stockton Street Merchants are Open for Business. 5. Require Contractor to coordinate with merchants, maintain access to businesses and assist with deliveries and pick-ups, continuously cleanup site, and provide pedestrian and vehicle traffic and protection plans, informational signage, and minimum sidewalk widths. 6. Require barriers to protect pedestrians and shield them from noise and dirt from construction. 7. Work with the Union Square BID or MOED to increase cleanup of the area and assist pedestrians across streets. 8. Include this work in cost & schedule estimates.	C	2	3	2	3	35%	5	10	Mitigation measures to be implemented and to the extent possible requirements will be written into contract documents to minimize disruptions to businesses.	9/7/16 UMS1430

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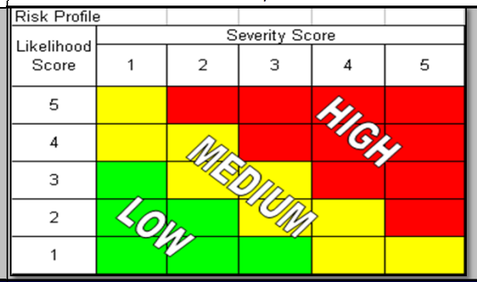

	Low (1)	Medium (2)	High (3)	Very High (4)	Significant (5)	Legend
Probability	< 10%	<> 10-50%	> 50%	<> 75% & 90%	>90%	<3 Low
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RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)
2
SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)

	Final Risk ID	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date
111	35	Ground support structure causes groundwater table to rise which results in leakage into adjacent structures.(new structure might create a dam that results into leaks into new and existing structures)	1. Perform detailed hydrogeologic modeling and analysis. 2. Monitor groundwater table at multiple locations and passive measures as necessary to mitigate. 3. Reference the Tech memo in contract documents. 4. Include probable costs in estimate.	C	1	2	-	1	10%	1	2	Mitigation measures incorporated in design based on updated Hydrogeologic analysis and report	9/7/16 UMS1430
112	36	Damage to buildings or utilities as a result of heave from jet grouting at UMS.	Utilize tangent piles combined with surface jet grouting.	C	1	1	-	1	10%	1	1	Mitigation measures implemented in contract documents to reduce risk	4/14/15 UMS1310
113	37	Damage to adjacent buildings at UMS due to surface construction activities.	1. Require protective barriers. 2. Have an emergency and rapid response customer focused task force to fix damaged facilities. 3. Quickly repair and reimburse resulting costs. 4. Include probable cost in estimate.	C	1	2	-	1	10%	1	2	Mitigation measures implemented in contract documents to reduce risk	9/7/16 UMS1430
159	J	Macy's entrance conflict with new piles	1. Show known obstructions shown on as-built drawings on contract drawings. 2. Make as-built drawings available to contractor as reference drawings. 3. Have contractor field verify obstruction shown on as-built drawings and contract drawings	C	3	1	1	1	50%	3	6	Known obstructions are shown on the ES drawings. Allowance for differing site conditions added to UMS Station contract.	1/23/14 UMS1060
160	Q	As-built drawings and UMS construction drawings do not contain enough information to produce shop drawings without significant surveying effort delaying construction north entrance.	1. Investigate if electronic files of design can be given to the contractor. 2. Clearly define shop drawing criteria in the technical specifications. 3. Make as-built drawings available as reference drawings to the contractor	C	3	1	1	1	50%	3	6	Specifications require contractor to survey USG in order to develop shop drawings for structural steel.	3/24/12 UMS1280
161	CTS Station												
163	46	Public complaints result in unanticipated restrictions on construction at CTS. (schedule and estimate for underground work assumes 6 day work week and 2 shifts per day)	1. Public outreach. 2. Maintain regular and open communications so Public knows construction plans and progress at all times. 3. Require Contractor to assist Public Outreach efforts, maintain access to businesses and assist with deliveries and pick-ups, control noise and vibration, continuously cleanup site, and provide pedestrian and vehicle traffic and protection plans, informational signage, ADA ramps and minimum sidewalk widths. 4. Require barriers to protect pedestrians and shield them from noise and dirt from construction. 5. Work with MOED to increase cleanup of the area and assist pedestrians across streets, as needed. 6. Monitor and enforce noise, vibration, ADA, traffic, and cleanup requirements. 7. Quickly process and resolve damage and accident claims from the Public. 8. Include this work in cost & schedule estimates.	C	2	5	1	3	35%	6	12	Implementation of mitigation measures part of Communication/Outreach plan and certain aspects to be included in the contract documents.	10/9/17 CTS1500

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Risk Profile

Likelihood Score	Severity Score 1	2	3	4	5
5					
4					
3					
2					
1					

HIGH

MEDIUM

LOW

	Low (1)	Medium (2)	High (3)	Very High (4)	Significant (5)	Legend
Probability	< 10%	<> 10-50%	> 50%	<> 75% & 90%	>90%	<3 Low
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RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)
2

SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)

	Final Risk ID	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date
167	48	Incomplete drawdown of groundwater. (inside of box and inside of caverns)	1. Require additional grouting to limit leakage to permissible level. 2. Include probable grouting work in cost & schedule estimates. 3. Include allowance for dewatering within cavern during construction.	C	2	2	1	2	35%	3	6	Mitigation measures have been included in contract documents	5/1/16 CTS1140
173	50	CTS station contractor delayed by tunnel contractor since station platform construction cannot start until tunnels have been finished.	1. Include provisions in CTS contract identifying the potential waiting period for tunnel contractor. 2. Actively monitor progress towards schedule milestones	C	2	1	2	2	35%	3	6	Constraints on CTS contractor added to specification "Work Sequence and Constraints"	12/16/13 TUN1122
175	52	Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)	1. Evaluate effect of potential settlement on utilities. 2. Slip-line sewer by TBM contractor. 3. Reinforce other utilities as needed, monitored during construction, and repair / replace, as needed. 4. Have contingency repair/restoration plan. 5. Utility contact information and procedure will be on plans. 6. Develop an allowance for utility repair. 7. Include probable cost in estimate. 8. Need to identify the new SFPUC contact	C	3	3	1	2	50%	6	12	Project configuration change, lowered station 25 ft. reducing the probability of this risk. Risk rating lowered.	4/22/16 N-CTS9730
183	F	Underground obstructions stations (CTS)	1. Provide adequate allowance for differing site conditions to address unknown underground obstructions. 2. Make as-built drawings of structures adjacent to the work available to the contractor as reference drawings	C	4	2	2	2	80%	8	16	Mitigation measures have been implemented.	10/9/17 CTS1500
214	U	Proximity at junction of head house boundary wall and school yard may result in relocation of school yard during wall construction		C	1	1	1	1	10%	1	2	Project configuration changed to eliminate encroachment. Risk converted to Construction risk from Risk 55.	8/16/13 CTS1010
216	General												
218	Demolition, Clearing , Earthwork												
220	Site Utilities, Utility relocations												
230	Hazmat, Contaminated Material												
234	Environmental Mitigations												
236	66	Archeological/Cultural findings during construction increases schedule and/or cost.(Moscone) AROUND 10%	1. Provide on-call Archeologist. 2. Provide allowance and procedure in contract for Archeological/Cultural discoveries.	C	3	1	1	1	50%	3	6	Mitigated - Current exposure only to those amount above those currently identified	4/28/15 TUN1150
237	67	Archeological/Cultural findings during construction increases schedule and/or cost. (UMS)…LESS THAN 1%	1. Provide on-call Archeologist. 2. Provide allowance and procedure in contract for Archeological/Cultural discoveries.	C	3	1	2	2	50%	5	9	Mitigation measures to be implemented in contract documents	8/12/15 UMS1320
238	68	Archeological/Cultural findings during construction increases schedule and/or cost. (CHINA TOWN) …AROUND 10%	1. Provide on-call Archeologist. 2. Provide allowance and procedure in contract for Archeological/Cultural discoveries.	C	3	1	2	2	50%	5	9	Mitigation measures to be implemented in contract documents	10/9/17 CTS1500

PROJECT RISK REGISTER

Central Subway Project San Francisco

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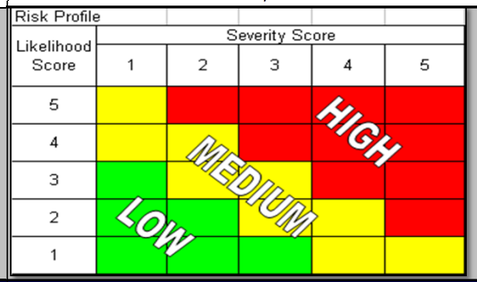

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SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)

	Final Risk ID	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date
240	Site Structure incl. sound walls												
242	Auto/bus/van access ways, roads												
247	Train Control and Signals												
249	72	Interface new Signaling and Train Control system to existing at Fourth and King	Connect new system in parallel with existing system until the new system has been tested and safety certified for operation.	C	2	2	3	3	35%	5	10	Awaiting approval of contract plans by Muni Operations.	3/4/16 STS1045
258	PR78	Delays or complication by other SFMTA projects delays CSP: radio, fare collection, C3/TMC	1. Monitor other projects' developments. 2. Develop contingency plans as needed to avoid 1256 delay of revenue service.	C	2	1	1	1	35%	2	4		7/27/12 FDS 1940
260	Traffic signals & Crossing Protn.												
262	Fare Collections Systems												
265	Purchase or lease of Real Estate												
266	79	Delay in obtaining tunnel easements (3 #) (goes to condemnation) - Costs of ROW may cost more than expected	1. Engage Owners in negotiations as soon as possible. 2. PM/CM to provide real estate specialists to facilitate.	R	1	1	-	1	10%	1	1	Right of possession obtained on all three parcels. Cost agreement reached with 1455 Stockton & 801 Market.	9/7/2012
273	Reloc. of Household or Business												
275	Vehicles												
278	Preliminary Engineering												
287													
291	95	Contractor default during construction impacts schedule. (key sub-contractor)	Assist Bonding company in transition and to maintain schedule.	C	1	2	2	2	10%	2	4		11/17/17 STS 1500
297	99	Breakdown in relationships between SFMTA and Contractors during construction results in increased claims and delays to the overall construction schedule.	1. Executive partnering and alternate dispute resolution. 2. Provide incentives in construction contracts in addition to penalties	C	2	4	1	3	35%	5	10	Mitigation measures being implemented	7/27/12 FDS 1940
299	100	Procurement of long lead items delays work. (fans, rails and special track work, TPSS, Escalators, elevators, TBM)	1. Include schedule milestones for procurement of and substantial payment for stored long lead items in contract to encourage early procurement. 2. Monitor procurement of critical items.	C	1	2	2	2	10%	2	4	Not considered a project risk.	11/17/17 STS 1500
301	102	Late finish of early contract delays later contracts and extends PM / CM and incurs additional costs	1. Actively manage contracts and include incentive provisions for early completion in critical contracts. 2. Add buffer float to critical path to actively manage schedule contingency	C	2	1	2	2	35%	3	6	LONP 1 & 2 initiated to reduce this risk. See Risk 86. The mitigation of risks associated with early contracts will address this risk. Risk rating reduced due to mitigation measures implemented	12/30/20 MS 0010
305	PR37	Temporary construction power and ability to provide permanent power feed - PGE ability to provide power requirements to the program together with their other commitment	1. Identify temporary power requirements for station construction. 2. Investigate the timing of the permanent feed.	C	2	1	2	2	35%	3	6	Cost for First and Redundant electrical services need to be included in Cost Estimate.	5/3/18 STS1080
306	Insurance, permits etc.												
307	103	Difficulty in getting required permits.	1. Coordinate with permit officials and request permits as early as possible. 2. Obtain assistance obtaining permits from PM/CM & FD Consultants.	C	1	2	1	2	10%	2	3		12/18/12 FDS 1275

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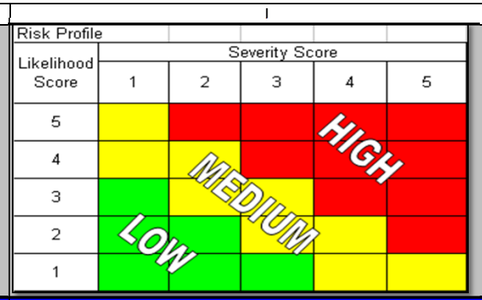

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104	CPUC approval at Grade Crossing for G0164d takes longer to negotiate / obtain than schedule allows	1. Obtain Grade Crossing approvals at final CPUC inspection at the completion of construction. 2. Coordinate closely with CPUC until approval is received.	R	2	3	2	3	35%	5	10	CPUC Resolution (TED-253) for extension of our at grade crossing was granted.	7/27/12 FDS 1940
105	Electrical service delays startup and testing.	1. Submit applications for new service as early as possible. 2. Coordinate closely with PG&E to ensure timely delivery of electrical service.	C	1	2	1	2	10%	2	3	Applications for new service have been submitted to PG&E.	11/17/17 STS 1500
106	Risk of Labor dispute delaying the work.	Enforce designated gate for employees of the contract in dispute so that the rest of the work is not delayed.	C	2	1	1	1	35%	2	4		11/17/17 STS 1500
Unallocated Contingency												
111	Major Earthquake stops work	Include Force Majeure clause in contracts.	C	1	5	3	4	10%	4	8	Force Majeure clause included in contracts.	12/30/20 MS 0010
112	Major safety event halts work	1. Require contractor Safety plan to address this risk. 2. CM inspections to ensure that safety plan and procedures are implemented.	C	1	5	3	4	10%	4	8	Health and Safety provisions included in contracts. CS Program provides full-time Safety Manager.	12/30/20 MS 0010
196	The process of acquiring station licenses: acquisition/condemnation could significantly delay schedule and cost more than that presently planned.	1. Continue to negotiate with building owners 2. Required Notices and Appraisals to be completed 3. Commence condemnation process with City Attorneys	C	1	1	1	1	10%	4	2		
202	Cargo Preference (Ship America) must solicit U.S.- flag carriers. Civilian Agencies Cargo = at least 50% (governed by Cargo Preference Act of 1954	1. Require Ship America compliance agreement first tier contractors and subcontractors	C	1	1	1	1	10%	1	2		
204	AT&T Vault - New Sewer Work south of Bryant	1. Continue negotiations/coordination with utility owners. 2. Schedule analysis to confirm coordination	C	1	2	4	3	10%	3	6		
205	Prolong period of CMod's creates additional cost/causes bad blood between Resident Engineer and Contractor	1. CMod Task Force - 5 Areas of Improvement 2. Implement 3. Delegation of Authority	C	3	1	1	1	50%	3	6		
211	Differing site conditions encountered during ground freezing of Cross Passage 5 results in increased costs.	1. Contractor has submitted a 'no cost, no schedule' PCC for ground freezing 2. Need early review of work plan, and identification of entity that will perform the work 3. Review Plans 4. Monitor work at CP5 - to ensure no addl cost are incurred by SFMTA 5. Review plans for overcoming incident	C	1	5	3	4	10%	4	8		Retired 12/16/14 Reopened 01/13/15
214	Micro Piles at UMS interfere with Tube-a-manchette installation (60' deep micropiles)	1. Provide micro-pile as-built information to contractor 2. Realign tube-a-manchettes clear of micro-piles	C	3	1	1	1	50%	3	6		

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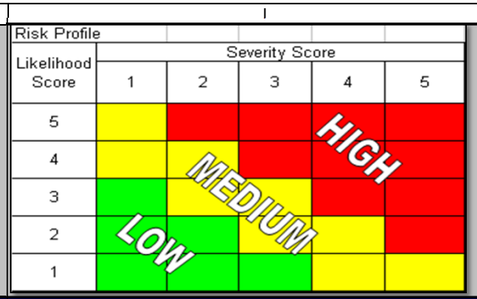

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340	215	DPW Excavation permit reviews delay contract works	1. Obtain a blanket excavation permits from DPW covering the area of work for 1253, 1254, 1255, 1256	C	2	1	1	1	35%	2	4		
341	216	Olivet building potential construction impact	1. Reach out to building owner and keep him abreast of CS construction activities.	C	1	1	2	2	10%	2	3		
342	217	Delays or complications construction by others – SF Dept. Of Technology, 3rd party utilities	1. Early engagement and coordination for agreements and plan development to avoid construction delays.	C	2	1	1	1	35%	2	4	DTIS MOU has been signed.	
347	222	ARGUS Monitoring Software - Sharing Instrumentation for CN1252 and CN1300	1. Outline responsibilities for each contractor (1252 & 1300)	C	3	3	1	2	50%	6	12		
348	223	Contamination during dewatering (CTS)	1. Review contract requirements .	C	2	3	1	2	35%	4	8		
349	224	CTS AWSS/Ductbank Interface - AWSS system is old and requires replacement	1. Look at alternatives to address 2. Turn off system while CSP work is being done, and then turn on later (find a bypass).	C	5	1	2	2	90%	8	15		
350	225	Ellis Street Utilities (unknown underground utilities)	1. Proactive investigation into identify the issue 2. Engineers should review and make a recommendation 3. Early review of potholing information for potential conflicts 4. Put the utilities on red alert	C	3	2	1	2	50%	5	9		
351	226	4th and King Street - Potential time for planned work shutdown - Contractor not able to perform the work in the manner prescribed	1. Identify schedule of potential time for planned work shutdown 2. Identify better traffic patterns 3. Pursue 4th & King option to achieve additional 3-6mos on the schedule 4. Review Giants and Warriors schedule for home games	C	3	3	3	3	50%	9	18		
352	227	LRV Training - having enough trained operators (surplus)	1. Ramp up trained operators a year ahead of time 2. Ensure testing is finished 3. Completion of work at storage track location (Bryant & King)	C	1	2	1	2	10%	2	3		
353	228	Muni union workers - barn signup (preferred runs)	1. Try to get six months advance notice for annual in addition to barn sign up.	C	1	1	1	1	10%	1	2		
354	229	Pre Revenue Testing		C									
355	230	Post Revenue Testing		C									
356	231	Implement 4th Street closure - minimize impact to traffic flow on Perry & Stillman Streets	1. Obtain agreement of closure	C	1	1	1	1	10%	1	2		

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Risk Profile

Likelihood Score	Severity Score 1	2	3	4	5
5					
4					
3					
2					
1					

HIGH

MEDIUM

LOW

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357	232	Schedule Mitigation - Ways to mitigate potential delays		C				-	0%	-	-		
358	233	Shotcrete Substitution - in the Stations for final lining	1. Meet and discuss with TPC's senior management what the issues are and the status for clarification.	C				-	0%	-	-		
359	234	Sequential Excavation Method at CTS (SEM) Sequence - Contractor proposes to build the north and south platform simultaneously	1. Designers concurrence on variation of options 2. Presented four options to the Contractor for going forward	C				-	0%	-	-		
360	235	Sewer work after lowering of tunnel - Damage / settlement 3x 5' to old brick sewer running parallel to tunnel alignment		C				-	0%	-	-		
361	236	UMS North Concourse Roof Issues - 12-inch waterline relocation		C				-	0%	-	-		