

PMOC MONTHLY REPORT

Second Avenue Subway Phase 1 (MTACC-SAS) Project

Metropolitan Transportation Authority

New York, New York

Report Period October 1 to October 31, 2015



PMOC Contract No. DTFT6014D00017

Task Order No. 2, Project No. DC-27-5287, Work Order No. 1

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Length of time on project: Five years on project for Urban Engineers

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THIRD PARTY DISCLAIMER

This report and all subsidiary reports are prepared solely for the Federal Transit Administration (FTA). This report should not be relied upon by any party, except FTA or the project sponsor, in accordance with the purposes as described below.

For projects funded through the FTA's Full Funding Grant Agreement (FFGA) program, FTA and its Project Management Oversight Contractor (PMOC) use a risk-based assessment process to review and validate a project sponsor's cost, budget and schedule. This risk-based assessment process is a tool for analyzing project development and management. Moreover, the assessment process is iterative in nature; any results of an FTA or PMOC risk-based assessment represent a "snapshot in time" for a particular project under the conditions known at that same point in time. The status of any assessment may be altered at any time by new information, changes in circumstances, or further developments in the project, including any specific measures a sponsor may take to mitigate the risks to project costs, budget, and schedule, or the strategy a sponsor may develop for project execution.

Therefore, the information in the monthly reports may change from month to month, based on relevant factors for the current month and/or previous months.

REPORT FORMAT AND FOCUS

This monthly report is submitted in compliance with the terms of the Federal Transit Administration (FTA) Contract No. DTFT6014D00017. Its purpose is to provide information and data to assist the FTA as it continually monitors the Grantee's technical capability and capacity to execute a project efficiently and effectively, and hence, whether the Grantee continues to be ready to receive federal funds for further project development.

This report covers the project management activities on the Second Avenue Subway (SAS) Phase 1 Project managed by MTACC. MTA is the Grantee and financed by the FTA FFGA.

MONITORING REPORT

1.0 PROJECT STATUS

During October 2015, the MTACC continued advancing SAS Phase 1 to meet a Revenue Service Date (RSD) of December 30, 2016, within its Current Working Budget (CWB) of \$4.451 billion (exclusive of financing). The overall project is approximately 81.9% complete. Substantial Completion has been achieved on three of the eight active construction contracts. Progress in this reporting period is discussed below.

a. Procurement

Procurement of construction contractors for SAS – Phase 1 is complete. Three construction contracts are currently in the closeout process.

b. Construction

As of October 31, 2015, there are eight (8) active construction contracts on the SAS Phase 1 Project. Construction progress on the active contracts during this period includes:

Contract C-26005 (C2A) 96th Street Site Work and Heavy Civil

- Substantial Completion was achieved on November 5, 2013; and,

- Sign off of the final volume of the “As-Built” drawings has been delayed until year end.

Contract C-26010 (C2B) 96th Street Station Civil, Architectural, and MEP

- Street Level (88th to 99th Street)
 - Permanent utility installation and street restoration on the west side of 2nd Avenue is being accelerated and is ongoing.
- Station Area 1 Grid Line (GL) 1-8 (91st to 93rd Street)
 - The contractor completed installation of the above platform conduits from grid line 2 thru 5. Wire pulling, installation of water mist piping, guiderails, and testing and commissioning of electrical work at the platform level is ongoing. At the mezzanine level, installation of miscellaneous panel boards, electrical resistance heaters, and power outlets is in progress.
- Station Area 2 GL 8-18 (93rd to 95th Street)
 - Field testing of the medium voltage switchgear and transformers and the low voltage switchboard panel at the platform level is ongoing.
- Station Area 3 GL 18-36 (95th to 99th Street)
 - At the platform level installation of above platform conduits, fast response sprinklers, and lighting fixtures is ongoing. Also, the contractor continues working on installation of the service carrier, emergency lighting fixtures, mezzanine lighting fixtures and conduits, panel boards, platform service carrier, and installation of interconnecting conduits, mimic panel conduits, pulling and terminating medium voltage switchgear and transformers, bus ducts and battery equipment.
- Ancillary #1 GL 8-9.5 (Northeast corner 2nd Ave. and 93rd St.)
 - Work continues on the ECS manhole (12x12x19) at 93rd Street. Installation of masonry walls, duct, lower and upper roof slab, and parapet walls at the various levels is ongoing.
- Ancillary #2 GL 28-29.5 (Southwest corner 2nd Ave. and 97th St.)
 - The upper roof slab and parapet walls were completed. Installation of the power and lighting conduit at the mezzanine level is ongoing.
- Entrance #1 GL 13-14 (Southwest Corner 2nd Ave. and 94th St.)
 - Installation of the escalators and stairs is ongoing.
- Entrance #2 GL 13-14 (Northeast Corner 2nd Ave. and 94th St.)
 - Work is ongoing in the construction of the masonry walls and the invert at the escalator pit.

- Entrance #3 GL 21-23 (West side of 2nd Ave. between 95th and 96th St.)
 - Delivery, installation of piping, conduits, and equipment for elevator installation is the ongoing activity at this entrance.
- Testing and Commissioning
 - Testing and commissioning meetings with SAS Management, the Contractor and the PMOC take place monthly; and,
 - Volume III of the Test Plan and Procedures is updated monthly to reflect FIAT, FIST, SIST and FSIT activity.

Contract C-26006 (C3) 63rd Street Station Rehabilitation

- The focus of the work effort remains at Area 5 and the progress at Entrance #1.
- **Area 5 (Reconstruction includes mezzanines and the deck plaza roof)**
 - In Area 5, pre-inspections and final inspections by NYCT user groups continued in Mezzanines #1 - #4;
 - At the 6th Mezzanine, the porcelain wall and beam tile cladding installation is nearing completion and installation of ceiling panels is beginning;
 - Arts-N-Transit artwork continues on the 6th Mezzanine;
 - Installation of the heat tracing system is complete;
 - The turnstiles for fare collection will be installed on the 6th Mezzanine in December 2015; and,
 - In the Traction Elevator Shafts, installation of the Travelling Cables is complete in 2 shafts. A pre-test is being scheduled.
- **Entrances (#1, #2, #3 and #4)**
 - At Entrance #1, installation of the storefront system continues and installation of the finish ceiling along the escalator incline began;
 - Installation of granite pavers at Entrance #1 will begin the week of November 1, 2015;
 - At Entrance #2, glazing continues along the elevator frame in the shaft; and,
 - Granite wall base and wall tiles continue along the stair inclines for street Entrances #3 and #4.
- **Platforms**
 - Glazing of the operable window panels is complete in the G4 Platform Lobby and beginning in the G3 Lobby;
 - The fire rated glass for the storefront system is being shipped; and,
 - Installation of porcelain track wall tiles, top stainless steel band and station lettering on the G3 and G4 platform track walls is complete.
- **Site**
 - Street granite curbs are being set along Entrances #3 and #4; and
 - Street paving will begin November 19, 2015.

Contract C-26007 (C4B) 72nd Street Station Cavern Mining and Lining

- Substantial Completion was achieved on January 14, 2014;
- Submittal of contract closeout documentation is ongoing; and,
- The contractor continues work in Entrance #2, correcting the deficiencies to the architectural finish along the escalator incline. This work is similar to the corrective work on the C5B contract. At Entrance #2, application of the final Miracote finish coating remains. It remains to be seen if corrective work will also be required on the Entrance #1 incline finish. This concrete incline has not been placed.

Contract C-26011 (C4C) 72nd Street Station – Station Finishes, MEP, Ancillary Buildings and Entrances

- **Ancillary #2**
 - The installation of architectural louvers on the south side was completed. The installation of the channel supports for the architectural terra cotta building stone continued along with the placement of pads and floor topping on the 3rd and 4th Floors; and,
 - At Ancillary #2, the contractor is continuing with sub-basement and basement level FPR electrical work.
- **Entrance #2**
 - Work continues to be on hold pending completion/approval of the corrective work to the architectural finish. The CCM has advised that this work continues by the C4B contractor and turnover date is December 2, 2015.
- **Ancillary #1**
 - Work has reached the final 5th Floor with completion of the slab and the start of wall placement; and,
 - MEP work continued in the sub-basement and basement FRP rooms and 4th Floor Fan Room.
- **Cavern Mezzanine (Public, North and South)**
 - The Traction Power Substation (TPSS) Room on the north mezzanine has been turned over to the C6 contractor and all equipment has been placed in the room. Final placement of equipment and conduit terminations is pending;
 - In the Public Mezzanine, work continued with installation of both W30 Wall framing and Service Carrier framing;
 - At the North and South Mezzanines, installation of mechanical, electrical, and plumbing systems (MEP) in the Fan/Chiller rooms is ongoing; and,
 - Installation of bus ducts, conduit, and wiring in the North and South Electrical Distribution Rooms (EDR) is continuing.
- **Platform**
 - Installation of service carriers, ceiling framing, and panels continues;
 - Installation of the track wall tile is complete;
 - Installation of the tactile platform edge is approximately 70% complete; and,

- Installation of Platform pavers is approximately 60% complete. Pull tests are being scheduled.

- **Entrance #1**

- Placement of the invert slab is advancing in the escalator incline. Lowering of the arch form was completed and the “skid” for sliding the arch form into place along the incline has been installed. On the outside, entrance walls have been placed and placement of the slabs continues.

- **Entrance #3 (Elevator Bank)**

- Construction of the street level work deck neared completion.

- **Schedule**

- Through October 31, 2015, the forecast Substantial Completion date remains February 17, 2017. The focus of this delay is the corrective action required to the concrete architectural finish in the escalator incline arch and walls in Entrance #2, and perhaps in the upcoming finish corrections in Entrance #1;
- An additional concern is the slow progress of electrical work throughout the site due to a lack of sufficient manpower. Notably, the C5C contract is experiencing the same type of problem. Another schedule concern is the difficulty in reinstalling the new water mist system, which requires welded stainless steel piping in very tight access areas; and
- The new forecast for completing energization of permanent power is February 29, 2016.

- **C6 Coordination**

- The C6 contractor is at the site installing rail. The south end crossover has been set in place. Concrete infill remains to be placed.

Contract C-26008 (C5B) 86th Street Station Cavern Mining and Lining

- Substantial Completion of all contract work was achieved on December 16, 2014; and,
- After completing the architectural finish correction at Entrance #2, the C5B contractor began the work at Entrance #1. This work is ongoing and scheduled to be completed the week of November 8, 2015.

Contract C-26012 (C5C) 86th Street Station Finishes, MEP Systems, Ancillary Buildings & Entrances

- **General**

- The 87th St. shaft remains open to allow the C6 contractor access to the lower level.

- **Cavern (Public, North & South Mezzanines)**

- The contractor continued to complete CMU walls in the North Mezzanine;
- Mechanical and conduit work is ongoing in the Public Cavern and North Mezzanine;

- MEP work continues on the 1st, 2nd and 3rd Upper Mezzanines;
- Service carrier installation work is ongoing on the mezzanine level.; and
- Facility Power Room (FPR) wiring to switchgear is ongoing in both the north and south FPRs. The work in the north FPR is moving slowly.
- **Entrance #1**
 - This is currently an emergency ingress/egress zone for the project. No appreciable work is underway due to the C5B corrective work.
- **Entrance #2**
 - The subcontractor continues installation of the “short run” escalators and the lower incline escalators have been set in place and installation continues.
- **Ancillary #1**
 - At the above grade portion of Ancillary #1 wall and slab placement has reached the street level. This work is progressing slowly.
 - MEP work continued in the FPR.
- **Ancillary #2**
 - Continued with waterproofing, walls and slab construction in Ancillary #2 to Elevation #125. The contractor is utilizing 2 shifts because this work has also been progressing slowly.
- **Platform**
 - Installation of the mezzanine to platform escalators and machine room work continues;
 - Continued installation of the sub-platform and platform for the mezzanine to platform hydraulic elevator and began installation of the car frame;
 - Installation of water mist system has begun under the platform;
 - Spray insulation application is continuing in the south platform area;
 - Painting of platform CMU walls is ongoing; and
 - Installation of the porcelain tile trackwall cladding continues on both the north and south tracks.
- **Schedule**
 - Permanent power is now forecast to be energized in February 2016; and
 - Of the 33 milestone rooms designated to be turned over to the C6 contractor, the Project Office has reported that 26 have been turned over and “conditionally” accepted. The final 7 rooms are scheduled to be turned over during the week of November 8, 2015.

Contract C-26009 (C6) Track, Power, Signals and Communication Systems

- **63rd Street Station**
 - Network FIAT and FIST is ongoing (MR-223D, MR-223E, MR-223F and MR-223G);

- On the S1/GR track, guard rail and protective board is being installed; and,
- Installation of speakers and pulling speaker cables is ongoing.
- **72nd Street Station**
 - Installation of signal equipment and conduit is ongoing;
 - Pulling of signal cables in Zone 10 is ongoing;
 - Pulling of fiber optic and copper cables between communication rooms is ongoing (AWO);
 - Installation of rack to rack wiring, plug couplers and dressing of the wires in the racks in the Relay Room is ongoing; and,
 - Installation of equipment in the traction power substation (TPSS) is ongoing.
- **86th Street Station**
 - Installation of epoxy floor in TPSS is in progress.
- **96th Street Station**
 - Installation of 500mcm cable to negative rail is in progress.
 - **Tunnel/Track Work**
 - Tunnel (Zone 1: 98th St. to 104th St.) – The contractor has completed pulling of all fiber, communication, power, and signal cables and the installation of tracks, third rail, and wayside equipment.
 - 96th St. Station Area (Zone 5: 93rd St. to 98th St.) – S1 and S2 tracks, third rails, cables, and the wayside equipment has been installed. Installation of protection board is ongoing.
 - Crossover (Zone 6: 92nd St. to 94th St.) – Special track work (crossover) has been installed and wayside equipment and cable installation is in progress. Installation of protection board is ongoing.
 - Tunnel (Zone 2: 87th St. to 92nd St) – Installation of the S1 and S2 tracks and third rails was completed during this reporting period. Installation of cables into signal cases, and stop machines is ongoing. Meggaring of signal cables is continuing.
 - 86th St. Station Area (Zone 11: 83rd St. to 87th St.) – Work has not started. Track installation forecasted to be completed May 2, 2016.
 - Tunnel (Zone 10: 73rd St. to 87th St.) – Work has not started. Track installation forecasted to be completed April 10, 2016.
 - Crossover (Zone 8: 72nd St. to 73rd St.) – Pulling of cables has been accelerated to facilitate track installation and completion by December 30, 2015.
 - 72nd St. Station Area (Zone 7: 69th St to 72nd St.) – Pulling of cables has been accelerated to facilitate track installation and completion by December 4, 2015.

- Crossover (Zone 4: 68th St. to 70th St.) – Pulling of cables has been accelerated to facilitate track installation and completion by December 4, 2015. Installation of SWP-132A-1 is ongoing
- Tunnel (Zone 3: 3rd Ave. to 68th St.) – G3 and G4 tracks, third rail, wayside equipment, and cables have been installed.

c. Quality Assurance and Quality Control (QA/QC)

Status:

During October 2015, the Second Avenue Subway Quality Management team continued to conduct Quality Meetings and Quarterly Quality Oversight of the Contractor with CCM, MTACC, and PMOC participation. The Quality Management Team participated in the job progress meetings, monitored quality matters in the field for each construction contract, reviewed and provided comments for Quality Work Plans, and participated in Preparatory Phase Meetings for numerous construction processes.

Observations:

Project Quality Manual (PQM): The SAS Quality Manager prepared Revision 3 to the PQM that reflects the new MTACC QO checklist requirements and other changes that have occurred since the last revision was issued. The PMOC is completing its review of the Final Draft and will return comments to the SAS Quality Manager in November 2015.

Daily Inspection Reports: The PMOC QA representative has constantly reminded the contractors of the importance of entering the Daily Inspection Reports into the Contractor Management System within one week. Overall, the contractors are performing well in this area. During this report period, however, Contract C3 is three weeks behind.

C5C Contractor: At the suggestion of the PMOC, the contractor hired two assistants for its Quality Manager. Both started work in June 2015. Significant improvement has been noted since the PMOC’s last Quarterly Report and includes:

- Submittal of Daily Inspection Reports has been reduced from three weeks to less than one week;
- NCRs that were identified as “not issued” have now been issued and entered into CMS;
- There is now a schedule for preparing Quality Work Plans (QWPs);
- Preparatory Phase Meetings are scheduled and are being held;
- Mechanical, Electrical, and Plumbing (MEP) sign-off is occurring prior to placement of concrete; and,
- The contractor hired a new Project Manager who has supported resolving open issues.

Among the remaining issues are:

- The contractor's Quality Manager does not have an audit schedule and has only conducted one audit; and,
- 35 of the open 40 non-concrete NCRs have been open for more than two months.

Concerns and Recommendations: Contained under each Contract Package, below:

Contract Package C2B	
Status:	Through October 31, 2015, a total of 131 NCRs have been issued. 87 have been closed and 44 NCRs are still open. In October 2015, nine new NCRs were written and five were closed. 28 of the open NCRs are for concrete that was out-of-specification.
Observation:	Bi-weekly Quality Management Meetings, as suggested by the PMOC, are still being held. Submittal of Daily Inspection Reports is 1½ weeks behind.
Concerns and Recommendations:	14 of the open 16 non-concrete NCRs have been open more than four months. The contractor has established closure dates that are not realistic. The PMOC recommends that a realistic schedule for closure of the open NCRs be established. The contractor should then make an effort to meet these dates. The PMOC also recommends that a concrete statistical analysis be performed and submitted.
Contract Package C3	
Status:	Through October 31, 2015, a total of 117 NCRs have been issued. 98 have been closed and 19 are still open. In October 2015, 4 new NCRs were written and none were closed.
Observation:	16 of the open 19 NCRs are due to concrete that was out of specification.
Concerns and Recommendations:	The PMOC has no concerns at this time.
Contract Package C4C	
Status:	Through October 31, 2015, a total of 192 NCRs have been issued. 109 have been closed and 83 NCRs are still open. In October 2015, nine new NCRs were written and two were closed.
Observation:	163 of the 192 NCRs are for concrete that was out of specification. Eight of the nine NCRs generated in October were for concrete. Submittal of Daily Inspection Reports is current.
Concerns and Recommendations:	67 of the 83 open NCRs are for concrete that was out of specification. The PMOC recommends that a concrete statistical analysis be performed and submitted.

Contract Package C5C	
Status:	Through October 31, 2015, 143 NCRs have been issued. 66 have been closed and 77 NCRs are still open. In October 2015, eight new NCRs were written and ten existing NCRs were closed.
Observation:	Submittal of Daily Inspection Reports is one week behind. 37 of the 77 NCRs that are open are for concrete that is out of specification.
Concerns and Recommendations:	In February 2015, the PMOC recommended that all NCRs be issued and entered into CMS immediately and that the contractor establish a schedule to close the non-concrete NCRs. All NCRs are now issued and entered into CMS. The PMOC continues to recommend that the contractor establish a schedule for closing the 40 non-concrete NCRs and recommends that a concrete statistical analysis be performed and submitted.
Contract Package C6	
Status:	Through October 31, 2015, a total of 42 NCRs have been issued. 34 NCRs have been closed and eight are still open. In October 2015, four new NCRs were written and none were closed. Entry of Daily Inspection Reports into CMS is current.
Observation:	The contractor submitted Waiver #23 to extend the time of concrete placement from 90 minutes to 120 minutes. The Designer of Record did not approve this waiver and subsequently requested the contractor to prepare and submit an analysis of the concrete strength. Based on the results of the analysis, 15 concrete NCRs have been closed. Three of the eight open NCRs are for concrete that is out of specification.
Concerns and Recommendations:	The PMOC has no concerns.

2.0 SCHEDULE DATA

Status:

The Integrated Project Schedule (IPS) is a management level schedule that integrates all ten construction packages along with design, procurement, startup, and other support activities. IPS Update #111 was received on November 3, 2015 and is based on a Data Date of October 1, 2015. This update includes the “.XER” schedule files for the IPS and contractor source schedules as well as the MTACC narrative report for the update period.

IPS Update #111 forecasts the completion of all construction and NYCT Pre-Revenue Training & Testing activities on November 28, 2016, with approximately 24 work days (WD) or 33 calendar days (CD) of contingency, resulting in a forecast Revenue Service Date (RSD) of December 30, 2016.

Schedule contingency based on IPS Update #111 is summarized as follows:

	Dates	Contingency (CD)	
MTACC Completion	11/28/2016	33	MTACC Contingency
MTACC RSD	12/30/2016	184	Additional Contingency
ELPEP Threshold	7/3/2017	240	Minimum ELPEP Contingency
FTA RSD	2/28/2018	457	TOTAL

Observations:

Project Critical Path:

IPS Update #111 identifies four independent float paths with less than 10 WD of schedule float. Consistent with previous reports, the PMOC considers each of these float paths to be “critical”.

1st Critical Path (TF=0): This period SAS’s Critical/Longest path involves communications system installation and testing. The path is initiated by equipment installation in Communications Room MR475A at the 96th Street Station. This work has started, but progress appears to be impacted by incomplete room turnover by the 96th Street Station contractor and its inability to achieve C2B MS #8. Following installation of equipment, FIAT and FIST testing at 96th Street Station will be the primary work activities through February 16, 2016. Systems’ testing of communications throughout the project is forecast to continue through September 23, 2016, followed by NYCT Pre-Revenue Testing and Phase 1 construction complete on November 28, 2016.

2nd Critical Path (TF=3): The 2nd Critical Path begins with construction of escalators E-09, E-10 and E-11 at the 72nd Street Station. All construction is forecast to be complete by September 2, 2016. Testing and commissioning follows completion of construction and is forecast to complete on November 22, 2016. This path then follows the Substantial Completion of Contract C4C and Phase 1 Construction Completion on November 28, 2016.

3rd Critical Path (TF=3): The 3rd Critical Path begins with construction of system wide track work in Zones 4, 7, 8, 10, and 11, followed by signal system testing and final acceptance throughout the project on September 20, 2016. This is followed by NYCT Pre-Revenue Service Testing and the Operational Revenue Service Date of November 28, 2016.

4th Critical Path (TF=3): This path represents the supply of permanent power at the 96th Street Station. Evaluation of the impact of the coordination study appears to be the only activity remaining to be completed before ConEd accepts the installation. Permanent power is forecast to be available on January 4, 2016. The path follows component and system testing of mechanical and electrical equipment throughout the station. The “Power Available” date experienced a one month delay this period; however, approximately 62 WD of schedule float were lost.

Secondary Paths: Other secondary float paths of significance to the project include:

- +11 WD:** This path involves installation of utility connections and site restoration activities adjacent to Entrance #1 at the 96th Street Station. This work is currently forecast to run continuously from October 1, 2015, through November 11, 2016. Completion of this work controls the C2B Substantial Completion date, which ties directly to the Phase 1 Completion date of November 28, 2016.
- +13 WD:** This path involves architectural and vertical transportation installation, testing and acceptance at the 96th Street Station, Entrance #3. Installation work is forecast for completion on August 8, 2016 and is followed by a period of escalator testing and acceptance leading to C2B Substantial Completion on November 11, 2016.
- +13 WD:** This path represents installation, third party testing, and inspection and acceptance by ConEd required for permanent power at the 72nd Street Station. Following the “Permanent Power Available” date of February 9, 2016, this path merges with numerous other paths involving the testing and acceptance of equipment throughout the station. The “Permanent Power Available” date has been delayed by over 1 month and schedule float available has decreased to 13 WD from the previous value of 45 WD.
- +14 WD:** This path involves installation of utility connections and site restoration activities between 95th and 99th Streets at the 96th Street Station site. This work is currently forecast to run continuously from October 1, 2015 through November 8, 2016. Completion of this work controls the C2B Substantial Completion date, which ties directly to the Phase 1 Completion date of November 28, 2016.
- +15 WD:** This path involves installation of axial fans for tunnel ventilation followed by installation and testing of station lighting in Ancillary 2 at the 96th Street Station. Completion of fan installation is forecast for November 25, 2015, and installation and testing of lighting completion is forecast for November 7, 2016. Completion of this work then ties to the C2B Substantial Completion date of November 11, 2016.
- +17 WD:** This path represents installation and testing.
- +19 WD:** This path represents installation and testing of permanent power equipment at the 86th Street Station. Following the forecast “Permanent Power Available” date of March 9, 2016, the path follows component and system testing of mechanical and electrical equipment throughout the station. The “Permanent Power Available” date experienced a 1 month delay this period; however only 11 WD of schedule float was lost.

+23 WD: This path involves installation of access control systems throughout the 72nd Street Station. Installation is forecast for completion on April 26, 2016, at which time individual and integrated system testing at 72nd Street Station starts and continues through September 7, 2016. At this time, this path joins the 0 WD float path for Pre-Revenue Operational Testing by NYCT.

Milestone Summary: For contracts actively under construction, an evaluation of reported progress for IPS schedule milestones includes:

1. Status of Milestones completed this update period (09/01/15 to 09/30/15):

Pkg	MS	Description	UD #110 Date	UD #111 Status
C5C	9	Turnover Traction Power Rooms	09/30/15	09/15/15A
C5C	9A	Room-to-Room Conduit Ready	09/30/15	09/15/15A

2. Milestones scheduled for completion during the next update period (10/01/15 to 10/31/15):

Pkg	MS	Description	UD #111 Date	UD #111 Float
C5C	7	Turnover of Signal Rooms	10/08/15	28
C5C	7A	Room-to-Room Conduit Ready	10/08/15	28
C5C	8	Turnover of Signal Rooms	10/08/15	28
C5C	8A	Room-to-Room Conduit Ready	10/08/15	28
C4C	7B	Complete Work Ancillary #1	10/15/15	222
C2B	6B	Full access to Comms. Rooms & Closets	10/16/15	1
C2B	6C	Full access to Comms. Rooms & Closets	10/16/15	1
C5C	6	Turnover of Comm. Rooms	10/23/15	17
C5C	6A	Room-to-Room Conduit Ready	10/23/15	48
C2B	8A	Full access to Traction Power Rooms	10/30/15	10
C2B	8B	Full access to Traction Power Rooms	10/30/15	160
C2B	8C	Full access to Traction Power Rooms	10/30/15	160

3. Milestones with unusual schedule variances, generally defined as a forecast date change approximately equal to or exceeding the duration of the reporting period (30 CD) are listed in the following table:

Pkg	MS	Description	UD #110	UD #111	Variance
C2B	10	Complete all remaining Comms., Signal, & Traction Power work	11/04/15	01/04/16	61
C4C	12	Full access @ Station Service Center(s)	09/22/15	11/13/15	52
C6	4A	Complete LAN - 72nd St. Station	02/04/16	03/16/16	41
C6	4B	Complete WAN - 72nd St. Station	02/04/16	03/16/16	41
C2B	8A	Full access to Traction Power Rooms	09/30/15	10/30/15	30
C2B	8B	Full access to Traction Power Rooms	09/30/15	10/30/15	30
C2B	8C	Full access to Traction Power Rooms	09/30/15	10/30/15	30
C5C	11	Full access @ Station Service Center(s)	11/04/15	12/03/15	29
C2B	9	Full access to Station Service Centers	10/22/15	11/19/15	28
C4C	7B	Complete Work Ancillary #1	09/18/15	10/15/15	27
C6	5A	Complete LAN - 63rd St. Station	10/22/15	11/16/15	25
C6	5B	Complete WAN - 63rd St. Station	10/22/15	11/16/15	25
C5C	6	Turnover of Comm. Rooms	09/30/15	10/23/15	23
C5C	6A	Room-to-Room Conduit Ready	09/30/15	10/23/15	23
C4C	7A	Complete Work in all Comms. Rooms	04/05/16	03/16/16	-20
C6	5C	Complete all 63rd St. Station work	07/07/16	06/14/16	-23

4. Milestones with unusual float variances, generally defined as a forecast date change approximately equal to or exceeding the duration of the reporting period are listed in the following table:

Pkg	MS	Description	UD #110	UD #111	Variance
C6	5C	Complete all 63rd St. Station work	98	119	21
C2B	6B	Full access to Comms. Rooms & Closets	26	1	-25
C2B	6C	Full access to Comms. Rooms & Closets	26	1	-25
C6	4A	Complete LAN - 72nd St. Station	141	114	-27
C6	4B	Complete WAN - 72nd St. Station	141	114	-27
C2B	8B	Full access to Traction Power Rooms	193	160	-33
C2B	8C	Full access to Traction Power Rooms	193	160	-33
C2B	7B	Full access to Signal Rooms	59	23	-36
C2B	7A	Full access to Signal Rooms	59	18	-41
C2B	10	Complete all remaining Comms., Signal, & Traction Power work	168	114	-54
C2B	8A	Full access to Traction Power Rooms	73	10	-63
C4C	7A	Complete Work in all Comms. Rooms	161		-161
C5C	11	Full access @ Station Service Center(s)	267	81	-186

Source Schedule Comparison:

The following compares substantial completion dates in IPS #110 and the most recent contractor schedule updates furnished by MTACC.

Contractor		IPS #111		PMOC Comments
Update	Substantial Completion	Substantial Completion		
C2B	32F (10/01/15)	11/30/16	11/11/16	IPS includes utility and street restoration accelerated completion of 08/31/16. This acceleration is not fully represented in Contractor Update #32F.
C4C	31 (10/01/15)	02/28/17	09/16/16	Contract critical path extends through architectural concrete remediation at Entrance #2. Work forecast to be complete on 11/13/15 (±). Revised contractor logic should result in significant improvement next update.
C5C	19R (10/01/15)	01/09/17	09/23/16	93 WD delay to Substantial Completion due to delays in delivering permanent power and follow-on equipment commissioning activities. No acceleration initiative to mitigate this delay noted in narrative report. Contractor schedule appears flawed as Substantial Completion is controlled by utility work/street restoration.
C6	38 (10/01/15)	02/03/17	11/28/16	Contractor critical path driven by police radio system installation. MTACC considers parallel installation of equipment and cable pulling a more reasonable approach that will reduce this path by as much as three months. Combined with other MTACC resequencing, police radio system is removed from critical path and Substantial Completion improved to 11/28/16.

“Earned Value” Analysis:

In an effort to corroborate the IPS forecast, the PMOC has reviewed schedule performance to date to develop performance metrics that can assist in evaluating CPM schedule forecasts.

In its periodic reports to the FTA, the MTACC details the Budgeted Cost of Work Scheduled (BCWS) versus the Budgeted Cost of Work Performed (BCWP) for each active construction contract. At a summary level, the resulting “S-curves” compare planned versus actual performance and can provide insight into performance trends and schedule forecasts. For each active construction contract, the following table compares the planned vs. actual monthly level of achievement in terms of value earned by completed construction work. This “earned value” can be used to estimate a variance in planned vs actual schedule performance.

September 2015 is the latest month for which this information is available.

Value Earned		September-15			Months Ahead (+) or Behind (-)	Est. Completion Date
Contract \$ (x100,000)	Plan	Actual	Plan Month for ES \$			
C2B	\$324	\$314	\$260	Dec-14	-7.6	9/8/16
C3	\$176	\$176	\$165	Jul-13	-24.9	7/1/16
C4C	\$258	\$247	\$173	Dec-14	-7.6	6/5/17
C5C	\$208	\$171	\$111	Mar-15	-4.6	11/18/16
C6	\$261	\$225	\$166	Feb-15	-5.6	3/8/17
TOTAL	\$1,227	\$1,133	\$875	Jan-15	-6.6	8/18/17

The PMOC notes the following:

- This evaluation uses base contract values only. AWOs can be considered a partial cause of the variances indicated. Schedule float is also not considered. The significant schedule delay to Contract C3 does not pose a risk to achieving the RSD;
- The interrelationship between contracts is not fully represented in this analysis. C6 cannot complete all its work until all station contracts are complete. As such, this analysis suggests the RSD may not be achieved until several months after the completion of the C4C contract (June 4, 2017);
- Between August 2015 and September 2015, a marginal improvement in progress is noted. It is premature to forecast whether this represents real schedule improvement; and,
- MTACC has implemented numerous “acceleration initiatives” in an effort to maintain the overall project schedule. While these efforts may mitigate select delays on the “critical path”, this analysis suggests that achieving these initiatives may result in other base contract work not being performed in a timely manner. Contractor shifting of resources to accelerated work and not performing other

required work ultimately compromises the value received for any accelerated work effort.

ELPEP/SMP Compliance: The MTACC considers the IPS and the associated schedule management procedures to be in compliance with the ELPEP and Schedule Management Plan, based on the following matrix:

- Forecast Revenue Service Date (RSD) and minimum schedule contingency:
 - ELPEP Requirement: February 28, 2018 (RSD); and,
 - ELPEP Requirement: 240 CD (measured against February 28, 2018).
- Minimum Allowable Float - Real Estate Acquisition;
 - ELPEP Requirement: 60 CD; and,
 - Current Forecast: All Real Estate takings are complete as of November 1, 2011, with the last “Title Vesting” occurring on October 25, 2011.
- Minimum Allowable Secondary Float Path;
 - ELPEP Requirement: Minimum 25 Calendar Days (approximately 18 WD) of schedule float for all secondary “near-critical” paths;
 - Numerous secondary float paths with Total Float (TF) \leq 25 CD. Many of these paths have multiple subsidiary paths branching off the independent paths; and,
 - Compliance with this requirement is not consistent with maintaining the project budget.
- Secondary Schedule Mitigation (critical path compression);
 - ELPEP Requirement: 125 CD; and,
 - MTACC is pursuing individual mitigation opportunities as they become available in an effort to maintain the overall project schedule.

Concerns and Recommendations:

Based on the PMOC’s review of IPS Update #111:

- Two of fifteen milestones (13%) forecast to complete this update by IPS update #110 were actually completed. MTACC has stated that partial turnovers have mitigated much of the apparent delay to achieving these milestones;
- Twelve of the remaining thirty-six active schedule milestones are forecast for completion during the next update period;
- Sixteen milestones exhibited excessive month-to-month schedule variances. Fourteen of these variances were delays to milestone achievement, while two represented improvement in schedule performance;
- Thirteen of the remaining thirty-six milestones exhibited excessive float variances, twelve of which reduced the schedule float available. This is generally consistent with stacking or rear-end loading of the schedule with incomplete activities; and

- Significant variances are noted in contract completion dates and contract-level critical paths with corresponding information contained in the IPS. These variances are discussed as part of the IPS Narrative Report for each contract. The PMOC generally concurs with MTACC's evaluation and corresponding IPS adjustments for Contracts C4C and C6. The PMOC notes that the IPS for Contracts C2B and C5C does not appear to fully represent delays and presumes successful acceleration initiatives without reasonable validation.

3.0 COST DATA

Based upon financial expenditures reported by the MTACC through October 31, 2015, SAS Phase 1 is approximately 81.9% complete. The completion status of the individual construction contracts through October 31, 2015, also based upon reported expenditures through that date, is as follows:

- C26002 (Tunnel Boring) – 100.0%;
- C26005 (96th Street Station) – 100.0%;
- C26010 (96th Street Station) – 82.3%;
- C26013 (86th Street Station) – 100%;
- C26008 (86th Street Station) – 99.6%;
- C26012 (86th Street Station) – 54.2%;
- C26006 (63rd Street Station) – 94.5%;
- C26007 (72nd Street Station) – 99.9%;
- C26011 (72nd Street Station) – 69.3% ; and,
- C26009 (Systems) – 63.9%.

Aggregate Construction percentage complete:

- 100% of all construction has been bid;
- 100% of all construction is under contract;
- 86.7% of base contract construction (excluding AWOs) is complete; and
- 87.6% of all construction is complete.

Based upon cost data received from the MTACC for the period through August 31, 2015:

- Value of construction in place this period = \$36,420,090;
- Estimated value of construction remaining = \$168,808,359 (base contract only);
- Target construction completion = November 28, 2016; and,
- Number of months remaining = 13.

Soft Cost expenditures (not including real estate, OCIP, etc.) reported this period by the MTACC totaled \$4.2M; expenditures were spread through all of the project management and technical support categories. At current expenditure levels, the available budget should be sufficient through 2016. Significant expenditure beyond 2016, however, may require the transfer of

additional funds from contingency. Any significant construction delays beyond December 2016 may also require additional contingency transfer.

Cost Growth: The value of AWOs reported by the MTACC/NYCT in October 2015 is summarized as follows:

	<u>Executed AWOs</u>	<u>AWO Exposure</u>
Oct-15	\$205,888,848	\$251,481,952
Sep-15	\$202,701,498	\$247,994,523
Δ	\$3,187,350	\$3,487,429
Δ	1.57%	1.41%

The changes in AWO Exposure for each construction contract are summarized as follows:

Const. Pkg.	AWO Exposure			
	Oct-15	Sep-15	Period Δ	Changes this Period
Completed Packages	\$ 47,612,118	\$ 47,612,118	\$0	Final values for Packages C1 and C5A as reported by MTACC.
C2A	\$ 47,615,409	\$ 47,615,409	\$0	No change reported this period.
C2B	\$39,798,947	\$ 38,808,942	\$990,005	Net increase is based on revised estimates for AWO #s 116, 160 and 168 and initial estimates for AWO #s 171, 173, 177, 182, and 188.
C3	\$36,432,896	\$ 34,519,474	\$1,913,422	Net increase is based on revised estimates for AWO #s 190, 229, 230, 234, 236, 238, 239, 242, 243, 245, and 246 and initial estimates for AWO #s 250 through 258.
C4B	\$1,325,639	\$ 1,325,639	\$0	No change reported this period.
C4C	\$33,010,799	\$ 33,217,345	-\$206,546	Net decrease is based on revised estimates for AWO #s 87, 88, 89, 115, 154, and 161 and initial estimates for AWO #s 156, 157, 159, 183, 184, and 191.
C5B	\$26,332,365	\$ 26,535,862	-\$203,497	Net decrease is based on revised estimates for AWO #s 52, 56, 64, and 98.

Const. Pkg.	AWO Exposure			
	Oct-15	Sep-15	Period Δ	Changes this Period
C5C	\$9,650,219	\$ 9,153,298	\$496,921	Net increase is based on revised estimates for AWO #s 56 and 94 and initial estimates for AWO #s 61, 126, 134, 138, 139, and 140.
C6	\$9,703,560	\$ 9,206,436	\$497,124	Net increase is based on revised estimates for AWO #s 39, 87, and 129 and initial estimates for AWO #s 92, 98, 122, 123, 131, 132, 134, and 140.
TOTALS	\$251,481,952	\$247,994,523	\$3,487,429	

The changes in Executed AWO Value are summarized as follows:

Const. Pkg.	Executed AWOs			
	Oct-15	Sep-15	Period Δ	Changes this Period
Completed Packages	\$ 47,612,118	\$ 47,612,118	\$0	Final values for Packages C1 and C5A as reported by MTACC.
C2A	\$ 47,615,409	\$ 47,615,409	\$0	No change reported this period.
C2B	\$27,600,388	\$ 27,600,388	\$0	No change reported this period.
C3	\$23,926,119	\$ 23,717,619	\$208,500	Increase is based on execution of AWO #s 194, 225, and 237.
C4B	\$1,325,639	\$1,325,639.14	\$0	No change reported this period.
C4C	\$27,372,861	\$25,475,861	\$1,897,000	Increase is based on execution of AWO #s 19, 114, 136, and 155.
C5B	\$19,181,413	\$19,181,413	\$0	No change reported this period.
C5C	\$3,355,439	\$ 3,224,339	\$131,100	Increase is based on execution of AWO #s 103, 107, 109, 112, 113, 117, 119, and 125.
C6	\$7,899,462	\$ 8,138,712	-\$239,250	Decrease is based on execution of AWO #s 3 and 129.
TOTALS	\$205,888,848	\$203,891,498	\$1,997,350	

As of September 30, 2015, the status of Additional Work Orders (AWOs) for each construction contract on Phase 1 of the Second Avenue Subway Project is summarized as follows:

Contract / (Package)	% Complete	Award	Exposure		Executed	
			\$	% of Award	\$	% of Award
C26002 (1)	100.00%	\$337,025,000	\$41,086,647	12.19%	\$41,086,647	12.19%
C26005 (2A)	100.00%	\$325,000,000	\$47,615,409	14.65%	\$47,615,409	14.65%
C26010 (2B)	82.33%	\$324,600,000	\$39,798,947	12.26%	\$27,600,388	8.50%
C26006 (3)	94.47%	\$176,450,000	\$36,432,896	20.65%	\$23,926,119	13.56%
C26007 (4B)	99.93%	\$447,180,260	\$1,325,639	0.30%	\$1,325,639	0.30%
C26011 (4C)	69.28%	\$258,353,000	\$33,010,799	12.78%	\$27,372,861	10.60%
C26013 (5A)	100.00%	\$34,070,039	\$6,525,471	19.15%	\$6,525,471	19.15%
C26008 (5B)	99.63%	\$301,860,000	\$26,332,365	8.72%	\$19,181,413	6.35%
C26012 (5C)	54.17%	\$208,376,000	\$9,650,219	4.63%	\$3,355,439	1.61%
C26009(6)	63.99%	\$261,900,000	\$9,703,560	3.71%	\$7,899,462	3.02%
TOTAL TO DATE		\$2,674,814,299	\$251,481,952	9.40%	\$205,888,848	7.70%

To date, \$2,318,518,656 (86.7%) worth of all base contract construction work has been completed. As a percentage of work completed, the AWO exposure for these contracts is 10.85% and the executed AWO percentage is 8.88%.

The PMOC notes that total AWOs currently exceed the original AWO budget. The PMOC also notes that exposure values are not included in a significant number of logged AWOs. Based on current AWO trends, the final AWO value is estimated at approximately \$270 million, which is reasonably close to the \$262 million adjusted AWO Budget currently maintained in the MTACC CWB.

MTACC maintains an AWO forecast at completion that includes input from its Risk Registers. The MTACC AWO EAC Forecast through September 30, 2015, is \$320,000,000; a \$28,000,000 decrease from the previous month's forecast. MTACC's reforecast of this exposure revealed several duplications and estimates of risk items not realized, explaining this adjustment. This value is somewhat greater than the PMOC's AWO forecast and will be used as part of the overall contingency/EAC analysis.

Cost Contingency: Based upon the MTACC Current Working Budget, expenditures as of September 30, 2015 reported by the MTACC and the current AWO Exposure analyses, the PMOC has developed the following contingency analysis:

	Contingency Analysis	
	Current	@ Completion
Phase 1 Budget	\$4,451,000,000	\$4,451,000,000
Construction Awards	\$2,674,814,299	\$2,674,814,299
Soft Cost Expended	\$1,139,498,774	\$1,139,498,774
Soft Cost Forecast to Complete	\$221,477,428	\$239,634,428
AWO Exposure	\$240,321,139	\$320,000,000
Total Contingency	\$174,888,360	\$77,052,499
Reserved Contingency	\$160,000,000	\$77,052,499
Available Contingency	\$14,888,360	
	Transfer from Reserved Contingency	\$82,947,501

Notes:

- (1) AWO Exposure @ Completion incorporates MTACC “risk-informed” forecast through September 2015;
- (2) Total Contingency = budget balance after forecast expenditures;
- (3) Final Contingency Balance reflects current forecast transfer of \$82,947,501 from Reserved Contingency ; and,
- (4) Minimum Available Contingency required by ELPEP is approximately \$45,000,000 (100% Construction Bid, 85% Construction Complete).

Conclusions based upon this analysis include:

- The project can be completed within the current MTACC CWB of \$4.451 billion;
- Current forecast indicates it will be necessary to utilize approximately 60% of funds from the “Executive” or “Reserved” Contingency in order to cover forecast project costs; and,
- Current available contingency of approximately \$175 million is greater than ELPEP-required minimum.

ELPEP/CMP Compliance: The SAS Project Team maintains an EAC for all construction costs, which are updated monthly. Revision #10 of the Project Cost Estimate, which includes a complete forecast of remaining soft costs has been prepared and incorporated into the project CWB. It is the opinion of the PMOC that SAS Phase 1 is in substantial compliance with the metrics, deliverables, and intangible goals enumerated for Cost Management in the Enterprise Level Project Execution Plan (ELPEP), dated January 15, 2010 (Section IV. b, page 8), and as further described by the Cost Management Plan (CMP).

4.0 RISK MANAGEMENT

Status

Major risks challenging the SAS Project Team at this time are primarily schedule related. During October 2015, MTACC restated and emphasized its goal of achieving the December 30, 2016 RSD. MTACC's tangible commitment to this effort is included in several risk mitigation strategies discussed later in this section.

In previous reports, the PMOC has questioned the status of MTACC's internal Risk Assessment completed in late 2014. This period, MTACC reports that the results of this assessment were never officially issued and that this assessment was essentially merged with and replaced by the Independent Risk Assessment requested by the IEC and conducted in May 2015 by Golder Associates.

The initial results of this analysis were essentially the same as the internal assessment and PMOC forecasts including a forecast RSD in mid-2017 and approximately \$55 to \$85 million contingency remaining. Several meetings have been held subsequent to the issue of the assessment results to become familiar with the independent assessment; slight adjustments have been made to the logic and a concerted effort made to address the top risks.

Observation and Analysis:

During this period, MTACC has broadened its approach to risk management by focusing on administrative and systematic changes to better manage certain high probability risks. In its most recent Monthly Risk Report, dated October 2015, MTACC reviews what it considers to be the six (6) significant risks to the project and details of their proposed mitigations:

1. Risk: Owner-driven design/scope changes (during construction)

Mitigation Strategies/Actions:

- Reduce the number of change orders needing to be addressed during construction by deferring those changes not involving life safety or otherwise directly impacting revenue service;
- Improve the efficiency (amount of time) for change order processing by assigning MTACC personnel to be responsible for changes on each open contract and to provide additional support to CM's to expedite completion of required tasks within the process; and
- Procure an on-call contractor to do minor work Station/System (painting, patching, added signage, etc.) that existing contractors do not want to do.

2. Risk: Delays to fire alarm testing & commissioning due to unanticipated complexity, poor quality and shortage of software programming resources.

Mitigation Strategies/Actions:

- Designate an experienced MTACC staff member as the project-wide individual responsible for fire alarm issues. This individual will lead the identification and resolution of remaining technical issues, coordinate NYCT staff inspections and corrective actions, and ensure that project reporting accurately depicts Station/Systems activities to complete testing and commissioning; and,

- Develop and pre-negotiate contract allowance items for typical fire alarm adjustments that will inevitably be identified during final installation/testing such as adding devices, relocating devices, adding shrouds, etc. This will expedite completion removing the need to negotiate new change orders at the very end of the construction. Develop a scope, estimate, etc., to be in position to issue an RFP by December 30, 2015.

3. Risk: Delays due to NYCT TA Resource (labor) availability

Mitigation Strategies/Actions:

- Work with NYCT and agree on dedicated NYCT resources to be located at site;
- NYCT subsequently agreed to provide a dedicated staff of 30 that will be located adjacent to the Community Information Center, and report to one manager who will be responsible for coordinating their activities;
- Enhance technical support for NYCT testing and inspection tasks. Database to document and support NYCT observations has been created. It is based on the EDMS system and includes latest contract documents, contract sketches, etc.; and,
- Hire a Code Consultant to augment NYCT Code Compliance Staff. A site tour was recently held with potential proposers. A contract is expected to be awarded by early December 2015.

4. Risk: Delay in completing communications equipment & cabling installation at 86th Street Station

Mitigation Strategies/Actions:

- Accelerate completion of this work by working double shifts to assure work can be completed in the September 2015 to January 2016 time frame.

5. Risk: Delay in providing Traction Power – 86th Street Station

Mitigation Strategies/Actions:

- The 86th Street Traction Power room has been damaged due to a water line leak. The Project has asked the Contractor to develop a schedule for completing the Traction Power rooms. Overtime hours may be used in his approach. The current plan is to have all four Traction Power rooms available by September 2016;
- Fragnets have been developed showing all interrelated activities. Fragnets capture the work that suffered one month delay in starting installation. Fragnets are continually updated; and,
- There is an opportunity to accelerate traction power equipment installation (6.5 months installation period as opposed to 9.5 months).

6. Risk: Water Mist System issue (Buy America) 72nd and 86th Street Stations

Mitigation Strategies/Actions:

- Revise the schedule model logic requirement that water mist system be installed and functional in the TPSS room in order to operate the TPSS. This is not required and logic will be changed to show the water mist system must be operational 30 days prior to fire alarm test completion;

- Fragnets are being developed showing all interrelated activities so the Project can evaluate opportunities for improvement and monitor progress;
- Securiplex design has been expedited. Evaluate opportunities for subsequent equipment fabricate and delivery acceleration; and,
- Expedite the disposition and removal of existing Marioff equipment.

Issues previously identified as “significant risks to the project” include:

- 1. Track Installation:** Installation of track and follow-up signal and traction power equipment installation has experienced several delays to date. MTACC has pro-actively addressed these delays and reports that there are no known issues that pose a threat to the prosecution of this work.
- 2. 72nd Street Station Entrance 1:** This risk has remained on schedule for approximately one year. MTACC will monitor progress and evaluate if any delays are encountered.
- 3. Facility Power:** Timely availability of permanent facility power at the new stations is necessary to ensure the timely completion of system installation, testing, and commissioning activities. While some delays have been encountered, schedule forecasts indicate all stations will be energized by early 2016 and testing and commissioning activities will not be impacted.
- 4. Delays to Achievement of Access Milestones:** Significant delays have been encountered and MTACC’s mitigation efforts through 2015 appear to have lagged. Continuing effort is required to expedite completion and turnover of remaining rooms to the follow-on systems contractor.
- 5. Architectural Finishes:** Currently, this risk specifically involves sandblasting and painting of exposed architectural concrete at the 72nd and 86th Street Station entrances. The risk of delay remains significant at both stations and MTACC must maintain efforts to complete this work promptly.
- 6. Water Infiltration at 96th Street Station:** Conditions have improved significantly as a result of grouting operations along the station perimeter and completion of the station roof.

Conclusions

The MTACC has used the risk management process to assist in identifying potential cost/schedule risks to the project and develop mitigation strategies. Recent performance suggests this process is not being utilized to its fullest capability.

5.0 ELPEP

The most recent ELPEP Quarterly Review Meeting was held on September 17, 2015. The next ELPEP Quarterly Review Meeting with MTACC, FTA-RII, SAS and the ESA project, and the PMOC is scheduled for December 17, 2015. With respect to SAS, the current status of each of the main ELPEP components is summarized as follows:

- **Technical Capacity and Capability (TCC):** MTACC has resolved all remaining FTA/PMOC comments and has issued the final revised PMP. MTACC is not planning any further updates to the PMP;
- **Schedule Management Plan (SMP):** MTACC's position is that the SAS management processes remain ELPEP compliant. The PMOC is developing comments to MTACC's recently submitted Schedule Management Plan, Revision 2, dated October 2015;
- **Cost Management Plan (CMP):** Comments on the ESA/SAS Cost Management Plan (CMP) were received on June 2, 2015. MTACC expects to set up a working meeting to resolve remaining issues. MTACC's position is that the SAS management processes remain ELPEP compliant;
- **Risk Mitigation Capacity Plan (RMCP) and Risk Management Plan (RMP):** MTACC's position is that the SAS management processes remain ELPEP compliant; and
- **ELPEP Requirements:** The SAS Project Team has implemented the principles and requirements embodied in the ELPEP. The procedural changes triggered by the ELPEP have become an integral part of the management of the project and gives the FTA/PMOC greater insight into the risk, cost, and schedule elements of the project.

6.0 SAFETY AND SECURITY

Each construction contractor continued implementation of the Safety Requirements as specified in Section 01 11 50 of the General Requirements.

As of September 30, 2015, a total of 11,579,970 construction hours have been logged on the project with 98 lost time and 170 recordable incidents documented. The total hours and incidents equates to a Lost Time Rate (LTR) of 1.69 and a Recordable Rate (REC) of 4.63. The LTR is below and the REC is above the US Bureau of Labor Statistics (BLS) national rates (Heavy & Civil construction) of 1.8 and 3.2 respectively. Although the REC is above the BLS national rate, it continues to show a downward trend for the last twelve months.

Safety and Security Certification: Safety and Security Certification Requirements are specified in Section 01 77 12 of the General Requirements for each station and system contract. The certifiable elements of the SAS project have been identified and the subsequent breakdown of the certifiable elements into a list of certifiable items (CIL) has been completed. Technical Working Group (TWG) meetings are ongoing with each station contractor and the system contractor to review the test status of the certifiable items. Documentation supporting verification (Body of Evidences) of a certifiable item is being accumulated and inputted into the data base. Status meetings are held quarterly with the FTA and the PMOC in order to provide updates.

7.0 ISSUES AND RECOMMENDATIONS

Schedule Performance: Completing all work and implementing new service on or near the schedule RSD is the primary issue of concern, particularly in light of MTACC's reaffirmation of its intent to achieve the December 30, 2016 RSD. During this period, MTACC has taken positive steps to mitigate the following processes which have a high probability of impacting the RSD:

- Improved capability to manage the AWO process;
- Increased NYCT resources dedicated to the testing, commissioning and acceptance of the project;
- Increased Code Compliance resources and early code compliance inspections to promptly identify problem issues;
- Complete construction and coordinate testing and commissioning efforts on a system wide basis; and,
- Mitigated the impact of last minute scope changes to the project.

The PMOC recommends corresponding enhancements to the project schedule management and reporting functions that will enhance MTACC's ability to identify and react to potential delays. Such enhancements may include:

- Biweekly updating of select contract schedules;
- Improved identification of schedule goals and enhanced focus issues affecting these goals at progress meetings;
- Contractor "readiness reviews" to verify that contractors have completed all necessary preparatory tasks (submittals, material procurement, etc.) in advance of upcoming schedule-sensitive tasks; and,
- MTACC's collaborative scheduling approach to the management of Entrance #1 at the 72nd Street Station has been very successful. The detailed development of a recovery schedule with the contractor, combined with joint updating of the status of the work, has enhanced the understanding of the challenges involved and potential mitigations available by all parties. This process should be used as a model for subsequent "critical issue" schedule management efforts.

APPENDIX A – ACRONYMS

ARRA	American Recovery and Reinvestment Act
AWO	Additional Work Orders
CBH	Circuit Breaker House
CCM	Consultant Construction Manager
CD	Calendar Days
CIL	Certiifiable Items List
CMP	Cost Management Plan
CSSR	Contact Status Summary Report
CPRB	Capital Program Review Board
CWB	Current Working Budget
CY	Cubic Yards
DCB	Detailed Cost Breakdown
EAC	Estimate at Completion
ELPEP	Enterprise Level Project Execution Plan
FFGA	Full Funding Grant Agreement
FTA	Federal Transit Administration
GO	General Outage
IPS	Integrated Project Schedule
MO	Month
MPT	Maintenance and Protection of Traffic
MTA	Metropolitan Transportation Authority
MTACC	Metropolitan Transportation Authority – Capital Construction
N/A	Not Applicable
NYCT	New York City Transit
NYSPTSB	New York State Public Transportation Safety Board
OSS	NYCT Office of System Safety
PEP	Project Execution Plan
PMOC	Project Management Oversight Contractor (Urban Engineers)
PMP	Project Management Plan
PQM	Project Quality Manual
QA	Quality Assurance

RAMP	Real Estate Acquisition Management Plan
RMCP	Risk Mitigation Capacity Plan
RMP	Risk Management Plan
ROD	Revenue Operations Date
ROW	Right of Way
RSD	Revenue Service Date
SAS	Second Avenue Subway
SCC	Standard Cost Category
SMP	Schedule Management Plan
SSCC	Safety and Security Certification Committee
SSOA	State Safety Oversight Agency
SSPP	System Safety Program Plan
TBD	To Be Determined
TCC	Technical Capacity and Capability
TPSS	Traction Power Substation
WBS	Work Breakdown Structure
WD	Work Days

APPENDIX B – TABLES

Table 1 - Summary of Schedule Dates

	FFGA (March 2015)	Forecast Completion	
		Grantee	PMOC
Begin Construction	January 1, 2007	March 20, 2007A	March 20, 2007A
Construction Complete	August, 2016	November 28, 2016	October 2017
Revenue Service	February 28, 2018	December 30, 2016	February 2018

A = Actual

Table 2 - Schedule Contingency

IPS Update #	104	107	108	109	110	111
Data Date	3/1/15	6/1/15	7/1/15	8/1/15	9/1/15	10/1/15
	Contingency (CD)					
RSD=12/30/2016						
Risk Mitigated	38	45	50	50	38	33
Risk Realized	38	45	50	50	38	33
RSD=02/28/2018						
Risk Mitigated	461	469	474	474	462	457
Risk Realized	461	469	474	474	462	457

Table 3 – Schedule Milestone Comparison

Pkg	MS	Description	Dates			Variance		Sch. Float 111	Float Δ
			Adjusted	UD#110	UD#111	Contract	Month		
C2B	6B	Full access to Comms. Rooms & Closets	08/21/14	09/30/15	10/16/15	-421	16	1	-25
C2B	6C	Full access to Comms. Rooms & Closets	08/21/14	09/30/15	10/16/15	-421	16	1	-25
C2B	7A	Full access to Signals Rooms	08/21/14	12/15/15	12/15/15	-481	0	18	-41
C2B	7B	Full access to Signals Rooms	08/21/14	12/15/15	12/15/15	-481	0	23	-36
C2B	7C	Full access to Signals Rooms	08/21/14	12/15/15	12/15/15	-481	0	63	4
C2B	8A	Full access to Traction Power Rooms:	08/21/14	09/30/15	10/30/15	-435	30	10	-63
C2B	8B	Full access to Traction Power Rooms:	08/21/14	09/30/15	10/30/15	-435	30	160	-33
C2B	8C	Full access to Traction Power Rooms:	08/21/14	09/30/15	10/30/15	-435	30	160	-33
C2B	9	Full access to Station Service Centers	11/21/14	10/22/15	11/19/15	-363	28	267	-16
C2B	10	Complete all remaining Comms., Signal, & Traction Power work	09/21/14	11/04/15	01/04/16	-470	61	114	-54
C2B	SS	Substantial Completion	12/22/15	11/11/16	11/11/16	-325	0	11	4
C3	SS	Substantial Completion	05/13/14	03/14/16	03/22/16	-679	8	179	-3
C4C	7A	Complete Work in all Comms. Rooms		04/05/16	03/16/16	-42445	-20		-161
C4C	7B	Complete Work Ancillary #1		09/18/15	10/15/15	-42292	27	222	-15
C4C	12	Full access @ Station Service Center(s)	08/28/14	09/22/15	11/13/15	-442	52	45	-3
C4C	SS	Substantial Completion w/o Ent. #1	11/13/15	11/13/16	11/23/16	-376	10	6	-5
C4C	SS	Substantial Completion - Ent. #1	10/07/16	09/16/16	09/16/16	21	0	51	4
C5C	6	Turnover of Comms. Rooms	03/24/15	09/30/15	10/23/15	-213	23	17	-3
C5C	6A	Room-to-Room Conduit Ready	03/24/15	09/30/15	10/23/15	-213	23	48	-16
C5C	7	Turnover of Signal Rooms	02/25/15	09/30/15	10/08/15	-225	8	28	8
C5C	7A	Room-to-Room Conduit Ready		09/30/15	10/08/15	-42285	8	28	8
C5C	8	Turnover of Signal Rooms	02/25/15	09/30/15	10/08/15	-225	8	28	8
C5C	8A	Room-to-Room Conduit Ready	02/25/15	09/30/15	10/08/15	-225	8	28	8
C5C	9	Turnover Traction Power Rooms	02/26/15	09/30/15	9/15/2015A	-201	-15		
C5C	9A	Room-to-Room Conduit Ready	02/26/15	09/30/15	9/15/2015A	-201	-15		
C5C	11	Full access @ Station Service Center(s)	03/24/15	11/04/15	12/03/15	-254	29	81	-186
C5C	15	Comp. Permanent Power		02/26/16	03/10/16	-42439	13	81	-5
C5C	SS	Substantial Completion	05/31/16	09/20/16	09/23/16	-115	3	46	1

Pkg	MS	Description	Dates			Variance		Sch. Float 111	Float Δ
			Adjusted	UD#110	UD#111	Contract	Month		
C6	2A	Complete LAN - 96th St. Station	05/18/15	02/19/16	03/01/16	-288	11	105	-4
C6	2B	Complete WAN - 96th St. Station	05/18/15	02/19/16	03/01/16	-288	11	105	-4
C6	3A	Complete LAN - 86th St. Station	07/18/15	03/21/16	03/31/16	-257	10	93	-4
C6	3B	Complete WAN - 86th St. Station	07/18/15	03/21/16	03/31/16	-257	10	93	-4
C6	4A	Complete LAN - 72nd St. Station	02/18/15	02/04/16	03/16/16	-392	41	114	-27
C6	4B	Complete WAN - 72nd St. Station	02/18/15	02/04/16	03/16/16	-392	41	114	-27
C6	5A	Complete LAN - 63rd St. Station	04/18/14	10/22/15	11/16/15	-577	25	199	-15
C6	5B	Complete WAN - 63rd St. Station	04/18/14	10/22/15	11/16/15	-577	25	199	-15
C6	5C	Complete all 63rd St. Station work	04/18/14	07/07/16	06/14/16	-788	-23	119	21
C6	SS	Substantial Completion	08/18/16	11/22/16	11/28/16	-102	6	0	0

Table 4 - Project Budget/Cost 

	FFGA			FFGA Amend	MTA Current Working Budget (CWB)		Expenditures as of September, 2015	
	\$ Millions	% of Total	Obligated (\$ Millions)	3/17/2015	\$ Millions	% of Total	\$ Millions	% of Total
Grand Total Cost	4,866.614	100	4,572.942	5,574.614	5,267.614	100	3,645.505	69.20
Financing Cost	816.614	16.78		816.614	816.614	15.50		
Total Project Cost	4,050.000	83.22	4,572.942	4,758.000	4,451.00	84.50	3,645.505	69.20
Total Federal	1,350.693	27.75	1,063.942	1,373.893*	1,350.693	24.60	1,124.748*	21.35
Total FTA share	1,300.000	96.25	990.049	1,300.000	1,300.000	23.68	1,124.748*	21.35
5309 New Starts share	1,300.000	100	990.049	1,300.000	1,300.000	23.68	1,050.855	19.95
Total FHWA share	50.693	3.75	73.893	73.893	50.693	0.96	73.893	1.40
CMAQ	48.233	95.15	71.433	71.433	48.233	0.88	71.433	1.35
Special Highway Appropriation	2.460	4.85	2.460	2.460	2.460	0.04	2.460	0.05
Total Local share	2,699.307	55.47	3,509.000**	3,384.107	3,509.000 **	63.92	2,520.757	47.85
State share	450.000	16.67	100.000		450.000	8.20		
Agency share	2,249.307	83.33	1,145.782		3,059.000	55.72		
City share	0	0			0	0		

* Obligated and expended amounts obtained from the Transportation Electronic Award Management (TEAM) system and MTACC's Grant Management Department.

** Current MTA Board approved budget.

Table 5 - Estimate at Completion

Category	Current Working Budget	EAC Forecast
Total Construction	\$2,674,814,299	\$2,994,814,299
Engineering Services Subtotal	\$622,862,000	\$684,157,000
Third Party Expenses	\$554,086,273	\$562,086,000
TA Expenses	\$131,160,085	\$132,890,202
Contingency	\$468,077,343	
Total	\$4,451,000,000	\$4,373,947,501

Table 6 - Allocation of Current Working Budget to Standard Cost Categories

Std. Cost Category (SCC)	Description	FFGA (January 2008)	FFGA Amended (March, 2015)	MTA's Current Working Budget (September, 2015)
10	Guideway & Track Elements	\$612,404,000	\$195,346,781	\$622,478,000
20	Stations, Stops, Terminals, Intermodal	\$1,092,836,000	\$1,666,605,679	\$1,277,642,000
30	Support Facilities	\$0	\$0	\$0
40	Site Work & Special Conditions	\$276,229,000	\$793,118,232	\$524,561,000
50	Systems	\$322,707,000	\$250,379,966	\$250,134,000
60	ROW, Land, Existing Improvements	\$240,960,000	\$281,500,000	\$281,500,000
70	Vehicles	\$152,999,000	\$0	\$0
80	Professional Services	\$796,311,000	\$1,026,608,168	\$1,185,742,929
90	Unallocated Contingency	\$555,554,000	\$544,441,174	\$308,942,010
Subtotal		\$4,050,000,000	\$4,758,000,000	\$4,451,000,000
Financing Cost		\$816,614,000	\$816,614,000	\$816,614,000
Total Project		\$4,866,614,000	\$5,574,614,000	\$5,267,614,000

Table 7 - Core Accountability Items

Project Status:		Original at FFGA	Current*	ELPEP**
Cost	Cost Estimate	\$4,050 million	\$4,451 million	\$4,980 million
Contingency	Unallocated Contingency	\$555.554 million	\$175 million	\$45 million
	Total Contingency (Allocated plus Unallocated)	\$555.554 million	\$175 million (September 2015)	\$45 million
Schedule	Revenue Service Date	June 30, 2014	December 30, 2016	February 28, 2018
Total Project Percent Complete	Based on Expenditures	81.9%		
	Based on Earned Value	N/A		
Major Issue		Status	Comments	
Construction Schedule Delay		Open	Achieving the current RSD of December 30, 2016, is the major risk issue on the project. Over recent periods, there has been a general inability to maintain planned construction schedule progress. Consistently delayed achievement of milestone dates and other schedule commitments may ultimately impact the project RSD.	
Date of Next Quarterly Meeting:		TBD		

* MTACC's Current Working Budget

** Enterprise Level Project Execution Plan (ELPEP), reflecting median level of risk mitigation

Schedule data based upon IPS Update #111; Data Date = 10/1/2015

Financial data based upon MTACC reporting through 10/31/2015