

PMOC MONTHLY REPORT

Second Avenue Subway Phase 1 (MTACC-SAS) Project

Metropolitan Transportation Authority

New York, New York

Report Period February 1 to February 29, 2016



PMOC Contract No. DTFT6014D00017

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

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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 February 29, 2016, 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 86% 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 February 29, 2016, 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.

- Sign off of the final volume of the “As-Built” drawings is in progress and is expected to be completed by the end of the 1st Quarter 2016.

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

- **Ancillary #1 (GL 8-9.5, Northeast corner 2nd Ave. and 93rd St.)**
 - Installation of the: removable hatch panel; stone cladding (2nd floor); fixed aluminum louvers; power and lighting conduits (mezzanine level); programmable logic controller; data communication cabinet ; disconnect switch; light fixtures (platform and upper levels); 12” steel gas pipe at 93rd St.; 12x12x19 ECS manhole at 93rd St.; piping to cooling towers at lower roof level; testing of dry fire standpipe; 4 axial fans for tunnel ventilation at platform level; and the tunnel and station smoke management supervisory system (upper platform) is ongoing.
- **Ancillary #2 (GL 28-29.5, Southwest corner 2nd Ave. and 97th St.)**
 - Installation of the: 4 axial fans for tunnel ventilation at the street level; tunnel and station smoke management system at 2nd floor; framing ahead of stone cladding; panel boards (street level); plumbing pipe (street level); plumbing pipe at invert/lower invert level; plumbing pip at 4th floor level; power and lighting conduit (platform, mezzanine, basement, street, 2nd floor, and 4th floor; data communication cabinet; light fixture including emergency lights (platform); and the light fixtures (mezzanine) is ongoing.
- **Entrance #1 (GL 13-14, Southwest Corner 2nd Ave. and 94th St.)**
 - Installation of the: plumbing pipe at the invert and lower invert levels; plumbing pip at the 4th floor level; granite base; HVAC duct; duct insulation; escalator work; architectural work; and mechanical services is ongoing.
- **Entrance #2 (GL 13-14, Northeast Corner 2nd Ave. and 94th St.)**
 - Ongoing work includes: architecture work; escalator work; overhead cooling grille frames; HVAC duct; conduits at the mezzanine and street levels; pulling of wire at street and mezzanine level; motor room escalator equipment (E07, E08, and E09); granite base at mezzanine level; canopy frame base; frame for porcelain ceramic wall tiles; fire suppression piping at the basement and mezzanine levels; and the granite base.
- **Entrance #3 (GL 21-23, West side 2nd Ave between 95th and 96th St.)**
 - Ongoing work includes: architecture work; escalator work (E10 and E11); overhead cooling grille; power to escalator machine room; domestic water heater; plumbing pipe at mezzanine level; and HVAC duct.
- **Station Area #1 work in progress (GL 1 to 8 - 92nd to 93rd St.)**
 - Ongoing work includes: pulling and termination of wires (mezzanine level); installation of power outlets and emergency lights (mezzanine level); testing and commissioning of electrical work; and the installation of the pump control manifold.

- **Station Area #2 work in progress (GL 8 to 18 - 93rd to 95th St.)**
 - Ongoing work includes: installation of the platform service; porcelain ceramic ceiling over track; frame for porcelain ceramic tile (mezzanine level); track wall panel frame and panels; conduit grid above platform; conduit grid mezzanine; duct and FCU in Room 2032; and domestic water heaters (platform and mezzanine levels).
- **Station Area #3 work in progress (GL 18 to 36 - 95 to 99th St.)**
 - Installation of the: frame for porcelain ceramic tile (mezzanine); platform elevator; stainless steel panel ceiling (mezzanine); acoustic ceiling (mezzanine); track wall panel frame; conduit grid above platform; pulling wires at the platform and mezzanine; the conduits and lighting fixtures is ongoing.
- **Permanent Power**
 - Two electrical feeders to the station have been energized.
- **Acceleration Schedule**
 - Fragnets for the electrical distribution system, HVAC, elevators, escalators, tunnel/station smoke management system, fire life safety systems, station finishes and testing and commissioning activities are being developed. Visibility in accomplishing the Milestones will be based on timely update of the fragnets.

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

- The focus of the work effort remains at Area 5, the progress at Entrance #1 and sitework.
- Work trains are being regularly scheduled on the inactive track for final trash removal.
- **Area 5 (Reconstruction includes mezzanines and the deck plaza roof)**
 - At the 6th Mezzanine, the ceiling panels and lighting are near complete.
 - In the Traction Elevators 1-4, artwork installation along the vertical shafts is complete.
 - At the 6th Mezzanine, the porcelain wall and beam tile cladding installation and stainless steel column cladding installation are nearing completion.
 - Arts-N-Design artwork installation is complete on the 6th Mezzanine and continues in Entrance #1.
 - Installation of granite pavers on the 6th Mezzanine is near completion.
- **Entrances (#1, #2, #3, and #4)**
 - At Entrance #1, the installation of the finish ceiling along the escalator incline is complete.
 - At Entrance #1, installation of storefront glazing and doors nears completion. Framing for the “signature” 2nd Ave. Subway Entrance Canopy is complete and the contractor is completing the street level wall finishes.
 - At the Entrance #2, elevator kiosk glazing nears completion and the framing for the “signature” SAS Entrance Canopy is installed.
 - At Entrances #3 and #4, porcelain tile and granite tile installation is complete. Stair nosings and handrail installations are complete.

- **Platforms**
 - The full height construction wall between the active and inactive platform will be removed for a “softer” demising barrier until full wall removal at the time of Revenue Service.
- **Site**
 - The Plaza renovation nears completion with granite pavers, granite planter facing, and public seating near complete. Site road and sidewalk paving is complete with the current placement of the final sections of perimeter sidewalk at Entrance #1.

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.
- The punch list items, including correcting the deficiencies to the architectural finish along the escalator incline at Entrance #2 are complete and the area has been turned back over to the C4C contractor
- Similar corrective work will also be required on the Entrance #1 incline finish.

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

- **Ancillary #2**
 - At the 3rd Floor setting anchors, shimming and bolting fan assemblies at Fans #2 - #4 is ongoing.
 - Electrical work is continuing in the Ancillary #2 basement & sub-basement FPRs.
 - Third Party testing continued in the Ancillary #1 & Ancillary #2 FPRs.
 - Installation of pipe risers from the street to the roof Cooling Towers & Dry Coolers continues at Ancillary #2.
 - The contractor is continuing with sub-basement and basement level FPR Third Party Testing.
- **Entrance #2**
 - At Entrance #2, Escalator #9 is in place. Installation of components for Escalators #10 & #11 continues.
- **Ancillary #1**
 - Cooling Tower and Dry Cooler delivery for the Ancillary #1 roof was completed.
 - At Ancillary #1, third party testing continues. Electrical work continues in the FPR Rooms at the sub-basement and basement levels.
 - Installation of conduit risers from the street EDR to the 4th Floor Fan Control Room continues.
- **Cavern Mezzanine (Public, North and South)**
 - Granite paver installation is approximately 90% complete in the Public Mezzanine.
 - In the Public Mezzanine installation of G2 & G3 grills in the W30 & W36 walls is complete and porcelain wall tile installation nears completion.

- In the North & South Mezzanines, electrical work continues in the Fan/Chiller Rooms and electrical wiring at the C1A ceilings continues.
- **Platform**
 - Installation of the platform granite wall tiles at the stairs is approximately 70% complete.
 - Installation of drive machines for the Platform to Mezzanine elevator (Elevator #1) nears completion.
 - Installation of conduit & lights in the platform service carriers continues.
- **Entrance #1**
 - At Entrance #1, the 6th final arch/wall incline placement will take place the week of February 28, 2016. Installation of the escalators is scheduled to begin May 1, 2016.
 - On the outside, Entrance #1 escalator component installation will resume March 2, 2016.
- **Entrance #3 (Elevator Bank)**
 - At Entrance #3, erection of the perimeter concrete walls above grade were completed. Structural steel framing for the roof is complete and the concrete roof placement began.
- **Schedule**
 - The target date for energizing the first permanent power feed has been further extended to April 30, 2016, from the previous February 29, 2016. All testing can be conducted with a single energized feed.

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

- Substantial Completion of all contract work was achieved on December 16, 2014.
- The architectural finish corrections at Entrance #2 and Entrance #1 escalator inclines has been completed and the areas turned back over to the C5C contractor.

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

- **Cavern (Public, North & South Mezzanines)**
 - The contractor continued the W30 wall erection.
 - The contractor continues with the W30 wall erection in the Public Mezzanine.
 - Installation of the transition ducts for the fans has begun.
 - Ductwork fabrication for the fan array was completed.
 - Third Party Testing continued in the FPRs (Facility Power Room).
 - The C6 contractor completed their portion of the Verizon Land Line. The land line is a ConEd requirement prior the feed energization.
 - Installation of the granite pavers in the Public Mezzanine is complete.
- **Entrance #1**
 - The long escalator truss alignment began.

- **Entrance #2**
 - The lower incline escalators installation continues.
 - The street level kiosk for the ADA Elevator has been installed.
- **Ancillary #1**
 - Erection of the roof parapet walls was completed.
 - The Cooling Towers were delivered.
- **Ancillary #2**
 - Waterproofing walls, and slab construction continued in Ancillary #2. The work has reached the Street Level. This is a low-rise structure.
- **Platform**
 - Installation of platform granite pavers is progressing. Granite tile installation at the platform on the escalators/stairways walls nears completion.
 - Police radio cabling continues to be installed at the platform.
- **Site**
 - Work on the 48” water main continues along 2nd Ave.
- **Buy America**
 - In October 2015, the PMOC observed that the contractor’s submittals indicate that the terra cotta exterior wall cladding system is being purchased from a German manufacturer. Despite repeated PMOC inquiries, there has been no response from either the contractor or the MTACC CCM. This continues to be an ongoing issue that is not being addressed.
- **Schedule**
 - Energization of permanent power (first of a total of 4 feeds) has been extended to approximately April 30, 2016, at the earliest. This extension is due to the previously reported slow progress of electrical work. This is the new timeline for a minimum of one energized feed. All testing in the station can be done off of one energized feed.

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

- **Electrical 63rd Street Communication and Signal Rooms:**
 - Comm. Rooms – FIAT network testing completed and FIST testing of the network is ongoing; and,
 - Signal Room – Wayside breakdown testing is in progress,
- **Electrical 63rd Street Circuit Breaker House:**
 - Installation of traction power cables nearing completion; and,
 - The upper level room has been built out as far as possible.
- **Electrical 63rd Street Mezzanine Local Antenna Cable (Area 5):**
 - Work is ongoing.

- **Electrical 96th Street Tunnel Work Zone 2 (87th Street. to 92nd Street):**
 - Contractor has completed all fiber, communication, power, and signal cable pulling.
- **Electrical 96th Street Tunnel Work Zone 1 (98th Street. to 104th Street):**
 - Contractor has completed all fiber, communication, power, and signal cable pulling.
- **Electrical 96th Street Communication, Traction Power Substation (TPSS), and Signal Rooms:**
 - Communication room equipment is installed and conduit installation ongoing;
 - TPSS room equipment is being built out; and,
 - Signal Rooms are being built out.
- **Electrical 72th Street Tunnel Work (Zone 3 (3rd Ave. to 68th Street)):**
 - Contractor has completed the pulling of all fiber, communication, power, and signal cable.
- **Electrical 72th Street Communication, TPSS and Signal Rooms:**
 - Partial turnover in three of five communication rooms has been accomplished. Equipment has been installed;
 - Signal room has been turned over and equipment installed; and,
 - Circuit Breaker House (CBH) has been turned over and equipment installed;
- **Electrical 86th Street Communication, TPSS and Signal Rooms:**
 - Three out five communication rooms turned over and are being built out;
 - TPSS is in the build out phase; and,
 - Central Instrument Room (CIR) is built out and pulling of the plug couplers is ongoing.
- **Civil north of 63rd Street Station (Zone 3 (3rd Ave. to 68th Street):**
 - 3rd rail and guard rail work remains on G3.
- **Civil 96th Street Tunnels (Zone 1 and Zone 2)**
 - Contact Rail and Concrete Pours on, Tracks S1 and S2 are complete.
- **Civil 96th Street Tunnel Work (Zones 5 (93rd Street to 98th Street) and Zone 6 (92nd Street to 94th Street):**
 - Track installation in Zone 5 and 6 (S1 and S2) is completed.
- **Testing and Commissioning**
 - Coordination meetings with the individual Station Contractors and System Integration Managers continued; and,
 - Systems Test Plans Volume 3, Rev. 18 was submitted to reflect status of the procedures and completed tests. The number of tests required has changed with the new matrix format. The total number of tests is now reported including situations where one procedure covers multiple tests.

- **Acceleration schedule**

- Test sequencing to achieve substantial completion to allow Revenue Service by the end of 2016 is being refined. The contractor has advised that they are working extended hours and has increased their manpower.

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

Status:

During February 2016, 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:

C2B: The C2B Contractor's Quality Manager has not met the dates he has committed to complete action items. Among the actions that keep slipping are:

- Preparation of a concrete statistical analysis is late;
- A Special Inspection Matrix has not been updated;
- Submittal of certifications from the Special Inspection Agency for completed work have not been received;
- Nonconformance reports that have been open for more than six months have not been closed; and,
- Submittal of Daily Inspection Reports is still two weeks behind.

The Contractor's Corporate Quality Manager attended the SAS C2B Quality Management Meeting on January 27, 2016, and although he has provided additional quality support to resolve the outstanding quality issues, no improvement has been noted.

C5C: There are many issues on this contract that affect Quality. These include:

- Submittals that have been returned for additional information have not been returned;
- Preparation of new submittals for approval has been delayed;
- The Quality Staff has been reduced from four to three;
- There is insufficient supervision for field activities;
- Performance of external Quality Audits is behind schedule;
- The electrical subcontractor's NCRs have not been processed for over three months;
- Preparation of concrete statistical analysis #2 is late;
- Record drawings at 50% completion have been delayed;
- Work is not ready for NYCT inspection;
- Check lists for many activities are not submitted on CMS;
- Work is progressing without Preparatory Phase Meetings being held; and,
- Submittal of Daily Inspection Reports is two weeks behind.

The same issues have been reported for several months and no improvement has been noted. The PMOC has recommended to MTACC Quality Management that the SAS C5C Contractor Executive Managers help resolve these issues.

Contract Package C2B	
Status:	Through February 29, 2016, a total of 148 NCRs have been issued. Ninety-one (91) have been closed and 57 NCRs are open. In February 2016, no new NCRs were written and one was closed. Forty-two (42) of the open NCRs are for concrete that was out-of-specification.
Observation:	Bi-weekly Quality Management Meetings, as suggested by the PMOC, are being held. Submittal of Daily Inspection Reports is still 2 weeks behind. The majority of the open NCRs were for concrete that was placed beyond the 90 minute time limit.
Concerns and Recommendations:	Thirteen (13) of the open 15 non-concrete NCRs have been open more than eight months. Based on the PMOC's suggestion, the contractor has established closure dates that now appear to be realistic. The contractor should make an effort to meet these dates. The contractor is still accumulating break data in order to complete the statistical analysis and close the concrete NCRs. The contractor's Quality Manager committed to have the analysis completed by February 5, 2016. As of the end of February 2016, the analysis has not been completed. The PMOC recommends that the analysis be completed immediately. The PMOC also recommends that effort be devoted to resolving the other issues listed in the beginning of this section.
Contract Package C3	
Status:	Through February 29, 2016, a total of 125 NCRs have been issued. One hundred eighteen (118) have been closed and 7 are still open. In February 2016, no new NCRs were written and none were closed.
Observation:	Submittal of Daily Inspection Reports is current.
Concerns and Recommendations:	The PMOC has no concerns.
Contract Package C4C	
Status:	Through February 29, 2016, a total of 218 NCRs have been issued. One hundred fifty-one (151) have been closed and 67 NCRs are still open. In February 2016, five NCRs were written and three were closed.
Observation:	One hundred eighty-four (184) of the 218 NCRs are for concrete that was out of specification. Three of the five NCRs generated in February were for concrete. Submittal of Daily Inspection Reports is current. The majority of the NCRs were for concrete that was placed beyond the 90 minute time limit.

Concerns and Recommendations:	Fifty-one (51) of the remaining 67 open NCRs are for concrete that was out of specification. The contractor has stated that ten of the open concrete NCRs will be closed in March 2016 based on reports from their test lab.
Contract Package C5C	
Status:	Through February 29, 2016, 172 NCRs have been issued. Seventy-three (73) have been closed and 99 NCRs are still open. In February 2016, 15 new NCRs were written but not issued and one was closed.
Observation:	Fifty-six (56) of the 99 NCRs that are open are for concrete that is out of specification. The majority of the open concrete NCRs were for concrete that was placed beyond the 90 minute time limit. The contractor has stated that a concrete analysis will be prepared and submitted in March 2016. Submittal of Daily Inspection Reports is three weeks behind.
Concerns and Recommendations:	The PMOC continues to recommend that the contractor establish a schedule for closing the 43 non-concrete NCRs and recommends that effort be devoted to resolving the issues listed in the beginning of this section.
Contract Package C6	
Status:	Through February 29, 2016, a total of 54 NCRs have been issued. Forty-one (41) NCRs have been closed and thirteen are still open. In February 2016, five new NCRs were written and none were closed.
Observation:	All thirteen of the open NCRs are for concrete that was placed beyond the 90 minute time limit. Submittal of Daily Inspection Reports is current.
Concerns and Recommendations:	The cause for the concrete NCRs that were placed beyond the 90 minute time limit was due to trucks that were delayed getting to the site due to heavy traffic. The PMOC recommends that the contractor perform a statistical concrete analysis in order to justify closing the open NCRs.

Concerns and Recommendations:

Discussed under each Contract Package.

2.0 SCHEDULE DATA

Status:

During February 2016, MTACC and four construction contractors reached “substantive agreement” on the acceleration of the remaining SAS construction that will allow NYCT to start pre-revenue testing on or about September 1, 2016. Financial elements and cost impacts are discussed in Section 3 of this report.

As of the writing of this report, MTACC continues to review and refine certain completion milestone dates. MTACC’s approach is to establish the Systems Contractor’s “need date” for

completion of a certain system or facility, and then work backwards to identify an accelerated work program for the affected station contractor.

One specific issue involves the contractor's "general understanding" that the accelerated completion of Level 5a testing Local Area Network (LAN) was not required to be completed until September 1, 2016. In fact, Level 5a must be completed by August 15, 2016, to allow a minimum of 2 weeks to complete Level 5b Wide Area Network (WAN) testing, at each station which is necessary to allow the start of RSD Operator Training on 9/1/16.

As reported by MTACC, other details of the schedule acceleration agreement(s) include:

- The acceleration agreements are agreed to be executed for all schedule delays claimed by the contractors up to the date of the agreement;
- The total price due for each of the agreements will be apportioned among the milestones and the contractors must complete the work for each milestone within 30 days of the date established for the milestone in order to receive the milestone payment;
- Should a contractor fail to achieve a certain schedule milestone, options exist wherein the contractor can still be paid that portion of the acceleration price, as long as MTACC schedule goals are ultimately achieved;
- Each agreement contains a "disincentive" value that is a portion of the milestone payment which the contractor will forfeit if it is responsible for failure to achieve the pre-revenue service testing date, start of training date, or achievement of the RSD;
- Some architectural and finish work may remain to be completed after 9/1/16. Remaining work is not expected to interfere with NYCT testing activities;
- Pre-revenue testing and training is currently targeted to start on 9/1/16; however NYCT has stated that it can delay this start until 10/1/16 and still achieve the RSD of 12/30/16. This may be considered schedule float, but at this time, MTACC is reluctant to report it as such;
- Some architectural and finish work may remain to be completed during the pre-revenue testing and training period. MTACC does not foresee significant platform or mezzanine level work remaining at this time and does not anticipate the need for flagging or protective measures to support this work. There may be a need for fire watch services in certain locations;
- Track S1 is expected to be complete throughout the project limits by 3/31/16. This will permit work trains (diesel) to deliver materials throughout the site. Temporary ventilation provisions have to be provided. All track is planned to be installed by 5/15/2016 with third rail installation completed by 5/23/2016;
- Communications-related issues are generally considered to be the "most-critical" going forward;
- Going forward, MTACC has requested a revision in schedule reporting procedure. The IPS will no longer be maintained. In its stead, a series of "Netpoint" schedule fragnets focusing on key project elements will be provided. Contract-level P6

schedules will continue to be updated and provided. MTACC’s expressed rationale for this change includes:

- It no longer uses the IPS for internal schedule management as the number of inter-contract relationships and dependencies have been greatly reduced to a manageable number of issues which are understood by all senior project staff.
- “Netpoint” fragnets have been successfully used in other similar circumstances as the primary schedule management tool. Superior graphic capabilities facilitate reporting to MTACC and other stakeholder executive level personnel.

Contingency reporting has been revised. Revised table separates MTACC third party construction and testing from NYCT pre-revenue activities, while maintaining the RSD and ELPEP metric.

	Dates	Contingency (CD)	
MTACC Construction, Testing Complete	9/1/2016		
NYCT Pre-Revenue Testing Start	10/1/2016	30	MTACC Embedded Contingency
MTACC RSD	12/30/2016		NYCT Schedule not included
ELPEP Threshold	7/3/2017	185	Additional Contingency
FTA RSD	2/28/2018	240	Minimum ELPEP Contingency
		455	TOTAL

Observations:

Contract schedules for C2B (96th St. Station Finishes), C4C (72nd St. Station Finishes), C5C (86th St. Station Finishes and C6 (Systems) contracts are expected to be received in early March 2016. MTACC has characterized these schedules as “95%+”, but do still represent “work-in-progress”.

C2B – 96th Street Station. Installation and/or testing activities for the following systems extend beyond the 9/1/16 completion milestone date established by MTACC:

- Track drainage supervisory system;
- Development of elevator test and acceptance procedures;
- Elevator testing and acceptance;
- Station Lighting;
- Curtain Wall glazing – Ancillary #2;
- Emergency Vent Fans;
- Aluminum Sunscreens – Ancillaries 1 and 2;
- Escalator Testing; and,
- Sitework.

Two of the four permanent power feeds to the 96th Street Station were energized during February 2016.

The PMOC notes that test and acceptance procedures for several systems are still forecast to be in development after the 9/1/16 completion milestone. Extending this work to such a late date in the project does not appear consistent with the intent of the schedule acceleration agreement.

C4C – 72nd Street Station Installation and/or testing activities for the following systems extend beyond the 9/1/16 completion milestone date established by MTACC:

- Escalator 6/7/8 testing;
- Sitework;
- Systems training for NYCT personnel;
- Entrance #1 architectural work. Based on the nature and volume of work remaining, it does not appear that Entrance 1 will be available for use until June 2017;
- Traction elevator testing;
- Ancillary #1 exterior architectural;
- Inspection and acceptance – escalator 12;
- HVAC level 5 and 6 testing;
- Track drainage acceptance and testing;
- Complete testing of escalator 1,3 and 5;
- Complete installation of escalators 12 and 13. As shown, this work does not complete until August 2017; and,
- Complete installation of escalators 6 and 7. As shown, this work does not complete until August 2017;

The PMOC review indicates several potential issues with this schedule:

- There appear to be duplicate paths for architectural and elevator work at Entrance #1. Several paths indicate this work will be complete in general accord with the acceleration agreement, while several other paths indicate this work will not complete until summer 2017;
- Approximately eighteen (18) independent zero-float paths with numerous additional paths with less than 10 WD of schedule float exists. This suggests a very aggressive schedule and numerous opportunities for delay due to the untimely actions of one or more parties; and,
- Several of the critical or near-critical paths are initiated by resolving an outstanding AWO with MTACC.

C5C – 86th Street Station. Installation and/or testing activities for the following systems extend beyond the 9/1/16 completion milestone date established by MTACC:

- Sitework;
- Tunnel ventilation testing;

- Exterior architectural work;
- Complete BMS testing; and,
- Escalator punch list and testing.

The PMOC review indicates several potential issues with this schedule:

- This schedule forecasts the vast majority of work to be complete by September 1, 2016 and therefore appears to be consistent with the acceleration agreement. Approximately 75% of all work activities have “negative schedule float”, suggesting the time required to complete the tasks may exceed the time available.
- This schedule forecasts a series of “initial inspections” of architectural construction throughout the station platform, mezzanine and ancillary spaces starting August 17, 2016 and continuing through December 21, 2016. The chaining of these inspections is arbitrary and appears to artificially extend the contract-level RSD forecast date.
- This contractor appears to have interpreted the acceleration agreement to mean that inspection and punchlist activities may extend beyond September 1, 2016. The nature of these activities may create punchlist work potentially interfering with NYCT pre-revenue testing at the platform and mezzanine levels.

C6 – Systems Installation and/or testing activities for the following systems extend beyond the 9/1/16 completion milestone date established by MTACC:

- Fire alarm testing; and,
- Installation and testing - police radio system.

The PMOC review indicates several potential issues with this schedule:

- This schedule appears to substantially comply with the acceleration agreement in that the planned completion of all virtually work is on or before September 1, 2016;
- Approximately 140 milestones have been added to the schedule, denoting the completion of work by other contractors on which C6 work is dependent; and,
- There are approximately 210 CD from the schedule data date of February 1, 2016, to the construction complete milestone of September 1, 2016. The fact that nearly 25% of the activities in this schedule have negative float values which exceed this value (negative float values extend to -735 WD) creates significant concern over the validity of this schedule.

Netpoint Summary Schedule: The PMOC received MTACC’s Netpoint Summary Schedule on March 9, 2016. In summary fashion, this schedule is intended to portray all remaining SAS, Phase 1 construction, testing, and acceptance activities. Schedule activities are color coded to help identify specific system installation and testing activities. Activities are also “banded” so that similar activities are grouped together.

Specific comments include:

- The schedule is based on the three new stations (72nd, 86th, and 96th Streets). Rail system activities generally within the limits of these stations, although performed by another contractor, are grouped with each station. 63rd Street Station is not included.

- Spot-checking of activity sequencing and duration against contract-level schedules previously provided by MTACC indicates this to be a reasonable summary of those schedules.
- This schedule is limited to construction and testing activities. Development and approval of test procedures is not included.
- Several intra-contract relationships are indicated. However the relationship type is not indicated, making it difficult to understand the precedence required.
- For each system, start and finish dates for the multi-tiered testing program (levels 2 through 6) are clearly indicated.
- Relating the “start testing” dates in the Netpoint Schedule with the test procedure development summary yields the following:

		Level 3/4 (FIAT)			Begin Test	Level 5 (FIST)			Begin Test	Level 6 (FSIT/SIT)			Begin Test
		Req'd	Sub	App		Req'd	Sub	App		Req'd	Sub	App	
72nd St.	Test Docs-(2/16)	44	33	26	5/15/16	24	15	8	8/15/15	23	10	5	12/1/16
	Test Docs-(12/15)	48	34	29		15	7	2		17	4	2	
	Period Progress	-4	-1	-3		9	8	6		6	6	3	
	% Comp			59%				33%				22%	
86th St.	Test Docs-(2/16)	44	32	18	5/1/16	22	11	5	6/1/16	24	10	5	12/1/16
	Test Docs-(12/15)	49	34	18		13	3	0		13	2	1	
	Period Progress	-5	-2	0		9	8	5		11	8	4	
	% Comp			41%				23%				21%	
96th St.	Test Docs-(2/16)	46	31	24	4/9/16	27	13	5	4/25/16	26	11	4	12/1/16
	Test Docs-(12/15)	46	31	24		17	6	0		18	3	1	
	Period Progress	0	0	0		10	7	5		8	8	3	
	% Comp			52%				19%				15%	

This table suggests significant risk for the uninterrupted Level 3/4 and Level 5 testing at the 96th Street Station by the C6 contractor.

- In general, the Netpoint Schedule appears to be a useful tool to facilitate monitoring and coordination of activities. Its graphic presentation and “filtering” of extraneous contract history are strengths.

Milestone Summary: Milestones for each active contract are tabulated in Table 2 (included in Appendix B). There are 31 new milestones, generally denoting the completion or turnover of a system for testing. Several of the previous milestones were stasured as complete. Interestingly, the acceleration schedules had the effect of deferring the existing milestones that remain to later dates.

As before, the PMOC will monitor actual performance against these milestone dates and report variances and discrepancies

“Earned Value” Analysis:

In its periodic reports to the FTA, 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 the variance in planned vs actual schedule performance. January 2016 is the latest month for which this information is available.

Value Earned		January-16				Const. Comp Date	Est. Const. Complete Date
Contract \$ (x100K)	Plan \$ Earned	Actual \$ Earned	Plan Month for Actual \$ Earned	Months Ahead (+) or Behind (-)			
C2B	\$324	\$324	\$280	Mar-15	-9.1	9/1/16	6/2/17
C3	\$176	\$176	\$169	Jul-13	-29.4	9/1/16	2/1/19
C4C	\$258	\$255	\$198	Feb-15	-10.6	9/1/16	7/16/17
C5C	\$208	\$196	\$157	Jun-15	-6.1	9/1/16	3/3/17
C6	\$261	\$247	\$192	Apr-15	-8.2	9/1/16	5/5/17
TOTAL	\$1,227	\$1,204	\$996	Mar-15	-9.2	9/1/16	6/5/17

$$\begin{aligned} \text{Cost Variance} &= \text{Plan \$ Earned} - \text{Actual \$ Earned} \\ &= \$1,204\text{M} - \$996\text{M} = \$208\text{M} \end{aligned}$$

This summary level analysis suggests the following:

1. Had the work progressed according to baseline “plans”, an additional \$208M worth of original contract work would have been performed as of January 31, 2016.
2. MTACC’s acceleration plan requires that \$231M of baseline construction be completed over the next 8 months. This does not include change order work or the value of the acceleration agreements.
3. Currently, only the C4C and C5C contracts appear to be progressing at a rate that can achieve this goal.

4. Based on current schedule assumptions, NYCT will require a minimum 3 months for pre-revenue testing after all construction is complete. This results in a forecast RSD of September 5, 2017, absent significant schedule improvement.
5. During February 2016, MTACC's acceleration program was still a "work-in-progress"; this analysis suggests inadequate schedule improvement during that time to support MTACC's acceleration goals.

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) <= 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 has implemented a schedule acceleration plan wherein approximately 23 CD were recovered at a cost of approximately \$66M.

Concerns and Recommendations:

In its review of contractor acceleration schedules, the PMOC has identified the following major concerns:

- The acceleration schedules essentially "rebaseline" the project, with a "construction substantially complete" milestone of September 1, 2016, and a "final construction completion" milestone of December 30, 2016.

MTACC has stated the acceleration agreements represent settlement for all delays that have occurred up to the date of the agreement.

To reasonably demonstrate that work can be completed within the defined time period(s), a CPM schedule should not contain significant "negative float". The large

number of activities with “negative float” in each of these schedules creates significant concern whether the work can actually be completed within the planned time period.

- Each of these acceleration schedules contains significant performance challenges for all parties involved. All parties, including MTACC and NYCT, must perform their assigned responsibilities in a timely and diligent manner.
- There is no time built into these schedules for retesting or rejection of performance testing. MTACC and NYCT must critically review all acceptance data and verify that any rejection or rework is firmly based on existing construction contract requirements.
- The duplication of activities within the C4C acceleration schedule is discussed in the previous section of this report. MTACC immediately acknowledged this discrepancy and noted it was a by-product of the contract amendment negotiation process. The PMOC notes that numerous adjustments to these schedules may be necessary due to the expedited manner in which they have been developed and negotiated.
- Discrepancies in the understanding of the project scope, such as those involving time required for Level 5a and 5b testing are a serious problem. At this late date, any misunderstanding of fundamental scope components such as this reflects poorly on the project team. Recurrence of this type of problem must be avoided.

3.0 COST DATA

Based upon financial expenditures reported by the MTACC through February 29, 2016, SAS Phase 1 is approximately 86% complete. The completion status of the individual construction contracts through February 29, 2016, 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) – 89.4%;
- C26013 (86th Street Station) – 100%;
- C26008 (86th Street Station) – 99.6%;
- C26012 (86th Street Station) – 77.8%;
- C26006 (63rd Street Station) – 96.5%;
- C26007 (72nd Street Station) – 99.9%;
- C26011 (72nd Street Station) – 78.9% ; and,
- C26009 (Systems) – 73.9%.

Aggregate Construction percentage complete:

- 100% of all construction has been bid;
- 100% of all construction is under contract;
- 91.2% of base contract construction (excluding AWOs) is complete; and,
- 91.9% of all construction is complete.

Based upon cost data received from the MTACC for the period through February 29, 2016:

- Value of construction reported in place this period = \$27,127,016;
- Estimated value of construction remaining = \$234,618,289 (base contract only);
- Target construction completion = September 1, 2016;
- Number of months remaining = 6; and,
- Avg. required construction expenditure to achieve target date = \$38,346,215/MO.

Soft Cost expenditures (not including real estate, OCIP, etc.) reported this period by the MTACC totaled \$7.8M; 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. MTA Staff cost associated with the acceleration have not been included in this analysis. Based upon the current rate of expenditures and the project schedule, the PMOC believes that the project budgets should be able to absorb these costs.

Cost Growth: The value of AWOs reported by the MTACC/NYCT in February 2016 is summarized as follows:

	<u>Executed AWOs</u>	<u>AWO Exposure</u>
Feb-16	\$221,965,673	\$333,988,472
Jan-16	\$218,359,805	\$299,046,313
Δ	\$3,605,868	\$34,942,159
Δ	1.65%	11.68%

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

Const. Pkg.	AWO Exposure			Changes this Period
	Feb-16	Jan-16	Period Δ	
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	\$ 58,522,301	\$62,097,907	-\$3,575,606	Net decrease is based on revised estimates for AWO #s 146, 204, 207, and 208 and initial estimates for AWO # 145, 214, and 216.
C3	\$38,605,684	\$40,580,699	-\$1,975,015	Net decrease is based on revised estimates for AWO #s 249, 262, 263, 265, 267, and 270 and initial estimates for AWO #s 227, 235, 251, 259, 261, 264, 266, 268, 269, and 273 through 281.
C4B	\$1,325,639	\$1,325,639	\$0	No change reported this period.
C4C	\$ 55,442,739	\$37,951,156	\$17,491,583	Net increase is based on revised estimates for AWO #s 18, 173, 195, and 196 and initial estimates for AWO #s 204, and 207.
C5B	\$26,297,858	\$26,353,474	-\$55,616	Net increase is based on revised estimates for AWO #s 81, and 124 and initial estimates for AWO #s 51, 88, and 109.
C5C	\$29,373,089	\$10,063,850	\$19,309,239	Net increase is based on revised estimates for AWO #s 20, 28, 79, 85, 110, and 123, and initial estimates for AWO #s 124, 127, 133, 147, 148, 149, 154, and 158.
C6	\$29,193,635	\$25,446,061	\$3,747,574	Net increase is based on revised estimates for AWO #s 52, 97, 144, 149, 153, 154, 155, and 164 and initial estimates for AWO #s 117, 165, 171, and 183.
	\$333,988,472	\$299,046,313	\$34,942,159	

The changes in Executed AWO Value are summarized as follows:

Const. Pkg.	Executed AWOs			
	Feb-16	Jan-16	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	\$34,553,483	\$32,636,842	\$1,916,641	Increase is based on execution of AWO #s 36, 88, 149, 166, 174, 177, and 193.
C3	\$26,032,088	\$25,403,348	\$628,740	Increase is based on execution of AWO #s 211, 230, 239, 243, 251, 257, 259, and 263.
C4B	\$1,325,639	\$1,325,639	\$0	No change reported this period.
C4C	\$ 30,078,999	\$29,141,539	\$937,460	Increase is based on execution of AWO #s 143, 171, 186, 188, 191, 196, 200, 201, 203, and 209.
C5B	\$20,906,813	\$20,906,813	\$0	No change reported this period.
C5C	\$5,397,939	\$5,397,939	\$0	No change reported this period.
C6	\$8,443,185	\$8,320,158	\$123,027	Increase is based on execution of AWO #s 52, 97, 144, 149, 153, and 164.
	\$221,965,673	\$218,359,805	\$3,605,868	

As of February 29, 2016, 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)	85.04%	\$324,600,000	\$58,522,301	18.03%	\$34,553,483	10.64%
C26006 (3)	94.71%	\$176,450,000	\$38,605,684	21.88%	\$26,032,088	14.75%
C26007 (4B)	99.93%	\$447,180,260	\$1,325,639	0.30%	\$1,325,639	0.30%
C26011 (4C)	73.36%	\$258,353,000	\$55,442,739	21.46%	\$30,078,999	11.64%
C26013 (5A)	100.00%	\$34,070,039	\$6,525,471	19.15%	\$6,525,471	19.15%
C26008 (5B)	99.63%	\$301,860,000	\$26,297,858	8.71%	\$20,906,813	6.93%
C26012 (5C)	64.84%	\$208,376,000	\$29,373,089	14.10%	\$5,397,939	2.59%
C26009(6)	69.51%	\$261,900,000	\$29,193,635	11.15%	\$8,443,185	3.22%
TOTAL TO DATE		\$2,674,814,299	\$333,988,472	12.49%	\$221,965,673	8.30%

To date, \$2,440,196,010 (91.2%) worth of all base contract construction work has been completed. As a percentage of work completed, the AWO exposure for these contracts is 13.7% and the executed AWO percentage is 9.1%.

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 \$300 million. MTACC maintains an AWO forecast at completion that includes input from its Risk Registers. The MTACC AWO EAC Forecast through January, 2016, is \$351,275,659. 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 February 29, 2016, 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	\$1,167,070,145	\$1,167,070,145
Soft Cost Forecast to Complete	\$209,584,620	\$209,584,620
AWO Exposure	\$299,046,313	\$351,275,659
Total Contingency	\$100,484,623	\$48,255,277
Reserved Contingency	\$100,484,623	\$48,255,277

Notes:

- (1) AWO Exposure @ Completion incorporates MTACC “risk-informed” forecast through February 2016
- (2) Total Contingency = Reserved Contingency = total budget balance after forecast expenditures;
- (3) Minimum Available Contingency required by ELPEP is approximately \$45,000,000 (100% Construction Bid, 85% Construction Complete).

Conclusions based upon this analysis include:

- Schedule acceleration costs attributable to construction contracts are included in this summary. Although MTACC soft costs are not included, the PMOC concludes that the project should 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.
- Available contingency conforms to ELPEP limits.

ELPEP/CMP Compliance: The SAS Project Team maintains an EAC for all construction costs, which is 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 overall 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

The major risk challenging the SAS Project Team at this time is schedule; senior MTA management has advised that the project must be complete and Revenue Service initiated by December 30, 2016. Secondary risk involves the possibility that additional schedule acceleration (or delay mitigation) costs could threaten the completion of the project within MTACC’s Current Working Budget of \$4.451B.

At this stage of the Project, these risks are well understood by senior SAS managers and their mitigation is the focus of almost all project management activity. As such, regular monthly risk management meetings and reports are somewhat redundant and are not currently scheduled.

Observation and Analysis:

The goal of MTACC’s “schedule acceleration initiative” is to complete all third-party construction, testing, and acceptance activities by September 1, 2016. This will create additional time for NYCT operational testing and final “debugging” necessary for Revenue Service to start on December 30, 2016. The acceleration of the construction schedule is a mitigation strategy directed at delays forecast by the project schedule and other project management tools.

Risks can be classified as either management and organizational risk or technical and coordination risk. Major risks within each of these categories are summarized as follows:

Management and Organizational Risks	
Risk	Status
1. MTACC’s ability to implement its schedule acceleration program through compression of construction schedules.	MTACC has achieved “substantial agreement” with contractors regarding schedule acceleration. Some details remain to be clarified. MTACC appears to have avoided this risk.
2. Design and scope changes requested by NYCT during the late stages of construction.	NYCT has agreed that changes not related to safe operation of the railroad and station facilities will be deferred until after the start of Revenue Service. This is an ongoing concern.
3. Availability of NYCT staff to support testing, commissioning and final acceptance of work performed by SAS contractors	Additional NYCT staff to support testing and acceptance of the work have been and will be made available to support project needs.
4. Availability of NYCT staff to conduct code compliance and final inspection of constructed facilities.	A consultant has been procured and will provide supplemental staff to support NYCT code compliance inspection activities.
5. MTACC’s ability to manage the change order process in a timely manner to avoid contractor delay.	Additional personnel have been assigned to each active contract to expedite and support the management of technical risk and any associated contract modifications. Unresolved AWOs control the start of several “near-critical” schedule paths. This issue remains a serious concern.

Technical and Coordination Risks		
Risk		Status
1.	Critical communication systems: fire alarm system and police radio installation, testing, commissioning and acceptance.	Acceleration schedules currently indicate these systems will be installed in time to support the December 30, 2016 RSD.
2.	Permanent facility power – all stations	Work is complete at 96 th Street Station. Delays have occurred at both 72 nd and 86 th Street Stations.
3.	Traction Power – all stations	63rd Street: Acceleration initiated. 72nd Street: Acceleration initiated. 86th Street: Acceleration initiated. 96th Street: Acceleration initiated
4.	Installation, testing, commissioning and acceptance of elevators and escalators.	Completion of this work is among the last tasks to complete at each station. Contractor capability and resource availability are concerns.
5.	Watermist system.	Acceleration schedules currently indicate these systems will be installed in time to support the December 30, 2016 RSD.

In addition to these risks, the PMOC considers the overall capability and readiness of the SAS Project Team (MTACC and its consultants and contractors) to implement an aggressive schedule acceleration initiative to be a significant risk.

As the number of field installation activities decreases, the next major “phase” of work involves system testing and commissioning. The following table summarizes the SAS Project Team’s progress during January and February 2016 in developing test procedures and acceptance criteria necessary for the performance of the actual equipment testing and acceptance.

		Level 2 (FAT)			Level 3/4 (FIAT)			Level 5 (FIST)			Level 6 (FSIT/SIT)		
		Req'd	Sub	App	Req'd	Sub	App	Req'd	Sub	App	Req'd	Sub	App
63rd Street	Test Docs-(2/16)	12	12	11	34	29	23	16	7	3	17	7	4
	Test Docs-(12/15)	12	12	11	32	28	23	9	6	4	12	4	3
	Period Progress	0	0	0	2	1	0	7	1	-1	5	3	1
	% Complete			92%			68%			19%			24%
72nd Street	Test Docs-(2/16)	20	19	18	44	33	26	24	15	8	23	10	5
	Test Docs-(12/15)	22	22	21	48	34	29	15	7	2	17	4	2
	Period Progress	-2	-3	-3	-4	-1	-3	9	8	6	6	6	3
	% Complete			90%			59%			33%			22%

		Level 2 (FAT)			Level 3/4 (FIAT)			Level 5 (FIST)			Level 6 (FSIT/SIT)		
		Req'd	Sub	App	Req'd	Sub	App	Req'd	Sub	App	Req'd	Sub	App
86th Street	Test Docs-(2/16)	20	19	19	44	32	18	22	11	5	24	10	5
	Test Docs-(12/15)	22	22	21	49	34	18	13	3	0	13	2	1
	Period Progress	-2	-3	-2	-5	-2	0	9	8	5	11	8	4
	% Complete			95%			41%			23%			21%
96th Street	Test Docs-(2/16)	21	21	20	46	31	24	27	13	5	26	11	4
	Test Docs-(12/15)	21	20	20	46	31	24	17	6	0	18	3	1
	Period Progress	0	1	0	0	0	0	10	7	5	8	8	3
	% Complete			95%			52%			19%			15%

This tabulation raises the following concerns:

- The level of completion of procedure development for each level is reasonably consistent across the contracts.
- Progress over the two month period represented by this table was limited.
- In several instances, the required number of procedures has changed. This is a concern suggesting that the scope of the testing requirements is not completely understood.
- Completion and approval of all test procedures is not a criterion restraining the start of testing at any level. However a large number of incomplete or unapproved test procedures increases the risk of delay significantly.

Conclusions

Significant risks remain for both the successful execution of MTACC's accelerated construction schedule as well as overall achievement of Revenue Service on December 30, 2016. Significant improvements in both construction progress and preparation for systems testing and acceptance must be achieved over the next several months in order for these efforts to be successful.

MTACC has effectively managed numerous cost/schedule risks over the construction phase of SAS. In many instances, MTACC has chosen to proactively manage the project schedule through directed acceleration at costs equal or less than costs that would be incurred by passive acceptance of commensurate delay costs. In these instances, the risk management process has been instrumental in identifying potential cost/schedule risks to the project and developing mitigation strategies. The PMOC anticipates use of this process will be an important component of MTACC's overall schedule acceleration initiative.

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 March 3, 2016. 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 SAS 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 and the PMOC have held meetings 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,

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 give 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 January 31, 2015, a total of 12,351,579 construction hours have been logged on the project with 100 lost time and 174 recordable incidents documented. The total hours and incidents equates to a Lost Time Rate (LTR) of 1.64 and a Recordable Rate (REC) of 4.44. 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.

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 entered into the database. Status meetings are held quarterly with the FTA and the PMOC in order to provide updates. Status meetings are held monthly with the PMOC in attendance and the FTA is briefed quarterly.

7.0 ISSUES AND RECOMMENDATIONS

Schedule Acceleration Initiative: MTACC's schedule acceleration initiative results in the establishment of September 1, 2016, as a new intermediate milestone at which time all construction installation and testing activities are to be completed and NYCT Pre-Revenue Testing is scheduled to commence. With respect to this initiative, the PMOC has the following concerns:

- From a technical perspective, the acceleration schedules developed by the stations and systems contractors do not demonstrate that the remaining work can be completed within the remaining time period. The presence of significant “negative schedule float”, some of which exceeds the remaining project duration by a factor of 6, raises considerable concern over the validity of these schedules. The PMOC also recognizes that the contractors have a considerable investment in the development of these schedules, which they are used to develop payment requisitions and in some cases may be needed for subsequent contract delay negotiations. The PMOC concurs with MTACC's approach of combining additional tracking and analytical methods to manage the project to its conclusion. The PMOC will also follow this approach.
- Failure for all parties to understand the scope and sequence of testing operations at this stage of the project is cause for significant concern. Refer to Section 2 of this report for details.
- NYCT's acceptance of all work required for operation and completion of pre-revenue activities within the time period available (assuming completion of third-party construction and testing by September 1, 2016). This risk is generally considered to be beyond the control of the SAS project team.
- Coordination of an accelerated construction schedule where limited access and significant interferences exist. MTACC has emphasized direct communication between contractor and MTACC executive managers as a method to resolve “big picture” problems. The PMOC notes that this communication has not always been adequate to eliminate contractor's posturing and foster the prompt resolution of problems.
- Safety and quality personnel to support acceleration. Contractors will be increasing the number of trade personnel they have working the project. There is no indication that the contractors will be adding additional safety and quality personnel to cover the extended work hours or additional shift. Safety and quality cannot be compromised to achieve schedule acceleration.

APPENDIX A – ACRONYMS

ARRA	American Recovery and Reinvestment Act
AWO	Additional Work Orders
BLS	Bureau of Labor Statistics
CBH	Circuit Breaker House
CCM	Consultant Construction Manager
CD	Calendar Days
CIL	Certifiable 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
LAN	Local Area Network
LTR	Lost Time Rate
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
REC	Recordable Rate
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
TWG	Technical Working Group
WAN	Wide Area Network (WAN)
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	September 1, 2016	October 2017
Revenue Service	February 28, 2018	December 30, 2016	February 2018

A = Actual

Table 2 – Schedule Milestone Comparison

Pkg	MS	Description	Dates	
			UD#113	Accel (2/1/16)
C2B	7A	Full access to Signals Rooms	02/26/16	4/20/2016
C2B	7B	Full access to Signals Rooms	02/26/16	4/20/2016
C2B	7C	Full access to Signals Rooms	02/26/16	4/20/2016
C2B	9	Full access to Station Service Centers	12/21/15	4/5/2016
C2B	10	Complete all remaining Comms, Signal , & Traction Power work	01/15/16	2/11/2016
C2B	NS00100	LAN Available	New	2/1/2016
C2B	NS00200	WAN Available	New	2/1/2016
C2B	SS	Substantial Completion	10/14/16	10/27/2016
C4C	SCT1000	Access to LAN	New	4/30/2016
C4C	SCT1020	Access to WAN	New	4/30/2016
C4C	STC14730	Comms./Turn Over UPS / Battery	New	8/3/2016
C4C	STC13280	Comms./Turn Over Water Mist	New	10/31/2016
C4C	STC16630	Comms./Turn Over Escalators 9/10/11	New	9/23/2016
C4C	STC15310	Comms./Turn Over SCADA/PLC	New	11/1/2016
C4C	STC16750	Comms./Turn Over Escalator 12	New	9/20/2016
C4C	STC11540	Comms./Turn Over Escalators 1/3/5	New	8/9/2016
C4C	STC16510	Comms./Turn Over Escalators 6/7/8	New	10/26/2016
C4C	STC11800	Comms./Turn Over HVAC (Dry)	New	8/17/2016
C4C	STC16990	Comms./Turn Over HVAC (Water)	New	10/6/2016
C4C	STC11250	Comms./Turn Over Hyd. Elevators	New	10/31/2016
C4C	STC14150	Comms./Turn Over Track Drainage	New	9/6/2016

Pkg	MS	Description	Dates	
			UD#113	Accel (2/1/16)
C4C	STC16350	Comms./Turn Over Traction Elevator	New	10/31/2016
C4C	STC12120	Comms./Turn Over TSSM (N & S)	New	10/6/2016
C4C	15	Complete Permanent Power Work / Energize	New	04/30/16
C4C	16	Complete HVAC / MEP / Start Level 3 Testing	New	07/01/16
C4C	17	Complete Tunnel Ventilation / Start Level 3 Testing	New	07/01/16
C4C	18	Complete Fire / Life Safety / Start Level 3 Testing	New	07/01/16
C4C	19	Complete All Activities for Pre-Revenue Training	New	09/01/16
C4C	20	Complete All Remaining Escalators / Elevators to support Level 5 & 6 Testing	New	11/01/16
C4C	FC	<i>Final Completion</i>	09/30/16	12/30/2017
C4C	SC	<i>Substantial Completion - Ent. #1</i>	09/06/16	11/17/2016
C5C	11	Full access @ Station Service Center(s)	02/19/16	2/14/2016
C5C	15	Comp. Permanent Power	03/31/16	4/28/2016
C5C	16	Elec & Mech. Installations	New	05/31/16
C5C	17	Axial Fan Installations	New	05/25/16
C5C	18	Fire & Life Safety Systems	New	05/26/16
C5C	19	Elevators / Escalators	New	09/01/16
C5C	20	Substantial comp.	New	11/30/16
C5C	C5CTC16875	Comms./Turn Over Track Drainage	New	8/11/2016
C5C	C5CTC16960	Comms./Turn Over BMS System	New	8/30/2016
C5C	C5CTC16775	Comms./Turn Over Dry Fire Standpipe	New	5/23/2016
C6	2A	Complete LAN - 96th St. Station	03/09/16	5/2/2016
C6	2B	Complete WAN - 96th St. Station	03/09/16	5/2/2016
C6	3A	Complete LAN - 86th St. Station	03/18/16	5/31/2016
C6	3B	Complete WAN - 86th St. Station	03/18/16	5/31/2016
C6	4A	Complete LAN - 72nd St. Station	03/14/16	5/22/2016
C6	4B	Complete WAN - 72nd St. Station	03/14/16	5/22/2016
C6	5A	Complete LAN - 63rd St. Station	01/15/16	2/22/2016
C6	5B	Complete WAN - 63rd St. Station	01/15/16	3/1/2016
C6	5C	Complete all 63rd St. Station work	04/22/16	8/2/2016
C6	SS	Substantial Completion	11/03/16	11/21/2016

Table 3 - Project Budget/Cost 

	FFGA			FFGA Amend	MTA Current Working Budget (CWB)		Expenditures as of February 29, 2016	
	\$ 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	3,816.573	72.45
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	3,816.573	72.45
Total Federal	1,350.693	27.75	1,063.942	1,373.893*	1,350.693	24.60	1,163.806	22.10
Total FTA share	1,300.000	96.25	990.049	1,3000.000	1,300.000	23.68	1,163.806	22.10
5309 New Starts share	1,300.000	100	990.049	1,3000.000	1,300.000	23.68	1,089.913	20.70
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	2,652.771	50.35
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 4 - Estimate at Completion

Category	Current Working Budget	EAC Forecast
Total Construction	\$2,674,814,299	\$3,026,089,958.00
Engineering Services Subtotal	\$622,862,000	\$681,088,115.00
Third Party Expenses	\$554,086,273	\$562,086,000.00
TA Expenses	\$131,160,085	\$133,480,650.00
Contingency	\$468,077,343	
Total	\$4,451,000,000	\$4,402,744,723

Table 5 - 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 (December, 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 6 - 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	\$100 million	\$45 million
	Total Contingency (Allocated plus Unallocated)	\$555.554 million	\$100 million (February 2016)	\$45 million
Schedule	Revenue Service Date	June 30, 2014	December 30, 2016	February 28, 2018
Total Project Percent Complete	Based on Expenditures	86%		
	Based on Earned Value	N/A		
Major Issue		Status	Comments	
Construction Schedule Acceleration		Open	MTACC's decision to accelerate the construction schedule to allow NYCT pre-Revenue Testing to commence on 09/01/16 results in concerns over additional cost and the ultimate ability to achieve this goal.	
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 #113; Data Date = 1/31/2016

Financial data based upon MTACC reporting through 2/29/2016