

PMOC MONTHLY REPORT

Second Avenue Subway Phase 1 (MTACC-SAS) Project

Metropolitan Transportation Authority

New York, New York

Report Period January 1 to January 31, 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 January 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 85% 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 January 31, 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

- **Entrance #1 work in progress (GL 13-14, Southwest Corner 2nd Ave. and 94th St.)**
 - Plumbing system (completed);
 - Electric domestic water heater (completed); and,
 - Escalator work (pending approval of coordination drawings).
- **Entrance #2 work in progress (GL 13-14, Northeast Corner 2nd Ave. and 94th St.)**
 - Granite base installation at mezzanine level;
 - Framing for porcelain ceramic wall tiles;
 - Installation of conduit at street level (completed);
 - Conduit at mezzanine level;
 - Motor room escalator equipment (pending approval of coordination drawings); and,
 - Fire suppression piping (basement/mezzanine – pending approval of coordination drawings).
- **Entrance #3 work in progress (GL 21-23, WS 2nd Ave between 95th and 96th St.)**
 - Handrails (escalator).
- **Ancillary #1 work in progress (GL 8-9.5, Northeast corner 2nd Ave. and 93rd St.)**
 - 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 platform levels);
 - Testing of DFSP piping;
 - 4 axial fans for tunnel ventilation at platform level;
 - Field Installation Acceptance Test (fan coils – completed); and,
 - Tunnel and station smoke management supervisory system (upper platform).
- **Ancillary #2 work in progress (GL 28-29.5, Southwest corner 2nd Ave. and 97th St.)**
 - Framing ahead of stone cladding (street level);
 - Panel boards (street level);
 - Piping to cooling towers (4th floor level – completed);
 - Variable frequency drives (2nd floor level – completed); and,
 - Plumbing pipe (street level).
- **Station Area #1 work in progress (GL 1 to 8 -92nd to 93rd St.)**
 - Pulling and termination of wires (mezzanine level);
 - Power outlets and emergency lights (mezzanine level);
 - Test and commission electrical work; and,

- Pump control manifold (on hold calculation and drawings being prepared).
- **Station Area #2 work in progress (GL 8 to 18 -93rd to 95th St.)**
 - Platform service carrier (on hold pending delivery of light fixtures);
 - Porcelain ceramic ceiling over track ;
 - Porcelain over platform (completed);
 - Framing for porcelain ceramic tile (mezzanine level);
 - Track wall panel frame and panels;
 - Stainless steel clad panel system at mezzanine (completed);
 - Conduit grid above platform;
 - Conduit grid at mezzanine level;
 - Duct and fan coil unit 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.)**
 - Granite base (mezzanine –completed);
 - Frame for porcelain ceramic tile (mezzanine);
 - Platform elevator;
 - Stainless steel panel ceiling (platform –completed);
 - Stainless steel panel ceiling (mezzanine) ;
 - Gratings and supports;
 - Acoustic ceiling (mezzanine);
 - Track wall panel frame;
 - Conduit grid above platform;
 - Pull platform wire ;
 - Mezzanine conduits and lighting fixtures ; and,
 - Pull mezzanine wire.
- **Acceleration Schedule**
 - Preparation of the contractor’s acceleration schedule is ongoing and forecasted to be incorporated into the project’s Integrated Project Schedule by February 2016. Construction and 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. See Section 7 of this report for PMOC’s concerns.

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

- The focus of the work effort remains at Area 5 and the progress at Entrance #1.
- Work trains are being regularly scheduled on the inactive track for final trash removal.
- **Area 5 (Reconstruction includes mezzanines and the deck plaza roof)**
 - Pre- inspections of completed rooms are nearing completion. A meeting was held on Friday, January 22, 2016, to review and finalize all inspection punch lists;

- At the 6th Mezzanine, the ceiling panels have been delivered and installation of the framing has begun;
 - In the Traction Elevators 1- 4, shaft preparations are underway to begin installation of the shaft artwork;
 - At the 6th Mezzanine, the porcelain wall and beam tile cladding installation is nearing completion;
 - Arts-N-Design artwork is well underway on the 6th Mezzanine and began in Entrance #1; and,
 - The turnstiles for fare collection installation by NYCT continued on the 6th Mezzanine.
- **Entrances (#1, #2, #3, and #4)**
 - At Entrance #1, continuing with installing the finish ceiling along the escalator incline;
 - At Entrance #1, preparations are underway for installation of artwork;
 - At the Entrance #2, elevator testing of the hydraulic oil pressure and the moving platform is being done today (January 19, 2016); and,
 - At Entrances #3 and #4, the remaining work consists of mounting handrails and installation of stair treads.
- **Platforms**
 - The “Areas of Refuge” are complete in the Elevator Lobbies at the G3 and G4 levels; and,
 - The C6 contractor is installing back boxes for speakers, cameras, etc. in the ceilings of the Elevator Lobbies.
- **Site**
 - At the Plaza, installation of the granite pavers is being scheduled, weather permitting; and,
 - Street paving along E 63rd Street. & 3rd Ave. is complete.

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 is complete and the area has been turned back over to the C4C contractor
- It remains to be seen if similar corrective work will also be required on the Entrance #1 incline finish. This concrete is currently nearing completion.

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

- **Ancillary #2**
 - The installation of the channel supports for the architectural terra cotta building stone continued;

- The contractor reports that wiring is 85% - 90% complete in the Ancillary #2 Fan Room; and,
- The contractor is continuing with sub-basement and basement level FPR Third Party Testing.
- **Entrance #2**
 - Escalator #9 is in place. Installation of Escalators #10 and #11 components continue.
- **Ancillary #1**
 - The 5th floor and roof construction is complete and form stripping and removal is underway. Electrical work continues in the FPR Rooms at the sub-basement and basement levels;
 - Cooling Towers delivery for the Ancillary #1 roof is underway by the riggers; and,
 - Third Party testing continues in the sub-basement and basement FRP rooms.
- **Cavern Mezzanine (Public, North and South)**
 - Granite paver installation is approximately 80% complete in the Public Mezzanine; and,
 - In the Public Mezzanine, installation of G2 and G3 grills in the W30 and W36 walls is approximately 90% complete.
- **Platform**
 - Installation of the tactile platform edge and rubbing boards are complete;
 - Installation of the platform granite wall tiles at the stairs is approximately 60% complete;
 - Installation of guiderails continues for the Platform to Mezzanine elevator (Elevator #1); and,
 - Installation of conduit in the platform service carriers continues and is approximately 75% complete.
- **Entrance #1**
 - At Entrance #1 the 4th of 6 arch/wall placements was completed; and,
 - On the outside, Entrance #1 escalator components installation is ongoing.
- **Entrance #3 (Elevator Bank)**
 - At Entrance #3 erection of the perimeter concrete walls above grade continued. Structural steel framing for the roof is being delivered.
- **Schedule**
 - The target date for energizing the first permanent power feed continues to be February 29, 2016. All testing can be conducted with a single energized feed; and
 - The remaining key milestones to have work complete at or before the end of December 2016 are:
 - Work complete to allow for test trains and training by - September 1, 2016
 - Facility ready for NYCT Training by - September 1, 2016
 - Architectural, Arts-N-Transit complete by - December 1, 2016
 - Revenue Service Date – December 31, 2016.

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

- **General**
 - The 87th St. shaft remains open to allow the C6 contractor access to the lower levels for equipment delivery.
- **Cavern (Public, North & South Mezzanines)**
 - The contractor began the W30 wall erection;
 - The contractor continues with the W30 wall erection in the Public Mezzanine;
 - The Fans have been delivered to the rigger and the rigging plan for delivery to the site is being finalized;
 - Ductwork is in fabrication for the fan array;
 - The VFDs (Variable Frequency Drives) will be delivered in mid-March 2016. Conduit installation is ongoing from the panel to the VFDs;
 - The MTACC CCM reports that there is good progress being made in the Chiller Rooms;
 - Third Party Testing is ongoing in the FPRs (Facility Power Room);
 - The Verizon Land Line installation is underway. The land line is a ConEd requirement prior the feed energization; and,
 - Installation of the C1A ceiling continues in the south mezzanine.
- **Entrance #1**
 - The long escalator trusses are being delivered from both the street entrance (upper trusses) and the north shaft (lower trusses).
- **Entrance #2**
 - The lower incline escalators installation continues; and,
 - The street level kiosk for the ADA Elevator has been delivered.
- **Ancillary #1**
 - Erection of the roof parapet walls continued.
- **Ancillary #2**
 - Waterproofing walls, and slab construction continued in Ancillary #2. The work has reached the Basement Level. This is a low-rise structure.
- **Platform**
 - Installation of the mezzanine to platform escalators and machine room work is complete;
 - Installation of the over the track ceiling is complete;

- Installation of the porcelain tile trackwall cladding is complete;
- Installation of platform granite pavers is progressing. Granite tile installation on the platform at the escalators/stairways continues. Platform rubbing board installation is complete; and,
- Police radio cabling continues to be installed at the platform.
- **Site**
 - Street/sidewalk restoration continues between E. 83rd & E. 84th Streets. 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.
- **Schedule**
 - Energization of permanent power (first of a total of 4 feeds) extended forecast is for end of March 2016 to mid-April 2016. The 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;
 - The remaining acceleration milestones are:
 - Work complete to allow for test trains and training by - September 1, 2016.
 - Facility ready for NYCT Training by - September 1, 2016.
 - Architectural, Arts-N-Transit complete by - December 1, 2016.
 - Of the 33 milestone rooms designated to be turned over to the C6 contractor, the Project Office has reported that 28 have been turned over and “conditionally” accepted. Four of the final five areas are shafts and the final area is the SCC (Station Service Center). This room turnover count has not changed in the last three months; and,
 - It should be noted that only critical work needed for Revenue Service is being accelerated. There will still be remaining station work to complete after Revenue Service is underway.

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

- **Electrical Manpower:**
 - Contractor has approximately 95 craft electricians (includes approximately 5 supervisors (non-working) and 2 warehouseman) on the job.
- **Electrical 63rd Street Communication and Signal Rooms:**
 - Comm. Rooms – FIAT network testing completed and FIST testing of the network is in process; and,
 - Signal Room – Wayside testing is in progress.
- **Electrical 63rd Street Circuit Breaker House:**
 - The upper level room has been built out as far as possible; and,
 - Lower rooms (basement) have not been turned over to contractor.

- **Electrical 63rd Street Mezzanine Local Antenna Cable (Area 5):**
 - Work commenced and has progressed up to but not including 6th Mezzanine.
- **Lexington Ave Relay Room UL/LL:**
 - Breakdown testing was completed.
- **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;
 - 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 3 of 5 communication rooms. Equipment has been installed;
 - Signal room has been turned over and equipment installed;
 - Circuit Breaker House (CBH) has been turned over and equipment installed; and,
 - TPSS testing to commence on 2/1/2016.
- **Electrical 86th Street Communication, TPSS and Signal Rooms:**
 - Three out 5 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 Manpower:**
 - Contractor has approximately 25 craft laborers on the job which include: 2 supervisors.
- **Civil north of 63rd Street Station (Zone 3 (3rd Ave. to 68th Street):**
 - 3rd rail/guarded rail work remains on G3.
- **Civil 96th Street Tunnels (Zone 1 and Zone 2)**
 - Contact Rail/Concrete Pours, 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**
 - The 63rd, 72nd, 86th, and 96th Street Stations contractors are meeting every two weeks with the C6 Systems Integration Manager in order to resolve coordination issues;
 - Updated Systems Test Plans Volume 3 Rev. 16 was submitted and will continue to be submitted monthly; and,
 - The revised Certifiable Items List (CIL) was submitted including updates to show bodies of evidence.
- **Acceleration schedule**
 - Preparation of the contractor's acceleration schedule is ongoing and forecasted to be incorporated into the project's Integrated Project Schedule by February 2016. Construction and 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 January 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:

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 completed its review of the Final Draft and returned comments to the SAS Quality Manager in January 2016.

C2B: The C2B Contractor Quality Manager is not able to meet the dates he has committed to complete action items since he does not have sufficient staff capacity. 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 two weeks behind.

The contractor's Corporate Quality Manager attended the SAS C2B Quality Management Meeting on January 27, 2016, and committed to evaluate the need for additional personnel to support their Quality Manager and to investigate and resolve the outstanding quality issues.

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 are behind schedule;
- The electrical subcontractor's NCRs have not been processed for three months;
- Preparation of a concrete statistical analysis is late;
- Record drawings at 50% completion has been delayed;
- Work is not ready for NYCT inspection; and,
- Submittal of Daily Inspection Reports is two weeks behind.

Contract Package C2B	
Status:	Through January 31, 2016, a total of 149 NCRs have been issued. Ninety-one (91) have been closed and 58 NCRs are still open. In January 2016, seven new NCRs were written and none were 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 still being held. Submittal of Daily Inspection Reports is 2 weeks behind. The majority of the 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 seven 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 effort be devoted to resolving the other issues listed in the beginning of this section.
Contract Package C3	
Status:	Through January 31, 2016, a total of 125 NCRs have been issued. Ninety-nine (99) have been closed and 26 are still open. In January 2016, one new NCR was written and one was closed.
Observation:	Eighteen (18) of the open 26 NCRs are due to concrete that was out of specification. 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:	The PMOC has no concerns at this time.
Contract Package C4C	
Status:	Through January 31, 2016, a total of 213 NCRs have been issued. One hundred fifty-two (152) have been closed and 60 NCRs are still open. In January 2016, eight NCRs were written and one was closed.
Observation:	One hundred eighty-one (181) of the 213 NCRs are for concrete that was out of specification. All eight of the NCRs generated in January 2016 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:	The PMOC encouraged the contractor to close concrete NCRs that had an approved statistical analysis and 32 closed NCRs in November and 7

	in January were for concrete. Forty-five (45) of the remaining 60 open NCRs are for concrete that was out of specification. The PMOC recommends that another concrete statistical analysis be performed and submitted.
Contract Package C5C	
Status:	Through January 31, 2016, 157 NCRs have been issued. Sixty-nine (69) have been closed and 88 NCRs are still open. In January 2016, no new NCRs were written and none were closed.
Observation:	Forty-six (46) of the 88 NCRs that are open are for concrete that is out of specification. Submittal of Daily Inspection Reports is two weeks behind. The majority of the NCRs were for concrete that was placed beyond the 90 minute time limit.
Concerns and Recommendations:	The PMOC continues to recommend that the contractor establish a schedule for closing the 42 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 January 31, 2016, a total of 49 NCRs have been issued. Forty-one (41) NCRs have been closed and eight are still open. In January 2016, one new NCR was written and two were closed.
Observation:	Six of the eight open NCRs are for concrete that is out of specification. All six are for concrete that was placed beyond the 90 minute time limit. Submittal of Daily Inspection Reports is current.
Concerns and Recommendations:	The PMOC has no concerns.

Concerns and Recommendations:

Discussed under each Contract Package.

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. Due to the ongoing development of MTACC's "schedule acceleration initiative" the IPS was not updated for the month of December 2015. As of February 9, 2016, MTACC has received the proposed acceleration schedules from 4 of 5 involved contractors. These schedules will be reviewed for conformity with ongoing schedule/cost negotiations between MTACC and the respective contractors. When the schedule is approved and negotiations successfully concluded, the IPS will be updated.

The PMOC anticipates an updated IPS at the end of February 2016, with Data Date = February 1, 2016 that will include up-to-date status and the forecast completion of all construction based on the accelerated construction schedules.

THE FOLLOWING IS A SUMMARY OF IPS UPDATE #113 BASED ON A DATA DATE OF DECEMBER 1, 2015. THIS UPDATE WAS PREVIOUSLY REPORTED IN THE DECEMBER 2015 PMOC MONTHLY REPORT.

IPS Update #113 is a hybrid schedule, consisting of the current status of work underway combined with forecasts and performance targets obtained from contractor summary schedules provided in their proposals as part of MTACC’s “acceleration initiative”. As such, IPS Update #113 may be considered a draft version of an accelerated schedule or MTACC’s version of what an accelerated schedule might look like.

IPS Update #113 forecasts the completion of all construction and NYCT Pre-Revenue Training & Testing activities by November 3, 2016. The available schedule contingency of 41 work days (WD) or 57 calendar days (CD) is then added, resulting in a forecast completion date of December 30, 2016. Schedule contingency based on IPS Update #113 is summarized as follows:

	<u>Dates</u>	<u>Contingency</u> <u>(CD)</u>	
MTACC Completion	11/3/2016		
	to		
MTACC RSD	12/30/2016	57	MTACC Contingency
	to		
ELPEP Threshold	7/3/2017	185	Additional Contingency
	to		
FTA RSD	2/28/2018	240	Minimum ELPEP Contingency
		482	TOTAL

Observations:

IPS Update #113 identifies a single “critical” schedule path with TF=0 and an additional five (5) independent schedule paths with total float less than or equal to ten (10) working days.

Critical Path (TF=0): The most critical path identified by IPS Update #113 involves installation and testing of railroad signal equipment at the 86th Street Station. This path is initiated by ongoing architectural construction within Ancillary #1, which is forecast to be complete on December 30, 2015, and will allow the start of signal equipment installation. The installation of signal equipment is forecast for completion on February 22, 2016, and is followed by local and system level testing, forecast for completion on November 3, 2016.

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

+2 WD: This path involves the completion of railroad signal system equipment at the 96th Street Station. This work is controlled by the achievement of C2B MS #7, which is currently delayed by C2B AWO #154, Changes to Dispatcher’s Office. This AWO has been negotiated and the contract amendment is currently being processed. The impact of these changes is forecast to be resolved by February 26, 2016. Remaining

equipment installation is forecast to be complete on March 22, 2016, and is followed by local testing, forecast to be complete on June 20, 2016. Upon completion of local testing, this path merges with the TF=0 path for remaining system level testing.

- +6 WD:** This path involves the fire alarm system installation at the 86th Street Station. The start of this work is currently delayed until the work represented by C6 AWO #35, Fire Alarm Design Changes, at all stations is completed. The path then continues through panel, wiring and device installation throughout the 86th Street Station through March 22, 2016. Installation is followed by local testing at 96th Street, which is forecast to be complete on August 18, 2016. At this time, the path merges with the TF=0 path for Pre-Revenue Operational Testing by NYCT.
- +10 WD:** There are three semi-independent float paths with +10 WD schedule float. Each path involves the supply, installation, testing and acceptance of the police radio system at the 72nd, 86th, and 96th Street Stations respectively. The equipment for all three stations should be available by April 27, 2016. Remaining installation work is forecast for completion by June 8, 2016, and local testing, punchlist and acceptance activities complete by August 18, 2016. At this time, the path merges with the TF=0 path for Pre-Revenue Operational Testing by NYCT.
- +12 WD:** This path involves CCTV installation and testing at the 96th Street Station. Completion of this work is currently April 15, 2016, and is currently delayed until the C2B Contractor can achieve its MS #7. This milestone is currently delayed until completion of work resulting from C2B AWO #154 (refer to the TF=2 path). Following completion of the work, local and system-level testing will occur from April 15, 2016, to July 4, 2016. This path then merges with the TF= +10 path for complete communications system testing, followed by pre-revenue service testing by NYCT.
- +18 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 January 14, 2016, with installation and testing of lighting completion is forecast for August 22, 2016 followed by architectural construction throughout Ancillary #2. Completion of this work is forecast for October 11, 2016, and then ties to the C2B Substantial Completion date of October 14, 2016.
- +22 WD:** This path represents the remaining third-party testing and Con-Ed final inspection and acceptance of facilities required for permanent power at the 72nd Street Station. Following the “Permanent Power Available” date of February 8, 2016, this path merges with numerous other paths involving the testing and acceptance of equipment throughout the station.
- +37 WD:** This path represents remaining Con-Ed commissioning activities required for permanent power equipment at the 96th Street Station. Following the forecast “Permanent Power Available” date of January 15, 2016, the path follows component and system testing of mechanical and electrical equipment throughout the station.
- +53 WD:** This path represents the remaining installation, third-party testing and Con-Ed final inspection and acceptance of facilities required for permanent power at the 86th Street

Station. Following the “Permanent Power Available” date of March 31, 2016, this path merges with numerous other paths involving the testing and acceptance of equipment throughout the station.

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 (11/01/15 to 11/30/15):

Pkg	MS	Description	UD #112 Date	UD #113 Status
C5C	6	Turnover of Comm. Rooms	11/18/15	11/18/15A
C5C	6A	Room-to-Room Conduit Ready	11/18/15	11/18/15A

2. Milestones scheduled for completion during the next update period (12/01/15 to 12/31/15):

Pkg	MS	Description	UD #112 Date	UD #112 Float
C2B	8A	Full access to Traction Power Rooms:	12/15/15	39
C2B	8B	Full access to Traction Power Rooms:	12/15/15	146
C2B	8C	Full access to Traction Power Rooms:	12/15/15	146
C2B	9	Full access to Station Service Centers	12/21/15	228
C4C	7B	Complete Work Ancillary #1	12/21/15	158
C2B	6B	Full access to Comms Rooms & Closets	12/29/15	30
C2B	6C	Full access to Comms Rooms & Closets	12/29/15	30

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 #112	UD #113	Variance
C4C	7A	Complete Work in all Comms. Rooms	03/16/16	05/24/16	69
C4C	12	Full access @ Station Service Center(s)	11/20/15	01/15/16	56
C5C	11	Full access @ Station Service Center(s)	01/06/16	02/19/16	44
C4C	7B	Complete Work Ancillary #1	11/13/15	12/21/15	38
C6	5A	Complete LAN - 63rd St. Station	12/16/15	01/15/16	30
C6	5B	Complete WAN - 63rd St. Station	12/16/15	01/15/16	30

Pkg	MS	Description	UD #112	UD #113	Variance
C2B	8A	Full access to Traction Power Rooms:	11/16/15	12/15/15	29
C2B	8B	Full access to Traction Power Rooms:	11/16/15	12/15/15	29
C2B	8C	Full access to Traction Power Rooms:	11/16/15	12/15/15	29
C2B	6B	Full access to Comms Rooms & Closets	11/30/15	12/29/15	29
C2B	6C	Full access to Comms Rooms & Closets	11/30/15	12/29/15	29
C6	SS	Substantial Completion	11/28/16	11/03/16	-25
C2B	SS	Substantial Completion	11/11/16	10/14/16	-28
C6	3A	Complete LAN - 86th St. Station	04/20/16	03/18/16	-33
C6	3B	Complete WAN - 86th St. Station	04/20/16	03/18/16	-33
C5C	SS	Substantial Completion	10/28/16	08/30/16	-59
C4C	SS	Substantial Completion w/o Ent. #1	11/28/16	09/30/16	-59
C6	5C	Complete all 63rd St. Station work	07/21/16	04/22/16	-90

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 #112	UD #113	Variance
C4C	7A	Complete Work in all Comms. Rooms	177	113	-64
C4C	7B	Complete Work Ancillary #1	201	158	-43
C6	5A	Complete LAN - 63rd St. Station	177	150	-27
C6	5B	Complete WAN - 63rd St. Station	177	150	-27
C4C	12	Full access @ Station Service Center(s)	60	37	-23
C5C	11	Full access @ Station Service Center(s)	59	38	-21
C6	2A	Complete LAN - 96th St. Station	103	82	-21
C6	2B	Complete WAN - 96th St. Station	103	82	-21
C2B	7C	Full access to Signals Rooms	30	9	-21

Pkg	MS	Description	UD #112	UD #113	Variance
C2B	10	Complete all remaining Comms., Signal & Traction Power work	113	138	25
C5C	SS	Substantial Completion	20	46	26
C2B	6B	Full access to Comms Rooms & Closets	3	30	27
C2B	6C	Full access to Comms Rooms & Closets	3	30	27
C2B	8A	Full access to Traction Power Rooms:	11	39	28
C4C	SS	Substantial Completion w/o Ent. #1	1	35	34
C6	5C	Complete all 63rd St. Station work	92	140	48

Source Schedule Comparison:

No contractor source schedules for IPS Update #113 were submitted by MTACC.

“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 the variance in planned vs actual schedule performance. December 2015 is the latest month for which this information is available.

Value Earned As of December 2015								
	Contract \$ (x100K)	Plan \$ Earned	Actual \$ Earned	Plan Month for Actual \$ Earned	Months Ahead (+) or Behind (-)	Contract Comp Date	Est. Const. Complete Date	Est. RSD Availability Date
C2B	\$324	\$324	\$280	May-15	-7.1	12/22/15	7/22/16	8/21/16
C3	\$176	\$176	\$168	Jul-13	-29.4	5/13/14	10/12/16	11/11/16
C4C	\$258	\$255	\$186	Jan-15	-11.6	9/16/16	8/31/17	9/30/17
C5C	\$208	\$192	\$148	Jun-15	-6.1	5/31/16	11/30/16	12/30/16
C6	\$261	\$243	\$192	Apr-15	-8.2	8/18/16	4/21/17	5/21/17
TOTAL	\$1,227	\$1,190	\$974	Feb-15	-10.2	12/30/16	10/31/17	11/30/17

This summary level analysis suggests the following:

1. For the month of December 2015, the value of (base) construction performed equaled approximately \$18M. In December 2015, the “burn rate” required to complete all work by September 1, 2016, was approximately \$30.12M/MO. Consistent with this underperformance, this analysis suggests the “construction complete” date slipped by one month.
2. While MTACC’s complete acceleration program is still a “work-in-progress”, this analysis suggests little measureable increase in progress during December 2015.

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 is pursuing an overall “acceleration initiative” that will result in the start of NYCT Pre-Revenue Testing on September 1, 2016.

Concerns and Recommendations:

In its review of IPS Update #113, the PMOC identified three major concerns with respect to MTACC’s schedule acceleration goals. These remain valid concerns; their status appears to have changed little during January 2016.

- Achieving agreement regarding the schedule acceleration requires negotiation and agreement with the respective construction contractors. Achieving the desired

schedule acceleration at a total cost acceptable to MTACC is a major challenge and concern.

- MTACC's ability to achieve a comprehensive schedule acceleration plan within a reasonable time period is questionable. As of this writing, MTACC's goal of presenting the MTA Board the full acceleration package at the February 2016 meeting that will include all acceleration and incentive costs for approval appears unlikely. MTACC's "construction complete" goal of September 1, 2016, is now 6-½ months away. Time available for negotiation and agreement with contractors is limited.
- Actually achieving the accelerated construction schedule (assuming agreement by all parties) will require a sustained improvement in achievement and production that is significantly beyond recent levels of performance.

3.0 COST DATA

Based upon financial expenditures reported by the MTACC through January 31, 2016, SAS Phase 1 is approximately 85% complete. The completion status of the individual construction contracts through January 31, 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) – 89.3%;
- C26013 (86th Street Station) – 100%;
- C26008 (86th Street Station) – 99.6%;
- C26012 (86th Street Station) – 73.6%;
- C26006 (63rd Street Station) – 95.6%;
- C26007 (72nd Street Station) – 99.9%;
- C26011 (72nd Street Station) – 74.1% ; and,
- C26009 (Systems) – 73.9%.

Aggregate Construction percentage complete:

- 100% of all construction has been bid;
- 100% of all construction is under contract;
- 90.4% of base contract construction (excluding AWOs) is complete; and,
- 91.0% of all construction is complete.

Based upon cost data received from the MTACC for the period through January 1, 2016:

- Value of construction in place this period = \$20,000,788;
- Estimated value of construction remaining = \$257,878,285 (base contract only);
- Target construction completion = September 1, 2016;
- Number of months remaining = 7; and,
- Avg. required construction expenditure to achieve target date = \$36,462,790.

Soft Cost expenditures (not including real estate, OCIP, etc.) reported this period by the MTACC totaled \$7.0M; 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 associated with the acceleration has not been included in this analysis. The PMOC notes that acceleration costs are currently being tracked on a time and material basis pending completion of negotiations with each active construction contract and approval of the associated contract modifications.

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

	<u>Executed AWOs</u>	<u>AWO Exposure</u>
Jan-16	\$218,359,805	\$299,046,313
Dec-15	\$216,831,917	\$268,364,413
Δ	\$1,527,888	\$30,681,900
Δ	0.70%	11.43%

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

Const. Pkg.	AWO Exposure			
	Jan-16	Dec-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	\$62,097,907	\$45,108,547	\$16,989,360	Net increase is based on revised estimates for AWO #s 36, 73, 166, 172, 178, 190, and 195 and initial estimates for AWO #s 150, 185, 192, 204, 207, 208, and 212.
C3	\$40,580,699	\$40,086,202	\$494,497	Net increase is based on revised estimates for AWO #s 92, 165, 190, 227, 247, 249, 250, 257, 259, 261, 262, 263, 264, and 265 and initial estimates for AWO #s 267 through 273.
C4B	\$1,325,639	\$1,325,639	\$0	No change reported this period.
C4C	\$37,951,156	\$32,891,150	\$5,060,006	Net increase is based on revised estimates for AWO #s 171, 172, and 191 and initial estimates for AWO #s 164, 173, 179, 186, 188, 193, 194, 197, 198, 200, 201, 203, and 209.
C5B	\$26,353,474	\$26,353,474	\$0	No change reported this period.
C5C	\$10,063,850	\$10,331,524	-\$267,674	Net increase is based on revised estimates for AWO #s 73, 115, 126, and 135 and initial estimates for AWO # 33.
C6	\$25,446,061	\$17,040,350	\$8,405,711	Net increase is based on revised estimates for AWO #s 52, 124, 135, 136, 138, 154, and 155 and initial estimates for AWO #s 139, 151, 153, 164, and 165.
TOTAL	\$299,046,313	\$268,364,413	\$30,681,900	

The changes in Executed AWO Value are summarized as follows:

Const. Pkg.	Executed AWOs			
	Jan-16	Dec-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	\$32,636,842	\$31,834,842	\$802,000	Increase is based on execution of AWO #s 47, 105, 126, and 195.
C3	\$25,403,348	\$25,194,048	\$209,300	Increase is based on execution of AWO #s 159, 244, and 254.
C4B	\$1,325,639	\$1,325,639	\$0	No change reported this period.
C4C	\$29,141,539	\$28,837,924	\$303,615	Increase is based on execution of AWO #s 157, 168, 169, 178, and 202.
C5B	\$20,906,813	\$20,906,813	\$0	No change reported this period.
C5C	5397939	\$5,200,439	\$197,500	Increase is based on execution of AWO #s 54, and 139.
C6	\$8,320,158	\$8,304,685	\$15,473	Increase is based on execution of AWO #s 52 and 138.
TOTAL	\$218,359,805	\$216,831,917	\$1,527,888	

As of January 31, 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	\$62,097,907	19.13%	\$32,636,842	10.05%
C26006 (3)	94.71%	\$176,450,000	\$40,580,699	23.00%	\$25,403,348	14.40%
C26007 (4B)	99.93%	\$447,180,260	\$1,325,639	0.30%	\$1,325,639	0.30%
C26011 (4C)	73.36%	\$258,353,000	\$37,951,156	14.69%	\$29,141,539	11.28%
C26013 (5A)	100.00%	\$34,070,039	\$6,525,471	19.15%	\$6,525,471	19.15%
C26008 (5B)	99.63%	\$301,860,000	\$26,353,474	8.73%	\$20,906,813	6.93%
C26012 (5C)	64.84%	\$208,376,000	\$10,063,850	4.83%	\$5,397,939	2.59%

Contract / (Package)	% Complete	Award	Exposure		Executed	
			\$	% of Award	\$	% of Award
C26009(6)	69.51%	\$261,900,000	\$25,446,061	9.72%	\$8,320,158	3.18%
TOTAL TO DATE		\$2,674,814,299	\$299,046,313	11.18%	\$218,359,805	8.16%

To date, \$2,416,936,014 (90.4%) worth of all base contract construction work has been completed. As a percentage of work completed, the AWO exposure for these contracts is 11.8% and the executed AWO percentage is 8.16%.

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 \$290 million. MTACC maintains an AWO forecast at completion that includes input from its Risk Registers. The MTACC AWO EAC Forecast through December 31, 2015, is \$339,000,000. 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 January 31, 2016 reported by the MTACC and the current AWO Exposure analyses, the PMOC has developed the following contingency analysis:

	<u>Current</u>	<u>@ Completion</u>
Phase 1 Budget	\$4,451,000,000	\$4,451,000,000
Construction Awards	\$2,674,814,299	\$2,674,814,299
Soft Cost Expended	\$1,159,190,213	\$1,159,190,213
Soft Cost Forecast to Complete	\$201,785,989	\$219,942,989
AWO Exposure	\$299,046,313	\$339,066,647
Total Contingency	\$116,163,186	\$57,985,852
Reserved Contingency	\$116,163,186	\$57,985,852

Notes:

- (1) AWO Exposure @ Completion incorporates MTACC "risk-informed" forecast through December 2015;
- (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:

- A significant portion of forecast schedule acceleration costs are included in this summary, therefore, the PMOC conclusion remains that 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.
- Available contingency conforms to ELPEP limits.

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 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 31, 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 31, 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.	As of the writing of this report, schedule/cost negotiations have not been completed for any active SAS contract. Accelerated work schedules have been initiated for specific elements of the project.
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.
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

Technical and Coordination Risks	
Risk	Status
1. Critical communication systems: fire alarm system and police radio installation, testing, commissioning and acceptance.	All communication work is forecast to be complete by 07/02/16. These systems are among the most critical communication systems. Accelerated work schedules are being used for critical work where available.
2. Permanent facility power – all stations	Work forecast to complete in time to support follow-on activities. Coordination efforts continue.
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.
5. Watermist system.	Delayed start of work due to “Buy America” noncompliance. Schedule risk due to out-of-sequence demo and installation. Installation work is being monitored to evaluate acceleration needs, if any.

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 generally decreases, the next major “phase” of work generally involves testing and commissioning. The following table summarizes the contractors’ progress in developing test procedures with acceptance criteria that is necessary to perform the actual equipment testing and acceptance.

December 31, 2015

Procedure		LEVEL 2 (FAT)			LEVEL 3/4 (FIAT)			LEVEL 5 (FIST)			LEVEL 6 (FSIT/SIT)		
		Required	Submitted	Approved	Required	Submitted	Approved	Required	Submitted	Approved	Required	Submitted	Approved
63rd Street	Test Documents	12	12	11	32	28	23	9	6	4	12	4	3
	Percent Completed	-	100%	92%	-	88%	72%	-	67%	44%	-	33%	25%
72nd Street	Test Documents	22	22	21	48	34	29	15	7	2	17	4	2
	Percent Completed	-	100%	95%	-	71%	60%	-	47%	13%	-	24%	12%
86th Street	Test Documents	22	22	21	49	34	18	13	3	0	13	2	1
	Percent Completed	-	100%	95%	-	69%	37%	-	23%	0%	-	15%	8%
96th Street	Test Documents	21	21	20	51	33	24	17	6	0	18	3	1
	Percent Completed	-	100%	95%	-	65%	47%	-	35%	0%	-	17%	6%

In comparing this tabulation with the prior month, the PMOC notes there has been limited progress in both submitting and gaining test approval, particularly for Level 5 and Level 6 tests.

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 31, 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 cost equal to or less than passively accepting the 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 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 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 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 December 31, 2015, a total of 12,181,670 construction hours have been logged on the project with 100 lost time and 172 recordable incidents documented. The total hours and incidents equates to a Lost Time Rate (LTR) of 1.64 and a Recordable Rate (REC) of 4.47. 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. 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:

- Successful negotiation of an accelerated construction and test schedule at an acceptable cost with all involved contractors in a timely manner. Challenges include agreement on very complicated technical and construction issues. In addition, some contractors (and subcontractors) may see this as an opportunity to recap any economic losses sustained on the project.
- The PMOC is concerned about the additional costs that will be incurred by this initiative. If the current IPS is accurate, this initiative will achieve 26 CD of schedule improvement. The PMOC questions the “benefit vs cost” consequences of the initiative.
- NYCT’s acceptance of all work required to 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
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	September 1, 2016	October 2017
Revenue Service	February 28, 2018	December 30, 2016	February 2018

A = Actual

Table 2 - Schedule Contingency

IPS Update #	104	107	110	111	112	113
Data Date	3/1/15	6/1/15	9/1/15	10/1/15	11/1/15	12/1/15
	Contingency (CD)					
RSD=12/30/2016						
Risk Mitigated	38	45	38	33	33	57
Risk Realized	38	45	38	33	33	57
RSD=02/28/2018						
Risk Mitigated	461	469	462	457	457	482
Risk Realized	461	469	462	457	457	482

Table 3 – Schedule Milestone Comparison

Pkg	MS	Description	Dates			Variance		Sch. Float 113	Float Δ
			Adjusted	UD#112	UD#113	Contract	Month		
C2B	6B	Full access to Comms. Rooms & Closets	08/21/14	11/30/15	12/29/15	-495	29	30	27
C2B	6C	Full access to Comms. Rooms & Closets	08/21/14	11/30/15	12/29/15	-495	29	30	27
C2B	7A	Full access to Signals Rooms	08/21/14	02/26/16	02/26/16	-554	0	2	-6
C2B	7B	Full access to Signals Rooms	08/21/14	02/26/16	02/26/16	-554	0	9	1
C2B	7C	Full access to Signals Rooms	08/21/14	02/26/16	02/26/16	-554	0	9	-21
C2B	8A	Full access to Traction Power Rooms:	08/21/14	11/16/15	12/15/15	-481	29	39	28
C2B	8B	Full access to Traction Power Rooms:	08/21/14	11/16/15	12/15/15	-481	29	146	-3
C2B	8C	Full access to Traction Power Rooms:	08/21/14	11/16/15	12/15/15	-481	29	146	-3
C2B	9	Full access to Station Service Centers	11/21/14	12/21/15	12/21/15	-395	0	228	-17

Pkg	MS	Description	Dates			Variance		Sch. Float 113	Float Δ
			Adjusted	UD#112	UD#113	Contract	Month		
C2B	10	Complete all remaining Comms, Signal , & Traction Power work	09/21/14	01/05/16	01/15/16	-481	10	138	25
C2B	SS	Substantial Completion	12/22/15	11/11/16	10/14/16	-297	-28	14	3
C3	SS	Substantial Completion	05/13/14	04/27/16	04/28/16	-716	1	135	-18
C4C	7A	Complete Work in all Comms. Rooms		03/16/16	05/24/16	-42514	69	113	-64
C4C	7B	Complete Work Ancillary #1		11/13/15	12/21/15	-42359	38	158	-43
C4C	12	Full access @ Station Service Center(s)	08/28/14	11/20/15	01/15/16	-505	56	37	-23
C4C	SS	Substantial Completion w/o Ent. #1	11/13/15	11/28/16	09/30/16	-322	-59	35	34
C4C	SS	Substantial Completion - Ent. #1	10/07/16	09/15/16	09/06/16	31	-9	43	-9
C5C	6	Turnover of Comms. Rooms	03/24/15	11/18/15	11/18/2015A	-239	0		
C5C	6A	Room-to-Room Conduit Ready	03/24/15	11/18/15	11/18/2015A	-239	0		
C5C	11	Full access @ Station Service Center(s)	03/24/15	01/06/16	02/19/16	-332	44	38	-21
C5C	15	Comp. Permanent Power		03/31/16	03/31/16	-42460	0	53	-16
C5C	SS	Substantial Completion	05/31/16	10/28/16	08/30/16	-91	-59	46	26
C6	2A	Complete LAN - 96th St. Station	05/18/15	03/03/16	03/09/16	-296	6	82	-21
C6	2B	Complete WAN - 96th St. Station	05/18/15	03/03/16	03/09/16	-296	6	82	-21
C6	3A	Complete LAN - 86th St. Station	07/18/15	04/20/16	03/18/16	-244	-33	86	7
C6	3B	Complete WAN - 86th St. Station	07/18/15	04/20/16	03/18/16	-244	-33	86	7
C6	4A	Complete LAN - 72nd St. Station	02/18/15	03/17/16	03/14/16	-390	-3	101	-12
C6	4B	Complete WAN - 72nd St. Station	02/18/15	03/17/16	03/14/16	-390	-3	101	-12
C6	5A	Complete LAN - 63rd St. Station	04/18/14	12/16/15	01/15/16	-637	30	150	-27
C6	5B	Complete WAN - 63rd St. Station	04/18/14	12/16/15	01/15/16	-637	30	150	-27
C6	5C	Complete all 63rd St. Station work	04/18/14	07/21/16	04/22/16	-735	-90	140	48
C6	SS	Substantial Completion	08/18/16	11/28/16	11/03/16	-77	-25	0	0

Table 4 - Project Budget/Cost 

	FFGA			FFGA Amend	MTA Current Working Budget (CWB)		Expenditures as of January 31, 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	3,782.012	71.80
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	3,782.012	71.80
Total Federal	1,350.693	27.75	1,063.942	1,373.893*	1,350.693	24.60	1,150.271	21.84
Total FTA share	1,300.000	96.25	990.049	1,300.000	1,300.000	23.68	1,150.271	21.84
5309 New Starts share	1,300.000	100	990.049	1,300.000	1,300.000	23.68	1,076.378	20.44
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	2,631.741	49.96
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	\$3,013,880,946.00
Engineering Services Subtotal	\$622,862,000	\$684,157,000.00
Third Party Expenses	\$554,086,273	\$562,086,000.00
TA Expenses	\$131,160,085	\$132,890,202.00
Contingency	\$468,077,343	
Total	\$4,451,000,000	\$4,393,014,148

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	\$116 million	\$45 million
	Total Contingency (Allocated plus Unallocated)	\$555.554 million	\$116 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	85%		
	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 = 12/1/2015

Financial data based upon MTACC reporting through 1/31/2016