

## **PMOC MONTHLY REPORT**

### **Second Avenue Subway Phase 1 (MTACC-SAS) Project**

Metropolitan Transportation Authority

New York, New York

**Report Period August 1 to August 31, 2015**



PMOC Contract No. D1FT6014D00017

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

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

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## **THIRD PARTY DISCLAIMER**

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

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

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

## **REPORT FORMAT AND FOCUS**

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

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

## **MONITORING REPORT**

### **1.0 PROJECT STATUS**

During August 2015, the MTAACC 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 79.9% complete. Substantial Completion has been achieved on three of the eight active construction contracts. Progress in this reporting period is discussed below.

#### **a. Procurement**

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

#### **b. Construction**

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

#### **Contract G 26005 (C2A) 96th Street Site Work and Heavy Civil**

- Substantial Completion was achieved on November 5, 2013.

- The final volume of the “As-Built” drawings is being signed off by the contractor and is expected to be completed by the end of September 2015.
- Water leaks have been reduced as a result of the grouting process and have been found acceptable by NYCT.

**Contract G26010 (C2B) 96th Street Station Civil, Architectural, and MEP**

- Station Area 1 Grid Line (GL) 1-8 (91st to 93rd Street)
  - Ongoing work in this area consists of the installation of: conduits and pulling of wire; doors and hardware; light fixtures; plumbing fixtures; plaster ceilings; CMU walls; bench manhole steel covers; motorized dampers; firestop; and miscellaneous punchlist activity in rooms turned over to the C6 contractor.
- Station Area 2 GL 8-18 (93rd to 95th Street)
  - Mezzanine level activity includes the installation of conduits and pulling of wire; placement of concrete fill course east and west side; resinous flooring installation; porcelain ceiling installation; cleaning of the architectural; and general cleanup of the area. Platform level activity includes installation of the service carrier; conduit installation in public areas; lighting installation; resinous flooring installation; escalator installation with motors and equipment; handrail installation; and porcelain ceiling installation.
- Station Area 3 GL 18-36 (95th to 99th Street)
  - a. Mezzanine level activity includes the installation of conduits and pulling of wire; installation of water mist zone valves; sprinkler installation; conduit and duct work installation over cast in place ceiling; placement of floor topping and fill course; chemical grouting room ceilings; resinous flooring installation; installation of doors and hardware; installation of plumbing fixtures; installing of ceil grids; and painting of rooms for turnover. Ongoing platform level activities includes: conduit routing with wire pulling and tagging; installation of piping for sanitary and storm drains; installation of handrails; and miscellaneous punchlist activity in rooms turned over to the C6 contractor.
- Ancillary #1 GL 8-9.5 (Northeast corner 2nd Ave. and 93rd St.)
  - a. Street level work includes the rubbing and patching of the walls; caulking and applying firestop of CMU walls and doors; installation of guardrails at S37 stairs; installation of mechanical piping in shafts; installation of brackets for channel reveals and installation of flush mount reveals. No activity is currently being performed on the mezzanine level. At the invert level; door frames are being installed; and installation of CMU walls is ongoing.
- Ancillary #2 GL 28-29.5 (Southwest corner 2nd Ave. and 97th St.)
  - Street level ongoing work includes; installation of CMU walls, doors and hardware; installation of piping in the shaft; and installation of drainage piping on the 1st floor. Assembly and installation of the sound attenuators on the mezzanine is ongoing; and placement of remaining floor topping at stairs S43 and S44 is in progress.

- Entrance #1 GL 13-14 (Southwest Corner 2nd Ave. and 94th St.)
  - Work being performed at the street level includes; the installation of escalators; CMU block work; and bricking of the exterior columns.
- Entrance #2 GL 13-14 (Northeast Corner 2nd Ave. and 94th St.)
  - Major work being performed is the installation of the escalators at the mezzanine level.
- Entrance #3 GL 21-23 (West side of 2nd Ave. between 95th and 96th St.)
  - Placement of the roof slab, parapet and subsequent removal of forms and shoring is the major effort at Entrance #3.

### **Contract G26006 (C3) 63rd Street Station Rehabilitation**

- The focus of the work effort remains at Area 5 and the progress at Entrance #1.
- **Area 5 (Reconstruction consists of mezzanines and the deck plaza roof)**
  - In Area 5 inspections by NYCT user groups continued in Mezzanines #1 and #4.
  - Traction elevator cabs (4) installation is ongoing
  - Arts-N-Transit art work continues on the 6<sup>th</sup> Mezzanine.
  - Installation of brackets and porcelain tile finish panels to walls and beam cladding continues throughout the 6<sup>th</sup> Mezzanine.
  - Stainless steel column cladding is ongoing on the 6<sup>th</sup> Mezzanine.
- **Entrances (#1, #2, #3 and #4)**
  - At Entrance #1 the subcontractor continued with escalators installation and work in the motor room
  - At Entrance #1 the ceiling work continued
  - At Entrance #2, the hydraulic elevator kiosk has been delivered and installed. Brackets and rails installation continued.
  - Granite cladding at the mezzanine level for street Entrance #4 is under way.
  - Installation of stainless steel framing for the architectural glass canopies is ongoing at Entrance #4.
- **Platforms**
  - Continued installation of channels for the operable glass in the G3 Lobby.
  - Completed installation of the stone bases and pavers in the Elevator Lobbies at the G-3 platform
  - Installation of porcelain track wall tiles, top stainless steel band & station lettering on the G3 and G4 platforms trackwall nears completion on both active and inactive tracks.
  - Granite installation continues at the “Link” (Platform – Platform) Stairs.
- **Site**
  - Sewer work, plaza fire hydrant and ConEd work has been completed.
  - Removal of site temporary facilities continues incrementally.

- **Testing & Commissioning**

- Testing and commissioning meetings with SAS Management takes place monthly.
- Test Procedures Tracking is being issued by the contractor on a regular basis for the FIAT, HST, and FSTP.
- Testing is ongoing daily for the station systems, including fan plants (2), air handling units, building management system (BMS), chilled and condenser water pumps, cooling towers (Ancillary #1), cycle test for tunnel and station smoke management (TSSM) dampers, sprinkler system supervisory control panels, etc.

**Contract G26007 (C4B) 72nd Street Station Cavern Mining and Lining**

- Substantial Completion was achieved on January 14, 2014.
- Submittal of contract closeout documentation is ongoing

**Contract G26011 (C4C) 72nd Street Station – Station Finishes, MEP, Ancillary Buildings and Entrances**

- **Ancillary #2/ Entrance #2**

- At Ancillary #2 the concrete superstructure is complete, shoring towers and formwork is being removed, concrete finish patching is being completed and the crane is being demobilized.
- At Ancillary #2 the contractor is continuing with sub-basement and basement level FRP work and continuing with all above street level civil and MEP work.
- At Entrance #2 installation of remaining conduit along the incline is ongoing along with placement of the escalator truss support steps.

- **Ancillary #1**

- Work has reached the 3<sup>rd</sup> Floor with completion of the slab and the start of wall placement.
- MEP work continued in the sub-basement and basement FRP rooms.

- **Cavern Mezzanine (Public, North and South)**

- Completed GlassTex shielding in the TPS Room (North Mezz).
- In the Public Mezzanine continued with installation of both W30 Wall framing and Service Carrier framing.
- At the North and South Mezzanines, work is continuing with MEP installation in Fan/Chiller rooms.
- Installation of bus ducts, conduit and wiring in the North and South Electrical Distribution Rooms (EDR) is continuing.
- Continued installing the precast fascia panels in the North Mezzanine.

- **Platform**

- Installation of service carriers, ceiling framing & panels continues.
- Installation of mezzanine to platform escalators (#1, #2 and #3) and machine room work is complete pending testing under permanent power.
- Installation of the track wall tile is 99% complete with the Station Identification Tiles remaining.
- Installation of the finish granite pavers is continuing.

➤ **Entrance #1**

- Work is ongoing on the entire invert & arch, rebar and concrete placement.
- The permanent foundation and opening through the existing building foundation has been completed
- Waterproofing is ongoing in the street entrance inclines, invert & walls, the escalator machine room and the escalator incline.

▪ **Entrance #3 (Elevator Bank)**

- At the Entrance #3 Elevator Shaft the street level beam and street level slab is complete. The above street structure work has begun.

▪ **Schedule**

- Through August 31, 2015 the Substantial Completion date per the approved Update # 9 has been extended to January 23, 2017. The focus of this delay is the corrective action required to the concrete architectural finish in the escalator incline arch and walls in Entrance #2, and perhaps in the upcoming finish in Entrance #1. As of the date of this report this corrective work has not begun. Nbr has a decision been made on which contractor will perform the work; C4B or the current C4C

**Contract G 26008 (C5B) 86th Street Station Cavern Mining and Lining**

- Substantial Completion of all contract work was achieved on December 16, 2014.
- The C5B contractor completed sandblasting of the architectural finish arch and walls on the incline of Entrance #2. This work was required to correct deficiencies noted by NYCT architects in the finish. The application of the follow up final finish coating (4 coats) has also been completed. This same process at Entrance #1 is also required and is being coordinated, as Entrance #1 is the prime ingress/egress for the site.

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

▪ **General**

- The 87th S Shaft remains open to allow for continued deliveries by the C6 contractor.

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

- Chiller equipment has been delivered and set in both the North & South Mezzanine rooms;
- Completing CMU walls in the North Mezzanine;
- MEP work is ongoing throughout; and
- Facility Power Room equipment is set in place in both North & South back-of-house mezzanines. Conduit, bus ways and wiring work is under way.

▪ **Entrance #1**

- Continues to be the prime ingress/egress zone for the project. No appreciable work is under way. Upcoming sandblasting of the concrete finish is being scheduled.

- **Entrance #2**
  - The subcontractor continues installation of the “short run” escalators from the street at Entrance #2.
- **Ancillary #1**
  - Placement of the upper level roof deck is ongoing for the below grade portion of the structure. The contractor has continued working 6 days, 2 weekday shifts in this area.
  - MEP work continued in the FPR.
- **Ancillary #2**
  - The contractor is beginning a 2<sup>nd</sup> shift to progress the work as waterproofing to shaft walls, construction of floor slabs & walls advance up to street level.
- **Platform**
  - Continued installation of duct work and dampers.
  - Mezzanine to Platform escalators installation is ongoing.
  - Continued installation service carriers.
- **Schedule**
  - Permanent power is now forecast to be energized in February 2016, in lieu of the previous December 2015.
  - The above-described issues regarding the correction to architectural concrete finish in the long escalator inclines is having a currently undetermined impact on the overall project schedule.
  - During August 2015 several room turnovers took place. However, the CCM has advised the contractor that they are turning over some rooms to M/ACC that are incomplete, where conduits don't have grounding couplers, tags or drag lines.
  - The CCM has further advised that they feel that (in spite of the just noted deficiencies) the work effort in this area has greatly improved, and they feel that the final 10 remaining rooms will be turned over by the end of September 2015.

## **Contract G 26009 (C6) Track, Power, Signals and Communication Systems**

- **63rd Street Station**
  - Communication and Signal Rooms – The contractor is in the process of wayside testing. Installation of data and telephone cables at the mezzanine and levels 1 thru 5 is ongoing.
  - Circuit Breaker House (CBH) – The contractor is still waiting for the turnover of the lower rooms (basement) in order to start the cable pulling operation.
  - Street Mezzanine (Area 5) - Work has progressed as far as it can go and the contractor has demobilized.
  - Lexington Ave. Relay Room (upper and lower levels) – Breakdown testing is still ongoing. The upper level was completed. The contractor is currently working on the lower level.



- **72nd Street Station**

- Communication and Signal Rooms – Three of the 5 communication rooms were turned over and equipment has been installed. Work is ongoing in the other two rooms. Equipment has been installed in the Signal Room and the CBH room
- Cable pulling and termination is still ongoing

- **86th Street Station**

- Communication and Signal Rooms – Contractor is still awaiting room turnover.

- **96th Street Station**

- Tunnel work (Zone 2) – All signal cable is pulled. Fiber and communication cable has progress as far as possible. The contractor is still awaiting turnover of Zone 11.
- Tunnel work (Zone 1) – The contractor has completed the pulling of all fiber, communication, power and signal cables.
- Communication and Signal Rooms – Communication rooms are partially turned over and equipment installed. The TPSS room has been turned over and equipment installed. The contractor is still awaiting turnover of the CBH room and the control center.
- Track Work (Zones 1 and 2) – Contact rail and concrete placement for tracks S1 and S2 are complete.
- Track Work (Zones 5 and 6) – Track construction in Zone 5 (on S1 track) is complete. S2 track has been surfaced; leveled and concrete placement is ongoing.

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

#### Status:

During August 2015, the Second Avenue Subway Quality Management team continued holding Quality Meetings and Quarterly Quality Oversight of the Contractor with CCM, the MFACC, and the PMOC participation. They 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 a draft of Revision 3 to the PQM that reflects the new MFACC QO checklist requirements and other changes that have occurred since the last revision was issued. The PMOC received a draft of Revision 3 to review and returned comments to the SAS Project Quality Manager. A Final Draft of Revision 3 is being reviewed by the PMOC.

**Daily Inspection Reports:** At the end of August 2015, all of the contractors were no more than 1½ weeks behind in entering their Daily Inspection Reports into the Contractor Management System (CMS). This is the first time that this has occurred. The PMOC has constantly reminded the contractors at Quality Meetings of the importance to enter Daily Inspection Reports within a

week. The C2B and C5C contractors have never been less than two weeks behind until this month.

**C2B Contractor:** A concrete analysis was prepared on May 6, 2015. The designer approved the analysis on June 9, 2015, but requested that concrete cylinder break results be added to each NCR. This was accomplished and 36 NCRs were closed on August 31, 2015. Of the 37 open NCRs, 17 are for concrete and 20 are for non-concrete. 13 of the non-concrete NCRs have been open more than four months.

**C5C Contractor:** At the suggestion of the PMOC, the contractor hired two assistants for their Quality Manager. Both of them started work in June 2015. Significant improvement was noted in August. Submittal of Daily Inspection Reports has been reduced from three weeks to one week. Among the additional improvements that have occurred are:

- All NCRs have now been issued and entered into CMS.
- 39 NCRs were closed in August.
- There is now a schedule for preparing Quality Work Plans (QWPs).
- Preparatory Phase Meetings are scheduled and are being held.
- Mechanical, Electrical, and Plumbing (MEP) sign-off is occurring prior to placement of concrete.
- One external quality audit was performed in August and the contractor's Quality Manager is scheduling additional audits.

Among the remaining issues are:

- 13 of the open 20 non-concrete NCRs have been open for more than four months. The contractor has established closure dates that are not being met.
- Approvals are not always obtained before mock-up work is started.
- Some electrical issues have still not been documented on nonconformance reports (NCRs).

<b>Contract Package C2B</b>	
<b>Status:</b>	Through August 31, 2015, a total of 119 NCRs have been issued. 82 have been closed and 37 NCRs are still open. In August 2015, no new NCRs were written and 39 were closed. 17 of the open NCRs are for concrete that was out-of-spec.
<b>Observation:</b>	Entry of Daily Inspection Reports into CMS is 1½ weeks behind. Bi-weekly Quality Management Meetings, as suggested by the PMOC, are still being held.
<b>Concerns and Recommendations:</b>	13 of the open 20 non-concrete NCRs have been open more than four months. The contractor has established closure dates that are not being met. The PMOC recommends that a realistic schedule for closure of these open NCRs be established and that the contractor make an effort to meet these dates.

<b>Contract Package C3</b>	
<b>Status:</b>	Through August 31, 2015, a total of 108 NCRs have been issued. 98 have been closed and 10 NCRs are still open. In August 2015, no new NCRs were written and two were closed.
<b>Observation:</b>	Entry of Daily Inspection Reports into CMS is current.
<b>Concerns and Recommendations:</b>	The PMOC has no concerns.
<b>Contract Package C4C</b>	
<b>Status:</b>	Through August 31, 2015, a total of 163 NCRs have been issued. 107 have been closed and 56 NCRs are still open. In August 2015, 11 NCRs were written and none were closed.
<b>Observation:</b>	137 of the 163 NCRs are for concrete that was out of specification. Six of the eleven NCRs generated in August were for concrete. Submittal of Daily Inspection Reports is current.
<b>Concerns and Recommendations:</b>	41 of the 56 open NCRs are for concrete that was out of specification. The PMOC has no concerns.
<b>Contract Package C5C</b>	
<b>Status:</b>	Through August 31, 2015, 125 NCRs have been issued. 52 have been closed and 73 NCRs are still open. In August 2015, 9 new NCRs were written and 39 were closed. 31 of the closed NCRs were for concrete that was out-of-spec. The remaining 8 were non-concrete NCRs.
<b>Observation:</b>	Submittal of Daily Inspection Reports is 1 week behind. 30 of the 73 NCRs that are open are for concrete that is out of spec. Bi-weekly Quality Management Meetings, as suggested by the PMOC, are still being held.
<b>Concerns and Recommendations:</b>	In February 2015, the PMOC recommended that all NCRs be issued and entered into CMS immediately and that the contractor establish a schedule to close the non-concrete NCRs. All NCRs are now issued and entered into CMS. The PMOC recommends that the contractor establish a schedule for closing the 43 non-concrete NCRs.

<b>Contract Package C6</b>	
<b>Status:</b>	Through August 31, 2015, a total of 38 NCRs have been issued. 31 NCRs have been closed and 7 NCRs are still open. In August 2015, one new NCR was written and 14 were closed. Entry of Daily Inspection Reports into CMS is current.
<b>Observation:</b>	The contractor submitted Waiver #23 to extend the time of concrete placement from 90 minutes to 120 minutes. The Designer of Record did not approve this waiver. The contractor then prepared and submitted an analysis of concrete strength, and was requested to provide additional information. Following submittal of the additional information, 13 concrete NCRs were closed in August.
<b>Concerns and Recommendations:</b>	The PMOC has no concerns.

Concerns and Recommendations: Refer to previous section.

## 2.0 SCHEDULE DATA

### Status:

The Integrated Project Schedule (IPS) is a management level schedule that integrates all ten construction packages along with design, procurement, startup and other support activities. IPS Update #109 was received on September 2, 2015 and is based on a Data Date of August 1, 2015. This update contains the “. XER” schedule files for the IPS. The narrative report was received on September 9, 2015.

IPS Update #109 forecasts the completion of all construction and NYCT Pre-Revenue Training & Testing activities on November 11, 2016, with approximately 50 calendar days (CD) or 35 work days (WD) of contingency, resulting in a forecast Revenue Service Date (RSD) of December 30, 2016.

Schedule contingency based on IPS Update #108 is summarized as follows:

	<b>Dates</b>	<b>Contingency ( CD )</b>	
MTACC Completion	11/11/2016	50	MTACC Contingency
MTACC RSD	12/30/2016	184	Additional Contingency
ELPEP Threshold	07/03/2017	240	Minimum ELPEP Contingency
FTA RSD	02/28/2018		
		<b>474</b>	<b>TOTAL</b>

### Observations:

#### Project Critical Path:

The MTACC's schedule narrative identifies three independent float paths as “critical”. Each of these paths has no more than 5 WD of schedule float. The PMOC concurs with the MTACC's evaluation of the relative importance of these paths and for consistency, will follow the same reporting format.

**1st Critical Path (TF=0):** This period SAS's Critical/Longest path involves architectural and vertical transportation installation, testing and acceptance at the 96<sup>th</sup> Street Station, Entrance #3. Installation work is forecast for completion on July 27, 2016 and is followed by a period of escalator testing and acceptance leading to C2B Substantial Completion and SAS Phase 1 Completion on November 11, 2016. Remaining Phase 1 schedule contingency (35 WD) leads to the forecast RSD of December 30, 2016.

**2nd Critical Path (TF=3):** The 2nd Critical Path begins with construction of system wide track work in Zones 5, 6, 4, 7, 8, 10 and 11, followed by signal system testing and final acceptance throughout the project on September 1, 2016. This is followed by NYCT Pre-Revenue Service Testing and the Operational Revenue Service Date of November 8, 2016. Accounting for three days of schedule float, this path joins the TF=0 path on November 11, 2016.

**3rd Critical Path (TF=5):** The 3rd Critical Path involves installation of access control systems throughout the 72<sup>nd</sup> Street Station. Installation is forecast for completion on March 3, 2016, at which time individual and integrated system testing at 72<sup>nd</sup> Street Station starts and continues through August 31, 2016. At this time, this path joins the +4 WD float path for Pre-Revenue Operational Testing by NYCT.

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

**+10 WD:** This path involves installation of railroad signal equipment and its testing at the 96<sup>th</sup> Street Station. The start of this work is controlled by C2B MS #7, which is forecast to be achieved on August 31, 2015. After testing work is completed at the 96<sup>th</sup> Street Station, this path joins the +4 WD float path on August 1, 2016 for final acceptance of the signal system throughout the project and the start of NYCT Operational Testing.

**+16 WD:** This path involves installation and field installation testing of traction power substation equipment at the 86<sup>th</sup> Street station. This work was forecast to begin on September 1, 2015 and is controlled by C5C MS #9 (Access to Traction Power Rooms North End of 86<sup>th</sup> Street Station). Installation is forecast to complete on July 6, 2016 and is followed by system level testing of the traction power system at 86<sup>th</sup> Street Station, forecast for completion on August 12, 2016, at which time this path joins the +4 WD float path on August 12, 2016, for the start of NYCT Operational Testing.

**+28 WD:** This path represents installation of equipment, third party testing, and inspection and acceptance by ConEd required for permanent power at the 72<sup>nd</sup> Street Station. Following the "Permanent Power Available" date of December 30, 2015, this path merges with numerous other paths involving the testing and acceptance of equipment throughout the station. The "Permanent Power Available" date remains unchanged however schedule float available has decreased to 28 WD from the previous value of 45 WD.

**+30 WD:** This path represents fabrication, installation and testing of permanent power equipment at the 86<sup>th</sup> Street Station. Following the forecast "Permanent Power Available" date of February 2, 2016, the path follows component and system testing of mechanical and electrical equipment throughout the station. The "Permanent Power Available" date experienced a 4 WD delay this period; however approximately 55 WD of schedule float was lost.

**+55 WD:** This path represents procurement, installation and testing of permanent power equipment at the 96<sup>th</sup> Street Station. Following the forecast "Permanent Power Available" date of November 4, 2015, the path follows component and system testing of mechanical and electrical equipment throughout the station. The

“Power Available” date experienced a 21 WD schedule improvement this period; however approximately 33 WD of schedule float was lost.

**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 ( 07/01/15 to 07/31/15):

<b>Pkg</b>	<b>MS</b>	<b>Description</b>	<b>UD #108 Date</b>	<b>UD #109 Date</b>
C5C	2	Limited Access; Sta 1209+00- >1198+00	<b>07/01/15</b>	<b>01/31/15A</b>
C5C	3	Shared Access; Sta 1209+00- >1198+00	<b>07/15/15</b>	<b>05/31/15A</b>
C5C	14b	Limited Access all locations	<b>07/08/15</b>	<b>02/08/15A</b>

2. Milestones forecast for completion during the next update period (08/01/15 to 08/31/15):

<b>Pkg</b>	<b>MS</b>	<b>Description</b>	<b>UD #109 Date</b>	<b>UD #109 Float</b>
C2B	6B	Full access to Comms Rooms & Closures	<b>08/31/15</b>	<b>37</b>
C2B	6C	Full access to Comms Rooms & Closures	<b>08/31/15</b>	<b>37</b>
C2B	7A	Full access to Signal Rooms	<b>08/31/15</b>	<b>10</b>
C2B	7B	Full access to Signal Rooms	<b>08/31/15</b>	<b>12</b>
C2B	7C	Full access to Signal Rooms	<b>08/31/15</b>	<b>125</b>
C4C	7B	Complete Work Ancillary #1	<b>08/17/15</b>	<b>254</b>
C5C	7	Turnover of Signal Rooms	<b>08/31/15</b>	<b>39</b>
C5C	7A	Room to-Room Conduit Ready	<b>08/31/15</b>	<b>46</b>
C5C	8	Turnover of Signal Rooms	<b>08/31/15</b>	<b>45</b>
C5C	8A	Room to-Room Conduit Ready	<b>08/31/15</b>	<b>46</b>
C5C	9	Turnover Traction Power Rooms	<b>08/31/15</b>	<b>16</b>
C5C	9A	Room to-Room Conduit Ready	<b>08/31/15</b>	<b>89</b>
C5C	10	Turnover Traction Power Rooms	<b>08/31/15</b>	<b>39</b>
C5C	10A	Room to-Room Conduit Ready	<b>08/31/15</b>	<b>89</b>

3. Milestones with unusual schedule 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.

<b>Pkg</b>	<b>MS</b>	<b>Description</b>	<b>UD #108</b>	<b>UD #109</b>	<b>Variance</b>
C4C	7A	Complete Work in all Comms Rooms	09/17/15	03/18/16	183
C5C	11	Full access @Station Service Center(s)	07/09/15	11/03/15	117
C6	5C	Complete all 63rd St. Station work	04/05/16	06/27/16	83
C2B	6B	Full access to Comms Rooms & Closets	07/08/15	08/31/15	54
C2B	6C	Full access to Comms Rooms & Closets	07/08/15	08/31/15	54
C2B	7A	Full access to Signals Rooms	07/08/15	08/31/15	54
C5C	10	Turnover Traction Power Rooms	07/09/15	08/31/15	53
C5C	10A	Room to-Room Conduit Ready	07/09/15	08/31/15	53
C4C	SS	Substantial Completion w/o Ent. #1	07/30/16	09/16/16	48
C5C	9	Turnover Traction Power Rooms	07/15/15	08/31/15	47
C5C	9A	Room to-Room Conduit Ready	07/15/15	08/31/15	47
C5C	7	Turnover of Signal Rooms	07/22/15	08/31/15	40
C5C	7A	Room to-Room Conduit Ready	07/22/15	08/31/15	40
C5C	8	Turnover of Signal Rooms	07/22/15	08/31/15	40
C5C	8A	Room to-Room Conduit Ready	07/22/15	08/31/15	40
C2B	7B	Full access to Signals Rooms	07/24/15	08/31/15	38
C2B	7C	Full access to Signals Rooms	07/24/15	08/31/15	38
C6	4A	Complete LAN - 72nd St. Station	01/07/16	02/04/16	28
C6	4B	Complete WAN - 72nd St. Station	01/07/16	02/04/16	28
C2B	8A	Full access to Traction Power Rooms:	08/06/15	08/31/15	25
C2B	8B	Full access to Traction Power Rooms:	08/06/15	08/31/15	25
C2B	8C	Full access to Traction Power Rooms:	08/06/15	08/31/15	25



<b>Pkg</b>	<b>MS</b>	<b>Description</b>	<b>UD #108</b>	<b>UD #109</b>	<b>Variance</b>
C5C	SS	Substantial Completion	<del>08/12/16</del>	<del>09/06/16</del>	25
C3	SS	Substantial Completion	<del>02/22/16</del>	<del>03/16/16</del>	23
C6	3A	Complete LAN - 86th St. Station	<del>03/30/16</del>	<del>03/03/16</del>	-27
C6	3B	Complete WAN - 86th St. Station	<del>03/30/16</del>	<del>03/03/16</del>	-27
C2B	9	Full access to Station Service Centers	<del>11/30/15</del>	<del>10/22/15</del>	-39

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.

<b>Pkg</b>	<b>MS</b>	<b>Description</b>	<b>UD #108</b>	<b>UD #109</b>	<b>Variance</b>
C4C	7A	Complete Work in all Comm Rooms	291	166	-125
C5C	11	Full access @Station Service Center(s)	163	83	-80
C6	5C	Complete all 63rd St. Station work	154	98	-56
C4C	SS	Substantial Completion w/o Ent. #1	105	57	-48
C2B	6B	Full access to Comms Rooms & Closets	73	37	-36
C2B	6C	Full access to Comms Rooms & Closets	73	37	-36
C5C	10A	Room to-Room Conduit Ready	123	89	-34
C5C	9A	Room to-Room Conduit Ready	119	89	-30
C5C	7	Turnover of Signal Rooms	70	45	-25
C5C	7A	Room to-Room Conduit Ready	71	46	-25
C5C	8	Turnover of Signal Rooms	70	45	-25
C5C	8A	Room to-Room Conduit Ready	71	46	-25
C2B	7C	Full access to Signal Rooms	149	125	-24
C2B	9	Full access to Station Service Centers	<del>11/30/15</del>	<del>10/22/15</del>	30
C6	5A	Complete LAN - 63rd St. Station	<del>09/14/15</del>	<del>09/23/15</del>	61
C6	5B	Complete WAN - 63rd St. Station	<del>09/14/15</del>	<del>09/23/15</del>	61

**Source Schedule Comparison:**

The following compares substantial completion dates in IPS #109 and the most recent contractor schedule updates furnished by MFACC.

	Contractor		IPS #109	
	Update	Substantial Completion	Substantial Completion	PMOC Comments
C2B	30P (07/01/15)	12/01/16	11/11/16	Contractor critical path driven by construction of Dispatcher's Office. Not acknowledged by MFACC.
C4C	29 (07/01/15)	01/26/17	09/16/16	Contractor critical path driven by AWO #86; summary/estimate of impact to Entrance #1 design change (architectural finish). Not acknowledged by MFACC.
C5C	17 (08/01/15)	09/28/16	09/06/16	Contractor critical path based on estimated impact of fan testing. Not acknowledged by MFACC.
C6	35 (08/01/15)	12/08/16	11/07/16	Contractor critical path driven by access to tunnel south of 86th St. and north of 72nd St., followed by Signal Wayside cable pulling in Zones 10, 8, 7, fiber optic and track work in Zones 7, 8, 10 and 11 and testing. Acceleration of this work assumed by MFACC.

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

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

Value Earned		July-15		Plan Month for Actual Invoice \$	Months Ahead (+) or Behind (-)	Est. Completion Date
Contract \$ (x100,000)	Plan	Actual				
C2B	\$324	\$311	\$239	Oct-14	-8.6	10/08/2016
C3	\$176	\$176	\$160	Apr-13	-26.9	08/30/2016
C4C	\$258	\$241	\$159	Nov-14	-7.6	06/4/2017
C5C	\$208	\$165	\$92	Jan-15	-5.5	12/16/2016
C6	\$261	\$219	\$161	Feb-15	-4.6	02/05/2017
<b>TOTAL</b>	<b>\$1,227</b>	<b>\$1,112</b>	<b>\$811</b>	<b>Nov-14</b>	<b>-7.6</b>	

The PMOC notes the following:

- This evaluation uses base contract values only. AWOs can be considered a partial cause of the variances indicated.
- Schedule float is also not considered. The significant schedule delay to contract C3 does not pose a risk to achieving the RSD.
- The interrelationship between contracts is not fully represented in this analysis. C6 cannot complete all its work until all station contracts are complete. As such, this analysis suggests the RSD may not be achieved until several months after the completion of the C4C contract (June 4, 2017).
- Between June 2015 and July 2015, this methodology confirms the continuing trend of schedule slippage for each contract and a negative variance for the overall project. These results are consistent with “stacking” activities later in the schedule and the observed increase in “near-critical” paths and reduction in overall schedule float.
- The lack of reported progress for Contract C5C may exaggerate these results slightly.

**ELPEP/SMP Compliance:** The MACC considers the IPS and the associated schedule management procedures to be in compliance with the ELPEP and Schedule Management Plan.

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
    - Current Forecast: All Real Estate takings are complete as of November 1, 2011 with the last “Title Vesting” occurring on October 25, 2011.
- Minimum Allowable Secondary Float Path
  - ELPEP Requirement: Minimum 25 Calendar Days (approximately 18 WD) of schedule float for all secondary “near-critical” paths;

- Numerous secondary float paths with Total Float (TF)  $\leq$  25 CD. Many of these paths have multiple subsidiary paths branching off the independent paths; and
- Compliance with this requirement is not consistent with maintaining the project budget.
- Secondary Schedule Mitigation (critical path compression)
  - ELPEP Requirement: 125 CD and
  - Mitigation opportunities will be pursued as they are identified

### **Concerns and Recommendations:**

Based on the PMOC's review of IPS Update #109:

- Three of Eighteen milestones forecast to complete this update period were actually completed. Interestingly, the completion date assigned to these milestones predates the current update period by several months. All of these milestones involved Contract C5C. This situation may indicate a lack of diligence in updating the contract schedule and suggests the schedule is not being used to its fullest capacity as a management tool.
- Fourteen of the remaining forty active schedule milestones are forecast for completion during the next update period.
- Twenty-seven milestones exhibited excessive month-to-month schedule variances. Twenty-three of these variances were delays to milestone achievement, while three represented improvement in schedule performance.
- Sixteen milestones exhibited excessive float variances, thirteen of which reduced the schedule float available. This is generally consistent with the large number of schedule variances (delays) noted above.
- The PMOC again notes MTACC's tendency to discount contractor assertions of delay and incorporate schedule acceleration scenarios prematurely. The PMOC is concerned that the predictive value of the IPS is compromised by these practices.

### **3.0 COST DATA**

Based upon financial expenditures reported by the MTACC through August 31, 2015, SAS Phase 1 is approximately 79.1% complete. The completion status of the individual construction contracts through August 31, 2015, also based upon reported expenditures through that date, is as follows:

- C26002 (Tunnel Boring) – 100.0%
- C26005 (96th Street Station) – 100.0%
- C26010 (96th Street Station) – 76.9%
- C26013 (86th Street Station) – 100%
- C26008 (86th Street Station) – 99.6%
- C26012 (86th Street Station) – 45.0%
- C26006 (63rd Street Station) – 91.1%

- C26007 (72nd Street Station) – 99.9 %
- C26011 (72nd Street Station) – 64.1 %
- C26009 (Systems) – 62.2%

**Aggregate Construction % Completion**

- 100 % of all construction has been bid
- 100 % of all construction is under contract
- 84.3 % of base contract construction (excluding AWOs) is complete; and
- 85.2 % of all construction is complete.

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

- Value of construction in place this period = \$29,343,432
- Estimated value of construction remaining = \$245,250,265 (base contract only)
- Target construction completion = November 15, 2016; and
- Number of months remaining = 14.5.

Soft Cost expenditures (not including real estate, O&P, etc.) reported this period by the MFACC totaled \$5.9M. 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, however significant expenditures beyond 2016 may require the transfer of additional funds from contingency. Any significant construction delays beyond December 2016 may also require additional contingency transfer.

**Cost Growth:** The value of AWOs reported by the MFACC/ NYCT in August 2015 is summarized as follows:

	<b>Executed AWOs</b>	<b>AWO Exposure</b>
Aug - 15	\$202,214,236	\$240,321,139
Jul - 15	\$195,240,278	\$234,072,360
Δ	\$6,973,958	\$6,248,779
Δ	3.57 %	2.67 %

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

<b>Const. Pkg.</b>	<b>Aug-15</b>	<b>AWO Exposure</b>		
		<b>Jul-15</b>	<b>Period Δ</b>	<b>Changes this Period</b>
Completed Packages	\$47,612,118	\$47,612,118	\$0	Final values for Packages C1 and C5 A as reported by MFACC
C2 A	\$47,615,409	\$47,615,409	\$0	No change reported this period
C2 B	\$33,710,298	\$32,305,659	\$1,404,639	Net increase is based on revised estimates for AWO # 96, 164, 169 and initial estimates for AWO # 155, 160, 172, 175, 176

Const. Pkg.	Aug-15	A WO Exposure		
		Jul-15	Period Δ	Changes this Period
C3	\$34,451,761	\$33,971,758	\$480,003	Net increase is based on revised estimates for AWO # 188, 190, 197, 224, 226, 233, 234, 235, 238 and initial estimates for AWO # 239 through 245.
C4 B	\$1,325,639	\$1,325,639	\$0	No change reported this period
C4 C	\$31,686,971	\$31,232,604	\$454,367	Net increase is based on revised estimates for AWO # 103, 136 and initial estimates for AWO # 148, 155.
C5 B	\$26,463,649	\$24,114,600	\$2,349,049	Net increase is based on revised estimates for AWO # 70 and initial estimates for AWO # 56, 66.
C5 C	\$8,198,012	\$8,009,156	\$188,856	Net increase is based on revised estimates for AWO # 56, 113 and initial estimates for AWO # 17, 28, 92, 96, 98, 110, 114, and 117.
C6	\$9,257,282	\$7,885,417	\$1,371,865	Net increase is based on revised estimates for AWO # 85, 91, 94, 96, 100, 116, 119, 120 and initial estimates for AWO # 58, 82, 111, 118 and 124.
	\$240,321,139	\$234,072,360	\$6,248,779	

The changes in Executed AWO Value are summarized as follows:

Const. Pkg.	Aug-15	Executed AWOs		
		Jul-15	Period Δ	Changes this Period
Completed Packages	\$47,612,118	\$47,612,118	\$0	Final values for Packages C1 and C5 A as reported by MTACC
C2 A	\$47,615,409	\$47,615,409	\$0	No change reported this period
C2 B	\$27,486,388	\$27,271,560	\$214,828	Increase is based on execution of AWO # 96, 142, 152, 153 and 169.
C3	\$23,291,919	\$16,864,949	\$6,426,970	Increase is based on execution of AWO # 102, 143, 148, 151, 157, 171, 183, 193, 196, 200, 202, 214, 220, 222, 226 and 233.

Const. Pkg	Aug-15	Executed AWOs		
		Jul-15	Period Δ	Changes this Period
C4B	\$1,325,639	\$1,325,639	\$0	No change reported this period
C4C	\$25,112,529	\$25,060,529	\$52,000	Increase is based on execution of AWO # 123, 148.
C5B	\$19,181,413	\$19,084,053	\$97,360	Increase is based on execution of AWO # 35, 80, 99 and 102.
C5C	\$3,224,339	\$3,224,339	\$0	No change reported this period
C6	\$7,364,482	\$7,181,682	\$182,800	Increase is based on execution of AWO # 85, 91, 94, 96, 100, 119 and 120.
	\$202,214,236	\$195,240,278	\$6,973,958	

As of August 31, 2015, the status of Additional Work Orders (AWOs) for each construction contract on Phase 1 of the Second Avenue Subway Project is summarized as follows:

Contract / (Package)	% Complete	Award	Exposure		Executed	
			\$	% of Award	\$	% of Award
<b>C26002 (1)</b>	<b>100.00 %</b>	<b>\$337,025,000</b>	<b>\$41,086,647</b>	<b>12.19 %</b>	<b>\$41,086,647</b>	<b>12.19 %</b>
C26005 (2A)	100.00 %	\$325,000,000	\$47,615,409	14.65 %	\$47,615,409	14.65 %
C26010 (2B)	76.88 %	\$324,600,000	\$33,710,298	10.39 %	\$27,486,388	8.47 %
C26006 (3)	91.11 %	\$176,450,000	\$34,451,761	19.52 %	\$23,291,919	13.20 %
C26007 (4B)	99.93 %	\$447,180,260	\$1,325,639	0.30 %	\$1,325,639	0.30 %
C26011 (4C)	64.07 %	\$258,353,000	\$31,686,971	12.26 %	\$25,112,529	9.72 %
<b>C26013 (5A)</b>	<b>100.00 %</b>	<b>\$34,070,039</b>	<b>\$6,525,471</b>	<b>19.15 %</b>	<b>\$6,525,471</b>	<b>19.15 %</b>
C26008 (5B)	99.63 %	\$301,860,000	\$26,463,649	8.77 %	\$19,181,413	6.35 %
C26012 (5C)	45.05 %	\$208,376,000	\$8,198,012	3.93 %	\$3,224,339	1.55 %
C26009(6)	62.18 %	\$261,900,000	\$9,257,282	3.53 %	\$7,364,482	2.81 %
<b>TOTAL TO DATE</b>		<b>\$2,674,814,299</b>	<b>\$240,321,139</b>	<b>8.98 %</b>	<b>\$202,214,236</b>	<b>7.56 %</b>

To date, \$2,254,441,025 (84.3%) worth of all base contract construction work has been completed. As a percentage of work completed, the AWO exposure for these contracts = 10.66% and the executed AWO % = 7.56%

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 \$260 million, which is consistent with the \$262 million adjusted AWO Budget currently maintained in the MFACC CWB.

The MFACC maintains an AWO forecast @ completion which includes input from its Risk Registers. The MFACC AWO EAC Forecast through July 31, 2015, is \$335,609,538. Since its

inception in March 2014, this forecast has increased over 26%. If this trend continues, total AWO expenditures on the project may approach \$400M. 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 MFACT Current Working Budget, expenditures as of August 31, 2015 reported by the MFACT and the current AWO Exposure analyses; the PMOC has developed the following contingency analysis:

	Contingency Analysis	
	Current	At 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	\$1,126,614,917	\$1,126,614,917
Soft Cost Forecast to Complete	\$234,361,285	\$252,518,285
AWO Exposure	\$240,321,139	\$335,609,538
Total Contingency	\$174,888,360	\$61,442,961
Reserved Contingency	\$160,000,000	\$61,442,961
Available Contingency	\$14,888,360	
Transfer from Reserved Contingency		\$98,557,039

Notes:

- (1) AWO Exposure @ Completion incorporates MFACT "risk-informed" forecast through July 2015
- (2) Total Contingency = budget balance after forecast expenditures
- (3) Final Contingency Balance reflects current forecast transfer of \$98,557,039 from Reserved Contingency
- (4) Minimum Available Contingency required by ELPEP is approximately \$45,000,000 (100% Construction Held, 85% Construction Complete).

Conclusions based upon this analysis include:

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

**ELPEP/ CMP Compliance:** The SAS Project Team maintains an EAC for all construction cost, 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 intangible goals enumerated for Cost Management in the Enterprise Level Project Execution Plan (ELPEP), dated January 15, 2010 (Section IV. b, page 8), and as further described by the Cost Management Plan (CMP).



## 4.0 RISK MANAGEMENT

### Status

Major risks challenging the SAS Project Team at this time are primarily schedule related. The Project maintains individual Risk Registers for each active contract. The resulting cost and schedule contingency curves are consistent with the previous discussions contained within this report.

### Observation and Analysis:

For several months, the MFACC has reported that the SAS Contract Risk Registers and Risk Analysis were performed in late December 2014, and that results of this analysis were reviewed with the MFACC Executive Management in March 2015. To date, the resulting schedule and cost contingency forecast curves have not been released.

In its most recent Monthly Risk Report, dated August 26, 2015, MFACC reviews what it considers to be the six (6) significant risks to the project:

- 1) **Track Installation Delay:** Installation of track and related work was on the project's primary critical path. Previous delays were mitigated through a re-sequenced work plan which significantly increased schedule float associated with this work.

IPS Update #108 and #109 confirm that new delays have occurred and schedule float has been reduced to 3 WD (IPS #109). Several issues are reportedly contributing to the new delay scenario:

- Lack of adequate tunnel ventilation and tunnel ventilation plans, largely due to lack of electric power to run the fans;
- Reduced physical access for material delivery due to the progression of station construction work that was not anticipated; and
- A new round of submittal review delays.

New schedule acceleration initiatives are under consideration by MFACC; however, concern has been expressed over the availability of additional options to materially improve the schedule. MFACC and the Systems Contractor continue to hold bi-weekly meetings in an effort to resolve track work issues and expedite the submittal development and review process.

- 2) **72nd Street Station Entrance 1:** In December 2014, the MFACC and the 72<sup>nd</sup> Street Station Contractor executed a change order to accelerate construction at 72nd Street Station Entrance 1 from January 27, 2017 to September 16, 2016. Work is currently on schedule however concern remains due to limited availability of mitigation options should additional delay be encountered.
- 3) **Facility Power:** Timely availability of permanent facility power at the new stations is necessary to ensure the timely completion of system installation, testing, and commissioning activities. The current IPS indicates that all stations will be energized by early 2016. All contractors reportedly support this date.
  - **72nd Street Station:** Rooms are complete equipment is in place except for the mimic panel. Installation work is under way. Third party testing may start in Ancillary #2 as

early as September. All property line boxes are installed. Power cable installation from ConEd manhole to the property line boxes may be a problem due to the relatively long distance. Forecast availability of permanent power remains December 30, 2015.

- **86th Street Station:** All rooms are complete and most equipment is in place. Late delivery of low voltage and DC equipment may impact the Facility Power availability date. To mitigate this delay, an acceleration plan install wire and make terminations in parallel to 3<sup>rd</sup> party testing is under consideration. All property line boxes are installed except for the Traction Power box. Forecast availability of permanent power is currently February 2, 2016, however the contractor is presently committing to a plan for Facility Power availability by end of 2015.
- **96th Street Station:** Wire termination is completed and 3<sup>rd</sup> party testing is forecast to be complete by early September 2015. All property line boxes are installed. Approval and acceptance of Third Party Testing procedures has not been determined. Availability of permanent power is currently November 4, 2015.

Various technical and commercial issues have affected this work at each of the stations. The MTACC continues to work through these issues. Permanent power is currently forecast to be available at each station in time to support testing and commissioning activities.

#### 4) **Delays to Achievement of Access Milestones:**

As noted elsewhere in this report, MTACC has encountered significant delays in achieving the turnover of system equipment rooms from station contractors to the system contractor, specifically those associated with IPS schedule milestones.

With respect to a forward-looking strategy to minimize these risks, MTACC's most recent Monthly Risk Report, dated August 26, 2015 offers the following:

“Continue to work with the contractor to assure that the access dates will be delivered as planned”.

By email dated August 13, 2015, MTA's Independent Engineering Consultant (IEC) has recently expressed concern over the progress and completeness of room turnovers at the 86<sup>th</sup> Street Station. Issues specifically cited include:

- Preliminary punch list” work not completed
- Of 67 punch list items, 44 appear to be incomplete items within the scope-of-work
- Of the 7 rooms conditionally accepted, only 4 are actually on the Milestone room list.
- Contractor is not intending to follow the milestone sequence, but is fitting out the station to his own convenience.
- NYCT staff did not participate in the punchlist inspections.

Based upon information evaluated and direct PMOC observations, it appears MTACC's management of the room acceptance and turnover process has regressed significantly and is no longer being conducted in accordance with procedures developed as part of the risk management process.

## 5) Architectural Finishes

Currently, this risk specifically involves sandblasting and painting of exposed architectural concrete at station entrances in order to obtain a finish acceptable to NYCT. Discussion of this risk within the most recent Risk Management report does not appear to be consistent with the current status of the issue(s).

- Architectural concrete finish is an issue at both 72<sup>nd</sup> and 86<sup>th</sup> Street Stations. The issue is currently a critical delay on the approved C4C schedule update. The risk report only mentions this delay at 86<sup>th</sup> Street Station.
- Remedial work is set to start at 86<sup>th</sup> Street Station, Entrance 1 in the near future. This is the primary ingress/egress to the work area.
- The risk of delay to follow-up escalator installation at each entrance is significant.

No mitigation strategy is offered by M<sup>T</sup>ACC for this risk.

## 6) Water Infiltration at 96<sup>th</sup> Street Station

This issue remains a risk to construction progress at 96<sup>th</sup> Street Station. Grouting operations have reportedly reduced water infiltration significantly, however the success of the overall effort is still uncertain and the work is not forecast to be completed until late 2015. This issue has had a significant impact on construction progress throughout the station.

No newspecific mitigation strategies are offered by M<sup>T</sup>ACC.

### Conclusions

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

## 5.0 ELPEP

The most recent ELPEP Quarterly Review Meeting was held on June 12, 2015. The next ELPEP Quarterly Review Meeting with the M<sup>T</sup>ACC, the FTA RII, SAS and ESA projects and the PMOC is scheduled for September 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):** The M<sup>T</sup>ACC has resolved all remaining FTA/PMOC comments and has issued the final revised PMP.
- **Schedule Management Plan (SMP):** The M<sup>T</sup>ACC's position is that the SAS management processes remain ELPEP compliant;
- **Cost Management Plan (CMP):** The PMOC comments for both SAS and ESA have been consolidated and forwarded to the FTA. The M<sup>T</sup>ACC's position is that the SAS management processes remain ELPEP compliant; and
- **Risk Mitigation Capacity Plan (RMCP) and Risk Management Plan (RMP):** The M<sup>T</sup>ACC's position is that the SAS management processes remain ELPEP compliant.

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 FT/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 July 31, 2015, a total of 11,185,893 construction hours have been logged on the project with 93 lost time and 170 recordable incidents documented. The total hours and incidents equates to a Lost Time Rate (LTR) of 1.66 and a Recordable Rate (REC) of 4.70. The LTR is below and the REC is above the US Bureau of Labor Statistics (BLS) national rate (Heavy & Civil construction) of 1.8 and 3.2 respectively. Although the REC is above the BLS national rate, it continues to show a steady 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 Contract and the System Contract. Technical Working Group meetings are being held with each station contractor and the system contractor to review the test status of the certifiable items. Body of Evidences (BOEs) required to support the verification of completed Certifiable Items List (CIL) are being accumulated and inputted into the data base.

## **7.0 ISSUES AND RECOMMENDATIONS**

**Schedule Performance:** Completing all work and implementing new service on or near the schedule RSD is the primary issue of concern. There are several issues affecting the current schedule forecast with which the PMOC has concerns:

- The PMOC has concerns over the validity of the schedule forecasts made by the IPS. Consequently, the PMOC has attempted to validate some portion of the IPS and its general forecasts using secondary data sources including:
  - Schedule milestone performance tracking;
  - IPS comparison with source (contractor) schedules;
  - “Earned schedule” analysis; and
  - Direct observations made by the PMOC at contract progress meetings.

Details of these analyses are included in Section 2.0 of this report. In each instance, data reviewed does not support the forecasts contained in the IPS and generally suggests the “real” RSD forecast to be slipping significantly.

- MTACC has overcome significant problems in successfully managing the project schedule to date. However, the PMOC is concerned that the MTACC has lost focus on realistic schedule goals as well as the resolution of those issues most likely to cause major delay to the project RSD.

## APPENDIX A – ACRONYMS

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AFI	Allowance for Indeterminates
ARRA	American Recovery and Reinvestment Act
AWO	Additional Work Orders
BA	Budget Adjustment
CBH	Circuit Breaker House
CCM	Consultant Construction Manager
CD	Calendar Days
CL	Certifiable Items List
CMF	Cost Management Plan
CSSR	Contact Status Summary Report
CPRB	Capital Program Review Board
CPP	Contract Packaging Plan
CWB	Current Working Budget
CY	Cubic Yards
DCB	Detailed Cost Breakdown
DMP	Deformation Monitoring Points
EAC	Estimate at Completion
ELPEP	Enterprise Level Project Execution Plan
EPC	Engineering-Procurement-Construction
FFGA	Full Funding Grant Agreement
FTA	Federal Transit Administration
GO	General Outage
IPS	Integrated Project Schedule
MO	Month
MPT	Maintenance Protection of Traffic
MTA	Metropolitan Transportation Authority
MTACC	Metropolitan Transportation Authority – Capital Construction
NA	Not Applicable
NOA	Notice of Award
NTP	Notice to Proceed
NYCT	New York City Transit

NYSPTSB	New York State Public Transportation Safety Board
OSS	NYCT Office of System Safety
PE	Preliminary Engineering
PEP	Project Execution Plan
PMOC	Project Management Oversight Contractor (Urban Engineers)
PPM	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
SM	Schedule Management Plan
SOE	Support of Excavation
SSCC	Safety and Security Certification Committee
SSOA	State Safety Oversight Agency
SSPP	System Safety Program Plan
TBD	To Be Determined
TBM	Tunnel Boring Machine
TF	Total Float (Schedule)
TCC	Technical Capacity and Capability
VE	Value Engineering
WBS	Work Breakdown Structure
WD	Work Days

**APPENDIX B – TABLES**

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**Table 1 - Summary of Schedule Dates**

	FFGA ( March 2015)	Forecast Completion	
		Grantee	PMOC
Begin Construction	January 1, 2007	March 20, 2007A	March 20, 2007A
Construction Complete	August, 2016	November 11, 2016	October 2017
Revenue Service	February 28, 2018	December 30, 2016	February 2018

A = Actual

**Table 2 - Schedule Contingency**

IPS Update #	103	104	105	106	107	108	109
Data Date	02/01/15	03/01/15	04/01/15	05/01/15	06/01/15	07/01/15	08/01/15
	Contingency ( CD)						
RSD=12/30/2016							
Risk Mitigated	38	38	49	43	45	50	50
Risk Realized	38	38	49	43	45	50	50
RSD=02/28/2018							
Risk Mitigated	461	461	473	467	469	474	474
Risk Realized	461	461	473	467	469	474	474

**Table 3 - Schedule Milestone Comparison**

Pkg	MS	Description	Dates			Variance		Sch Float 109	Float Δ
			Adjusted	UD #108	UD #109	Contract	Month		
C2B	6B	Full access to Comm Rooms & Closets	08/21/14	07/08/15	<b>08/31/15</b>	-375	54	37	<b>-36</b>
C2B	6C	Full access to Comm Rooms & Closets	08/21/14	07/08/15	<b>08/31/15</b>	-375	54	37	<b>-36</b>
C2B	7A	Full access to Signal Rooms	08/21/14	07/08/15	<b>08/31/15</b>	-375	54	10	<b>-5</b>
C2B	7B	Full access to Signal Rooms	08/21/14	07/24/15	<b>08/31/15</b>	-375	38	12	<b>-3</b>
C2B	7C	Full access to Signal Rooms	08/21/14	07/24/15	<b>08/31/15</b>	-375	38	125	<b>-24</b>
C2B	8A	Full access to Traction Power Rooms:	08/21/14	08/06/15	<b>08/31/15</b>	-375	25	32	<b>6</b>
C2B	8B	Full access to Traction Power Rooms:	08/21/14	08/06/15	<b>08/31/15</b>	-375	25	180	<b>-14</b>
C2B	8C	Full access to Traction Power Rooms:	08/21/14	08/06/15	<b>08/31/15</b>	-375	25	180	<b>-14</b>
C2B	9	Full access to Station Service Centers	11/21/14	11/30/15	<b>10/22/15</b>	-335	-39	275	<b>30</b>
C2B	10	Complete all remaining Comm, Signal, & Traction Power work	09/21/14	08/10/15	<b>08/14/15</b>	-327	4	83	<b>0</b>
C2B	SS	Substantial Completion	12/21/15	11/11/16	<b>11/11/16</b>	-326	0	0	<b>0</b>
C3	SS	Substantial Completion	05/13/14	02/22/16	<b>03/16/16</b>	-673	23	172	<b>-14</b>
C4C	7A	Complete Work in all Comm Rooms		09/17/15	<b>03/18/16</b>	-42447	183	166	<b>-125</b>
C4C	7B	Complete Work Ancillary #1		07/31/15	<b>08/17/15</b>	-42233	17	254	<b>-11</b>
C4C	10	Complete north power rooms	02/25/15	09/30/15	<b>7/27/2015 A</b>	-152	-65		
C4C	12	Full access @ Station Service Center(s)	08/28/14	08/07/15	<b>08/21/15</b>	-358	14	69	<b>-6</b>
C4C	SS	Substantial Completion w/o Ent. #1	11/13/15	07/30/16	<b>09/16/16</b>	-308	48	57	<b>-48</b>
C4C	SS	Substantial Completion - Ent. #1	10/07/16	09/16/16	<b>09/16/16</b>	21	0	40	<b>0</b>
C5C	2	Limited Access; Sta. 1209+00->1198+00	01/22/15	07/01/15	<b>1/31/2015 A</b>	-9	-151		
C5C	3	Shared Access; Sta. 1209+00->1198+00	05/22/15	07/15/15	<b>5/31/2015 A</b>	-9	-45		
C5C	5	Turnover of Comm Rooms	09/23/14	07/15/15	<b>4/16/2015 A</b>	-205	-90		
C5C	6	Turnover of Comm Rooms	03/24/15	08/13/15	<b>08/31/15</b>	-160	18	39	<b>-11</b>
C5C	6A	Room to-Room Conduit Ready	03/24/15	08/13/15	<b>08/31/15</b>	-160	18	40	<b>-11</b>
C5C	7	Turnover of Signal Rooms	02/25/15	07/22/15	<b>08/31/15</b>	-187	40	45	<b>-25</b>
C5C	7A	Room to-Room Conduit Ready		07/22/15	<b>08/31/15</b>	-42247	40	46	<b>-25</b>
C5C	8	Turnover of Signal Rooms	02/25/15	07/22/15	<b>08/31/15</b>	-187	40	45	<b>-25</b>



Pkg	MS	Description	Dates			Variance		Sch Float 109	Float Δ
			Adjusted	UD #108	UD #109	Contract	Month		
C5 C	8A	Room to Room Conduit Ready	02/25/15	07/22/15	<b>08/31/15</b>	-187	40	46	<b>-25</b>
C5 C	9	Turnover Traction Power Rooms	02/26/15	07/15/15	<b>08/31/15</b>	-186	47	16	<b>-11</b>
C5 C	9A	Room to Room Conduit Ready	02/26/15	07/15/15	<b>08/31/15</b>	-186	47	89	<b>-30</b>
C5 C	10	Turnover Traction Power Rooms	02/25/15	07/09/15	<b>08/31/15</b>	-187	53	39	<b>15</b>
C5 C	10A	Room to Room Conduit Ready	02/25/15	07/09/15	<b>08/31/15</b>	-187	53	89	<b>-34</b>
C5 C	11	Full access @Station Service Center(s)	03/24/15	07/09/15	<b>11/03/15</b>	-224	117	83	<b>-80</b>
C5 C	14b	Limited Access all locations	09/23/14	07/08/15	<b>2/28/2015 A</b>	-158	-130		
C5 C	15	Comp. Permanent Power		01/28/16	<b>02/02/16</b>	-42402	5	95	<b>10</b>
C5 C	SS	Substantial Completion	05/31/16	08/12/16	<b>09/06/16</b>	-98	25	48	<b>-16</b>
C6	2A	Complete LAN - 96th St. Station	05/18/15	01/08/16	<b>01/21/16</b>	-248	13	123	<b>-9</b>
C6	2B	Complete WAN - 96th St. Station	05/18/15	01/08/16	<b>01/21/16</b>	-248	13	123	<b>-9</b>
C6	3A	Complete LAN - 86th St. Station	07/18/15	03/30/16	<b>03/03/16</b>	-229	-27	101	<b>19</b>
C6	3B	Complete WAN - 86th St. Station	07/18/15	03/30/16	<b>03/03/16</b>	-229	-27	101	<b>19</b>
C6	4A	Complete LAN - 72nd St. Station	02/18/15	01/07/16	<b>02/04/16</b>	-351	28	134	<b>-20</b>
C6	4B	Complete WAN - 72nd St. Station	02/18/15	01/07/16	<b>02/04/16</b>	-351	28	134	<b>-20</b>
C6	5A	Complete LAN - 63rd St. Station	04/18/14	09/14/15	<b>09/23/15</b>	-523	9	215	<b>61</b>
C6	5B	Complete WAN - 63rd St. Station	04/18/14	09/14/15	<b>09/23/15</b>	-523	9	215	<b>61</b>
C6	5C	Complete all 63rd St. Station work	04/18/14	04/05/16	<b>06/27/16</b>	-801	83	98	<b>-56</b>
C6	SS	Substantial Completion	08/18/16	11/07/16	<b>11/07/16</b>	-81	0	3	<b>3</b>

**Table 4 - Project Budget/ Cost** 

	FFGA			FFGA Amend	MTA Current Working Budget (CWB)		Expenditures as of August 31, 2015	
	\$ Millions	% of Total	Obligated (\$ Millions)	3/17/2015	\$ Millions	% of Total	\$ Millions	% of Total
Grand Total Cost:	4,866,614	100	4,572,942	5,574,614	5,267,614	100	3,556,179	67.51
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	4,451,000	84.50	3,556,179	67.51
Total Federal:	1,350,693	27.75	1,063,942	1,373,893*	1,350,693	24.60	1,113,498*	21.14
Total FTA share:	1,300,000	96.25	990,049	1,300,000	1,300,000	23.68	1,113,498*	21.14
5309 New Starts share	1,300,000	100	990,049	1,300,000	1,300,000	23.68	1,039,605	19.74
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	2,442,681	46.37
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 MTA's Grant Management Department.

\*\* Current MTA Board approved budget.

**Table 5 - Estimate at Completion**

Category	Current Working Budget	EAC Forecast
<b>Total Construction</b>	\$2,674,814,299	\$3,010,423,837.00
<b>Engineering Services Subtotal</b>	\$622,862,000	\$684,157,000.00
<b>Third Party Expenses</b>	\$554,086,273	\$562,086,000.00
<b>TA Expenses</b>	\$131,160,085	\$132,890,202.00
<b>Contingency</b>	\$468,077,343	
<b>Total</b>	\$4,451,000,000	\$4,389,557,039

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

<b>Std Cost Category (SCC)</b>	<b>Description</b>	<b>FFGA (January 2008)</b>	<b>FFGA Amended (March, 2015)</b>	<b>MTA's Current Working Budget (June, 2015)</b>
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
<b>Subtotal</b>		<b>\$4,050,000,000</b>	<b>\$4,758,000,000</b>	<b>\$4,451,000,000</b>
<b>Financing Cost</b>		<b>\$816,614,000</b>	<b>\$816,614,000</b>	<b>\$816,614,000</b>
<b>Total Project</b>		<b>\$4,866,614,000</b>	<b>\$5,574,614,000</b>	<b>\$5,267,614,000</b>

**Table 7 - Core Accountability Items**

Project Status:		Original at FFGA	Current*	ELPEP**
<b>Cost</b>	Cost Estimate	\$4,050 million	\$4,451 million	\$4,980 million
<b>Contingency</b>	Unallocated Contingency	\$555.554 million	\$175 million	\$45 million
	Total Contingency (Allocated plus Unallocated)	\$555.554 million	\$175 million (August 2015)	\$45 million
<b>Schedule</b>	Revenue Service Date	June 30, 2014	December 30, 2016	February 28, 2018
<b>Total Project Percent Complete</b>	Based on Expenditures	79.9%		
	Based on Earned Value	N/A		
<b>Major Issue</b>		<b>Status</b>	<b>Comments</b>	
Construction Schedule Delay		Open	Achieving the current RSD of December 30, 2016 is the major risk issue on the project. Over recent periods, there has been a general inability to maintain planned construction schedule progress. Consistently delayed achievement of milestone dates and other schedule commitments may ultimately impact the project RSD	
<b>Date of Next Quarterly Meeting:</b>		TBD		

\* MFACC's Current Working Budget

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

Schedule data based upon IPS Update #109; Data Date = 08/1/2015

Financial data based upon MFACC reporting through 08/31/2015