

PMOC MONTHLY REPORT
East Side Access (MTA C&D-ESA) Project
Metropolitan Transportation Authority
New York, New York

Report Period January 1 – January 31, 2020

PMOC Contract No. DTFT60D1400017

Project No. DC-27-5287, Task Order No. 0002, Work Order No. 10

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Length of time on project: Thirteen 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 the FTA or the project sponsor, in accordance with the purposes as described below.

For projects funded through the FTA Full Funding Grant Agreements (FFGA) program, FTA and its Project Management Oversight Contractor (PMOC) use a risk-based assessment process to review and validate a project sponsor’s 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 will change from month to month, based on relevant factors for the month and/or previous months.

EXECUTIVE SUMMARY

This summary highlights key events and important issues for the current month.

Overall Program Status¹: The Overall Program is 81.4% actual versus 82.6% as-planned (based on invoice cost and April 2018 EAC forecast).

Construction Status¹: The Construction Status is 85.8% actual versus 87.1% as-planned (based on invoice cost and April 2018 EAC forecast).

Contracts

Awarded/Completed: (None)

Construction Progress Issues: CM014B, CS084, CS179, CS086.

Program Funding: Total program funding is \$10,335 million, which is sufficient for the MTA C&D forecasts through December 2020.

Program Cost and Budget: Total remaining contingencies decreased to \$450.9 million (\$330.0 million unallocated; and \$120.9 million allocated).

Integrated Project Schedule: The target RSD forecast remains April 18, 2022. The program critical path is controlled by Manhattan/Systems work.

Risk Management: 13 major risks remain.

Harold Interlocking: No Issues.

Key Stakeholder Issues: LIRR – Late resolution of CS179, CS084, CS086, and VS086 issues; late completion of Positive Train Control Design. MTA C&D- Change Order processing issues, GEC CPS support for Contractor Submittals, Redesigns, RFIs, Field Conditions.

Construction Safety: 0.81 – Lost Time (LT) and 1.61 Recordable (RI) BLS Injury ratios during December 2019; both lower than November 2019.

ELPEP Compliance: MTA C&D reported Schedule Contingency is 36 CDs less than the ELPEP minimum; Cost is \$191 million above ELPEP minimum.

Project Management Plan: MTA C&D is updating PMP/Sub-plans to reflect major management, organizational, and process changes (in progress).

Buy America: One CS179 Issue – Small Split HVAC units (waiver requested).

All Project Sponsor cost and schedule data included in this report is based on the MTA C&D East Side November 2019 Monthly Progress Report, referenced in this report as the ESA November 2019 MPR, which has a Cost and Schedule data date of December 1, 2019. Unless otherwise noted, all progress percentages in this report are based on invoiced costs, not actual construction.

REPORT FORMAT AND FOCUS

This report is submitted in compliance with the terms of the Federal Transit Administration (FTA) Contract No. DTFT60D1400017, Task Order No.2. Its purpose is to provide information and data to assist the FTA as it continually monitors the Project Sponsor's technical capability and capacity to execute a project efficiently and effectively, and hence, whether the Project Sponsor continues to be ready to receive federal funds for further project development. This report covers the project and quality management activities on the East Side Access (ESA) Mega-Project managed by MTA Capital Construction (MTA C&D) with MTA as the Sponsor and financed by the FTA FFGA.

¹ Based on invoice cost and April 2018 EAC forecast.

MONITORING REPORT

1.0 PROJECT STATUS

a. Engineering Design and Construction Phase Services

In the ESA November 2019 Report, the PMT reported the overall engineering effort at 87.6% complete compared to planned completion of 88.6%. Since the ESA July 2018 MPR, the PMT calculates summary Engineering progress as a percentage of the \$871.8 million April 2018 engineering EAC forecast.

Status of Construction Packages Advertised

CH063 Electric Traction Catenary Work, 3rd Party: The RFQ for this contract was advertised earlier in 2019 and MTA C&D received seven proposals, of which four were deemed “pre-qualified”. ESA issued a “Best and Final Offer” solicitation for this contract on September 11, 2019, and responses were originally due back to ESA in December 2019. Due to many proposers’ questions, however, ESA has delayed the award of this contract and now anticipates an early April 2020 award.

Status of Construction Packages Not Awarded

CM015 – 48th Street Entrance: MTA/MTA C&D-ESA has reached agreements with the owners of the buildings at 415 Madison Avenue and 270 Park Avenue regarding the ESA 47th Street and the 48th Street Entrances to the LIRR Concourse at GCT. As a result, and with the FTA's August 2019 concurrence, the owner of 415 Madison Avenue will construct the 48th Street Entrance core and shell and will complete the facility fit-out work.

FQA33B, Mid-Day Storage Yard Facility – Amtrak F/A, includes provision for what was originally a second west end yard access to the Amtrak mainline through a connection from Sub 3 to Line 4. During March 2019, however, MTA C&D received CCC approval to pursue this option for the single west end MDSY exit. Correspondingly, the funding for the FQA33A Sub 4 to Line 2 connection option, which was under previous consideration, will be transferred to the FQA33B Sub 3 to Line 4 option.

Status of Positive Train Control Design

Positive Train Control: The MOU between MTA C&D and LIRR for the implementation of Positive Train Control (PTC) on ESA was executed and the Technical Concurrence Document has been agreed upon by MTA C&D and LIRR. MTA C&D-ESA will be installing, testing, and commissioning PTC for all track and signal systems built under the ESA Program.

- LIRR had been expected to complete the PTC design by March 31, 2018, but this was significantly delayed due to extensive resolution of GEC and LIRR technical issues regarding Contracts VS086, CS086, and CS179. Although LIRR had reportedly provided most of the design information to the GEC, there remained outstanding items at that time required for completion of the additional scope of work for the three contracts noted above, including: Final Design, Book of Plans, Bill of Material and details of the Wayside Interface Units for Plaza Interlocking; PTC L2 Switch and FDP drawing for each ESA interlocking; and Final LIRR PTC test plans and procedures, including FRA test plans. As of January 31, 2019, some, but not all, of these items have been provided to the GEC. Completion of the PTC design by LIRR is now forecast for April 2020.
- The GEC had earlier prepared initial scope design modifications to Contracts CS179, VS086, and CS086, which will provide for the LIRR designed PTC overlay onto the ESA systems. The GEC has provided LIRR with the proposed changes for PTC on these

contracts to insure coordination with the LIRR PTC requirements, but contract modifications cannot be finalized absent the final PTC design. Accordingly, MTA C&D made the decision during Q4 2019 to work through the CPR and contract modification process with the CS179, VS086 and CS086 contractors for incorporation of as much of the PTC work scope that can be reliably included based on PTC “assumptions” developed by MTA C&D that will be included in the CPRs for the three referenced contracts. Due to continuing delays to completion of the PTC design by LIRR, MTA C&D is now planning to complete installation of PTC after completion of the base signal system under VS086 and CS086, and this will delay substantial completion of both ESA contracts.

Status of MTA C&D and LIRR Review and Approval of Systems Contractors’ Final Designs

CS179, Systems Facilities Package No.1: The backlog of needed decisions continues to remain as a serious issue and contributes to delay of change orders needed to progress work and to facilitate the design completion of the Control and Non-Control Systems. MTA C&D management acknowledges that only 8 of the 10 Control system final designs (FDs) are approved. As of the end of January 2020, the completion and approval of all 10 Control System final designs is 45 months late. Completion of Non-Control Systems designs also continues to be delayed, with the contractor continuing to assert that open issues and NOCs that remain unaddressed are responsible for delaying its ability to complete these designs and the subsequent completion equipment rack fabrication.

As of the end of January 2020, the number of contractor submittals (plus 19 RFIs and 1 FCR) awaiting MTA C&D responses was 468. The delay in providing responses to the contractor is still, per the contractor, impacting work progress. Two Control Systems (Fire Life Safety and Security Management) are still under design development. Additionally, the Voice Communications System, which had already received approval by LIRR, continues to undergo some design modifications. The full impact on contract progress of the delays to completion of FD on Control and Non-Control Systems remains undetermined at this time.

CS084, Traction Power Systems Package 4: Some design issues related to water remediation methodologies in spaces designated for CS084 equipment and other identified field construction issues continue to remain open – most notably, the solution to the water issue at the C03 substation that has all CS084 work at that location “on hold”. Further discussions on what action might be taken on any possible modification of the implementation methodology designed for the “blue light” system are underway. The contractor continues to indicate that any change in design of the “blue light” system at this time will require further changes to the PLC software.

VS086, Systems Package 3 – Signal Equipment Procurement: The PMOC previously reported that there were four (4) design issues needing resolution or direction that had the potential to adversely impact the schedule. There are now seven (7) outstanding design issues that continue to impact the completion of the signal design under this contract. They are: 1) PTC design and incorporation; 2) PTC Application Logic changes; 3) Electromagnetic Interference (EMI) requirements; 4) issues regarding the “light-out” protection design; 5) inclusion of the design and provisioning of train departure test equipment, 6) preparation of Track and Signal Routing (TSR) designs and charts; and 7) the possibility of a software-based design change to the operational methodology for the “Diamond” track switch.

CS086, Tunnel Systems Package 2 – Signal Installation: It was previously reported that the only design issues noted by MTA C&D on this contract revolved around issues related to installation of equipment in the field. Specific problems include the ability to properly install signal cases and signal heads in the designated locations – there are some noted obstructions – and the mounting of

impedance bonds to the track bed, where mounting plate attachment points appear to be out of tolerance. While those issues remain open, some additional design/installation issues were recently identified (i.e., missing “ground” plates, additional equipment racks, and installation of 91.6 Hz ATS equipment). A contract modification to address the changes incorporated into the conformed contract documents is still required.

b. Procurement

The ESA November 2019 Report shows that total procurement for the ESA Program is 87.5% complete, with total awards at \$9,740 million. Since the ESA July 2018 MPR, the PMT calculates summary procurement progress as a percentage of the \$11,133 million ESA program April 2018 EAC forecast. Active procurements include:

CH063 Electric Traction Catenary Work, 3rd Party: This will be a negotiated procurement using the RFP process. The scope of work will include ET catenary relocation work for the Mid-Day Storage Yard, catenary construction work for the new W crossover in Harold Interlocking, and other miscellaneous catenary work. The contract was advertised online in January 2019 and responses were received in March 2019. Of the 7 responses received, 4 were deemed “Pre-Qualified” and proposals from those 4 respondents were solicited in a “Best and Final” (BAFO) solicitation issued on September 11, 2019. BAFO responses were originally due back on December 9, 2019, but ESA delayed award of the contract due to many proposers’ questions and the proposals are now due on February 28, 2020. ESA anticipates award of the contract in early April 2020.

c. Construction

The ESA November 2019 Report states that the total construction progress reached 85.8% complete compared with 87.1% as-planned. Since the ESA July 2018 MPR, the PMT calculates summary construction progress as a percentage of the \$8,014 million April 2018 construction EAC forecast. The percentage of work complete, as shown throughout this report, is calculated using invoiced costs to represent construction progress. The current contract and force account budgets equal the amounts that are allocated in the MTA Impact accounting system and are used for percentage calculations for individual contracts.

Manhattan Contracts

Costs and substantial completion dates are tabulated below for active Manhattan contracts.

| | Current Budget | Appr'd Contract | Rem Budget | Invoice Cost | EAC | Planned Comp | Invoice Comp | Current BL SC | Forecast SC | Notes |
|--------|----------------|-----------------|------------|--------------|---------|--------------|--------------|---------------|-------------|-------|
| CM007 | 708.3 | 667.8 | 40.5 | 550.1 | 725.0 | 96.5% | 82.4% | 1/28/20 | 10/8/20 | |
| | nc | nc | nc | +13.2 | (-5.5) | +2.2% | +2.0% | nc | +48 cd | |
| | 708.3 | 667.8 | 40.5 | 536.9 | 730.5 | 94.3% | 80.4% | 1/28/20 | 8/21/20 | |
| CM014B | 571.7 | 538.7 | 33.0 | 443.4 | 546.1 | 89.0% | 82.3% | 6/26/20 | 9/2/20 | |
| | (-7.8) | +5.5 | (-13.3) | +3.7 | (-19.0) | +1.4% | (0.2%) | nc | (-50 cd) | |
| | 579.5 | 533.2 | 46.3 | 439.7 | 565.1 | 87.6% | 82.5% | 6/26/20 | 10/22/20 | |
| VM014 | 46.9 | 34.9 | 12.0 | 32.4 | 50.7 | NA | 92.8% | 10/25/19 | 3/23/20 | |
| | nc | nc | nc | nc | (-1.0) | NA | nc | nc | nc | |
| | 46.9 | 34.9 | 12.0 | 32.4 | 51.7 | NA | 92.8% | 10/25/19 | 3/23/20 | |

Notes: Costs in millions; line 1 = current value; line 2 = period change, nc = no change; and, line 3 = prior value.
Please refer to the contract narratives for additional information.

CM007 – GCT Station Caverns and Track:

Schedule: The ESA November 2019 MPR reports that this contract was 82.4% complete vs. 96.5% planned. Milestone #5 (Substations US1 and US2 Complete) was forecast for November 22, 2019,

from the previous October 22, 2019. Milestone #5 was completed in November 2019 and included successful local testing.

Construction Progress: Through January 31, 2020, work proceeded in both the East and West Caverns with the pulling of control wire for the HVAC and installation of rail post supports for Stairs #9 and #11. HVAC Duct Progress remained approximately 78.7% complete, Piping was 79.7%. MEP Fire Protection remained approximately 69.5% complete and Plumbing was 93.8%. Electrical conduit was approximately 72.5% complete and Fixtures remained 91.1%. Architectural Wall progress was approximately 37.4% complete; Ceilings 28.5% and Flooring was approximately 23.7% complete.

Trackwork: On December 18, 2019, the contract began a 6 week Vehicle Access Restriction for the other ESA contractors working in the tunnels. All track work was completed on schedule on January 28, 2020.

Traction Power Track Monument Repairs: Work on Out-of-Tolerance monuments in Areas #1 and 2 are complete.

Rail Replacement: As previously reported by the PMOC, MTA C&D has identified, with the assistance of an independent engineering consultant, the need to replace some portion of the rail installed to date by the CM007 contractor due to observed significant deterioration involving pitting and corrosion. In January 2020, MTA C&D advised that detailed field inspection of the installed rail and evaluation of the extent of rail that will be replaced has been deferred until all rail installation is completed, now expected by May 1, 2020.

CM014B – Concourse and Facilities Fit-Out:

Schedule: The ESA November 2019 Report reports that this contract was 82.3% complete vs. 89.0% planned. The new contract date for Substantial Completion has been extended to February 2021, from the previous December 15, 2020, excluding completion of LIRR concourse within the footprint of foundation work for 270 Park Avenue. The Substantial Completion for the Biltmore Connection remains October 9, 2020, but may be further extended because MNR is removing force account support personnel at the Express Track Level. The JPMC Substantial Completion date for the Concourse Zone H4 work for 270 Park Avenue is reported as June 2021.

Construction Progress: Through January 2020, the HVAC Piping (Chilling System) remained at 45% complete and HVAC ductwork progress remained at 78% complete. Electricians continued with installation of branch light fixtures, conduit and pulling of wire. Plumbers continued roughing in plumbing chases and installation of fixtures. Installation of the marble stone wall finish is ongoing in public areas from south to north. Terrazzo flooring placement dominates at the south end of the Concourse, moving north. Installation of the suspended ceiling system continues throughout the Concourse from south to north. LIRR is making design changes to the Ticket Area, eliminating seating and revising display cases.

VM014 – Vertical Circulation Elements (Escalators and Elevators):

Schedule: Although this contract includes milestones covering fabrication and delivery of escalators and elevators, the actual schedule for those areas is driven by the respective schedules and access dates provided by the CM014B and CM007 contractors.

Construction Progress: For CM007, In-Contract Maintenance (ICM) is underway at Elevators #18, #19; Escalators #51, #52, #53, #54, #55, #56, #59 and #60. ICM Readiness Review preparations are underway for Escalators #51 - #57 & #58, #6, #62 & #64. Elevators #7 and #8 are in temporary use by the CM007 contractor. For CM014B, ICM is underway for Elevators #1, #2, #9, #11, #12, #17, and #21 and Escalators #30 and #31.

Queens Contracts

Costs and substantial completion dates are tabulated below for active Queens Contracts.

| | Current Budget | Appr'd Contract | Rem Budget | Invoice Cost | EAC | Planned Comp | Invoice Comp | Current BL SC | Forecast SC | Notes |
|-------|----------------|-----------------|------------|--------------|-------|--------------|--------------|---------------|-------------|-------|
| CQ033 | 334.3 | 324.8 | 9.5 | 260.5 | 348.5 | 84.5% | 80.2% | 8/10/20 | 1/3/21 | |
| | nc | +0.8 | (-0.7) | +7.0 | +0.3 | +3.1% | +2.0% | nc | +13 cd | |
| | 334.3 | 324.0 | 10.2 | 253.5 | 348.2 | 81.4% | 78.2% | 8/10/20 | 12/21/20 | |

Notes: Costs in millions; line 1 = current value; line 2 = period change, nc = no change; and, line 3 = prior value.
Please refer to the contract narratives for additional information.

CQ033 – Mid-Day Storage Yard Facility:

Schedule: No contract milestones were scheduled to be or were completed in January 2020.

Construction Progress: The contractor continued construction/installation of the following yard facilities during January 2020: CAM platforms; the Storage, Cart Storage, and toilet service buildings; water and sanitary sewers; yard lighting; traction power conduit and cables; track monuments; and track, turnout, and third rail in various locations within the MDSY.

Systems Contracts

Costs and substantial completion dates are tabulated below for active Systems contracts.

| | Current Budget | Appr'd Contract | Rem Budget | Invoice Cost | EAC | Planned Comp | Invoice Comp | Current BL SC | Forecast SC | Notes |
|-------|----------------|-----------------|------------|--------------|--------|--------------|--------------|---------------|-------------|-------|
| CS179 | 690.4 | 685.9 | 4.5 | 568.3 | 746.2 | 85.3% | 82.8% | 6/30/21 | 8/31/21 | 1 |
| | nc | +1.9 | (-2.0) | +8.5 | +2.8 | +0.8% | +1.0% | nc | +1 cd | |
| | 690.4 | 684.0 | 6.5 | 559.8 | 743.4 | 84.5% | 81.8% | 6/30/21 | 8/30/21 | |
| CS084 | 79.7 | 73.9 | 5.8 | 51.9 | 82.9 | 99.8% | 70.2% | 12/2/19 | 6/25/21 | 1 |
| | nc | nc | nc | +1.1 | +0.8 | +0.9% | +1.5% | nc | nc | |
| | 79.7 | 73.9 | 5.8 | 50.8 | 82.1 | 98.9% | 68.7% | 12/2/19 | 6/25/21 | |
| CS086 | 60.9 | 53.0 | 7.9 | 6.0 | 64.2 | 48.6% | 11.4% | 2/21/21 | 6/27/21 | 1 |
| | nc | nc | nc | +0.8 | (-0.7) | +3.1% | +1.6% | nc | +35 cd | |
| | 60.9 | 53.0 | 7.9 | 5.2 | 64.9 | 45.5% | 9.8% | 2/21/21 | 5/23/21 | |
| VS086 | 21.8 | 20.4 | 1.5 | 18.0 | 22.4 | NA | 88.1% | 7/2/20 | 11/19/20 | 1 |
| | nc | nc | nc | +0.3 | +0.1 | NA | +1.2% | nc | +57 cd | |
| | 21.8 | 20.4 | 1.5 | 17.7 | 22.3 | NA | 86.9% | 7/2/20 | 9/23/20 | |
| VH051 | 30.2 | 29.8 | 0.4 | 29.7 | 30.2 | NA | 99.6% | 4/30/15 | 7/13/21 | |
| | nc | nc | nc | +0.1 | nc | NA | +0.2% | nc | nc | |
| | 30.2 | 29.8 | 0.4 | 29.6 | 30.2 | NA | 99.4% | 4/30/15 | 7/13/21 | |

Notes: Costs in millions; line 1 = current value; line 2 = period change, nc = no change; and, line 3 = prior value.
Please refer to the contract narratives for additional information.

Forecast SC is based on the approved schedule that does not account for open unresolved issues.

CS179 – Systems Package 1 – Facilities Systems:

Schedule: In June 2019, MTA C&D presented a modified Integrated System Test Plan (ISTP), characterized as an “Incremental” ISTP to meet the testing requirements of the project. In previous reports, the PMOC noted its observations and concerns regarding this amended ISTP and advanced its opinion that the Incremental ISTP, as presented, was only an outline of what would be accomplished; and, that it failed to provide any details regarding the system tests, the testing methodologies, or testing schedule. The PMOC has requested that MTA C&D provide a much more detailed briefing on this Incremental ISTP; however, to date, MTA C&D has not been able to provide the requested briefing. MTA C&D currently advises that this incremental integrated system testing is scheduled to begin in August 2020, with a goal to achieve SC on July 9, 2021.

Design Progress: The completion of Final Design (FD) for all 10 Control Systems, due 45 months ago, has not occurred yet. Two (2) of the Control Systems (Building Management/Fire Life Safety and Security Management) are still under design development, and completion of Non-Control Systems designs continues to be delayed. The contractor continues to contend that the lack of resolution on open items is the primary cause for its delays; and, that any continued progress on system designs and equipment testing is being hampered by a lack of information from MTA C&D/LIRR, unanswered RFIs, and unissued CPRs that have the potential to alter existing designs. However, despite the delays in receiving FD approvals, the contractor continues to move forward with the development and submission of test plans.

Construction Progress: In January 2020, the CS179 contractor continued to actively progress installation work efforts in the tunnels, in numerous communications rooms, in substation facilities, and in various other areas where access was available and conditions warranted. The contractor has placed an increased focus on local testing of installed equipment and systems so as to move closer to its plan to begin system testing. Coordination issues with other contractors, unexpected field conditions, unresolved design issues, water infiltration remediation efforts, open NOCs/CPRs, and Stop Work Orders continue to impact further progress. The contractor reports that it is making progress on the replacement of the damaged duct banks at the 55th Street (C05) facility. The forecast is to complete the Southside ductbank installation in February and then begin excavation of the Northside ductbank. Once the Northside ductbank is exposed, MTA's GEC will develop a plan to replace it. Despite the fact that the BMS/FLSS and Security Systems have not achieved FD completion yet, factory testing for them is still scheduled for completion by the end of June 2020. Testing of the Backbone Communications System (BCS) – a Non-Control system was completed in January 2020. Testing of 6 of the 19 Non-Control Systems continues to remain incomplete due to either the lack of a completed design or the lack of approved test procedures for those systems. The contractor contends that development of test procedures for the 2 Control systems and the 6 Non-Control systems cannot be completed until contract interface coordination issues are adequately addressed, Stop Work Orders are lifted, and RFIs and NOCs are resolved.

The contractor is requesting more information from MTA C&D. MTA C&D needs to provide detailed information on how non-ESA work at 270 Park Avenue will impact the ESA CS179 work so that work schedules and overall installation and testing impacts can be determined. In January 2020, the contractor advised MTA C&D that the cable vault at the Roosevelt Island facility was, once again, filling up with water. MTA C&D reports that a root cause for this water infiltration is unknown and that it appears that the solution to this water infiltration issue will be to “manage” it over time rather than “prevent” it for all time. Installation of sump pumps at this location is, per MTA C&D, not an option at this time. The contractor has also identified the various areas that require remediation of electrical “ground” plates for the ESA signal system – plates installed by other contractors – and is making needed repairs to enable signal equipment installations by the CS086 contractor.

The PMOC continues to observe a lack of progress in the timely resolution of adjacent contractor interface issues. Although the affected contractors report that they meet on a regular basis to identify and develop strategies to resolve interface issues, there does not appear to be much progress on mitigating the issues. Further, the ESA PMT does not appear to be able to effectively manage the resolution of these adjacent contractor interface issues. The PMOC recommends that MTA C&D management take a larger role and assert more control in managing the resolution of these issues.

CS084 – Tunnel Systems Package 4 – Traction Power Systems:

Schedule: MTA C&D indicates that while the contractual CS084 SC date was December 2, 2019, the current forecast is June 25, 2021. However, as previously reported, the CS084 contract schedule is out of date and contract milestones – including the SC date – need to be adjusted after room access and other construction issues (including water infiltration remediation) are resolved with the CS179 contract. The contractor continues to indicate that all of the delays are as a result of late approval of substation designs, unresolved issues, and obstructions in CS084 work areas from other ESA contractors, SWOs, and site access restraints. In October 2019, MTA C&D provided the CS084 contractor with a list of assumptions (e.g., availability of all track monuments by the end of November 2019 and complete access to the C03 facility in January 2020) to use to develop a “recovery” schedule. At that time, and again in January 2020, the contractor indicated that it would attempt to provide the requested “recovery” schedule despite its belief that some of the MTA C&D-provided assumptions were unrealistic; for example, the new forecast of March 2020 was for C03 accessibility, and yet the water infiltration issue remains unresolved. As of the end of January 2020, the “recovery” schedule is still outstanding and the contractor is now requesting that MTA C&D update its assumptions because complete availability of all the track monuments by the end of November 2019 was not achieved.

Design Progress: Some design issues related to water remediation methodologies in spaces designated for CS084 equipment and other identified field construction issues continue to remain open – notably the solution to the water issue at the C03 substation that has all CS084 work at that location “on hold”. While a comprehensive plan for remediation of specification non-conformance issues related to the track monuments is still being developed, remediation efforts in many locations are underway. However, the ordering of the cabling from the monuments to the 3rd rail is still an issue, as the finite number of cables of the specific sizes needed for the monument sites cannot be determined until all the monument remediation efforts are completed. In January 2020, an issue regarding the attachment of the cable from the impedance bond bus to the negative return rail was identified by LIRR and under consideration by the contractor. Discussions with NYCT related to cathodic protection are continuing and MTA C&D is preparing to issue a contract modification to the GEC to perform a “study” of this concern. MTA C&D and the contractor continue discussions on what action might be taken on any possible modification of the implementation methodology designed for the “blue light”. The contractor continues to indicate that any change in design of the “blue light” system at this time will require further changes to the PLC software.

An agreement between the SCADA software designer and MTA regarding source codes is still needed before LIRR will grant final acceptance of the system.

Construction Progress: Equipment installations are complete in the C04 substation and the contractor was forecasting completion of all the C04 substation work in early February 2020; however, the contractor now reports that completion in early February 2020 will not be met because the CS179 contractor is still working in the area and there is no room for additional personnel. The contractor indicates that all equipment and material for the substations, with the exception of the C03 substation equipment/material, has been delivered to the respective substation locations. The C03 substation equipment is currently in storage awaiting access availability at the C03 substation. The contractor continues to cite coordination issues, water infiltration issues, access restraints, stop work orders (SWOs), and differing site conditions as its reasons why work at some of the locations cannot progress.

The PMOC previously reported significant Quality issues related to 2 of the 18 required substation transformers (those for the C03 and C05 substations) in which there were 3 failures related to

foreign debris in the windings while undergoing hi-pot testing. After changes in the fabrication methodology were made, both of those transformers were re-fabricated and successfully passed additional hi-pot testing; completing all testing of the required transformers. Both the PMOC and LIRR had earlier raised concerns regarding the “acceptability” and long-term viability of the transformers that were fabricated and tested before the second fabrication procedure modification was implemented due to the hi-pot test failures. Discussions between MTA C&D and LIRR regarding these concerns were held, but no information regarding the disposition of this concern is available to the PMOC at this time.

Corrective action to address non-conformance issues with track monuments (conduit turn ups at track level for routing of traction power cables) continues to be a major significant issue impacting the timely progression of work on this contract. MTA C&D took the action to have the CM007 ESA contractor ensure that, where possible, any monuments that are turned over to the CS084 contractor meet LIRR specifications and the CM007 contractor is making alterations as may be necessary. Some of the monuments in the Yard Track area have been turned over to the CS084 contractor and cable installation work at those locations is progressing.

The removal of the PVC liner from the C05 conduit system was scheduled to be complete in early December 2019; and, this substation was scheduled for energization in December 2019. Neither of those dates was met; and, the removal of the liner is now forecast for completion in February 2020, with energization of the substation by ConEd in March 2020. Work on conduit repair/re-installations at several other substations needs to be performed. Other obstruction issues, caused by other ESA contractors remain at several locations and must be resolved to facilitate CS084 installations.

Reassembly of the C08 substation pre-fabricated sections was completed; but, several water leaks between the pre-fabricated sections were noted. Work on the elimination of the water leaks progressed in January 2020, but several leaks still persist. The CS179, contractor continues to install the fire alarm system; and, a connection to the site sewer system is still needed. The plan is still to be able to energize this substation by the end of March 2020.

As previously reported, the condition and utilization of the MTA-supplied inductive reactors continues to be an area of concern. The original contract requirement was to have the CS084 contractor install 26 of the reactors to provide broken-rail protection at the various substation locations. In Q3 2018, the PMOC identified a quality-related issue regarding potential damage to the 26 MTA-supplied inductive reactors. In Q4 2018, after much discussion regarding the acceptability of these reactors, the contractor accepted two of the reactors and installed one in the Vernon (C05) substation. Subsequent design review by LIRR and the GEC indicated that only 10 of the original 26 reactors must be installed by the CS084 contractor to provide broken-rail protection; 6 of which are already installed at the C05 and C06 substations. Four (4) reactors must still be installed at the C03 substation by the CS084 contractor, while reactor installations at the C08 and C07 substations will be done by LIRR forces and the CQ033 contractor, respectively.

The PMOC remains concerned about many issues, including:

1. Transformer hi-pot testing failures and long-term viability of the transformers;
2. Verification of existing conduit and manholes in several substations;
3. Coordination with other contractors;
4. Extent of non-conformance of track monuments;
5. Water infiltration issues in the facilities; and
6. Continuing design changes or re-evaluations to equipment or implementation methodology.

VS086 – Systems Package 3, Signal Equipment Procurement:

Schedule: The original contract schedule had the Substantial Completion (SC) date in October 2019, and no modification to that SC has been made to date. There is no contract schedule by which MTA C&D or the PMOC can accurately gauge progress on this contract; however, the contractor and MTA C&D are working together to ensure that the remaining contract work is identified and progressed in a timely manner. Any updated VS086 schedule must include additional design and fabrication work recently identified, incorporation of a Positive Train Control (PTC) system, and support of the CS086 contractor in testing signal equipment in a Construction Phase Services (CPS) role. Once the PTC work scope is finalized and the CS086 contract schedule is modified and accepted, the overall schedule and interim milestones for the VS086 contract will be modified to incorporate all the outstanding and added contract work. The current forecast by MTA C&D shows an October 2020 SC date, one (1) month later than that reflected in MTA C&D’s previous monthly report. However, given the understanding that the VS086 contractor will have to support the CS086 contractor’s installation and testing of signal equipment, and that the current S/C date for the CS086 contract is shown as May 2021, it is unclear to the PMOC how this October 2020 SC date for the VS086 contract was determined.

Design Progress: MTA and the VS086, CS086, and CS179 contractors continue to discuss the methodology and scheduling of the Factory Integrated Acceptance Test (FIAT), testing that is performed after the FAT to test the interlocking designs and equipment as a composite systems package. The VS086 contractor indicates that the FIAT is intended to certify that the interlocking control system equipment supplied by the VS086 contractor is compatible with the various Control and Non-Control systems being designed and installed by the CS179 contractor. No date for this FIAT, which will be done in the field rather than in a factory environment, has been established at this time.

There are now seven (7) outstanding design issues that continue to impact the completion of the signal design under this contract. They are: 1) PTC design and incorporation; 2) PTC Application Logic changes; 3) Electromagnetic Interference (EMI) requirements; 4) issues regarding the “light-out” protection design; 5) inclusion of the design and provisioning of train departure test equipment, 6) preparation of Track and Signal Routing (TSR) designs and charts; and 7) the possibility of a software-based design change to the operational methodology for the “Diamond” track switch.

In the absence of any comprehensive input from LIRR, Hitachi made its own assumptions regarding the needs of LIRR on the PTC-related issues (Nos. 1 and 2) and submitted a proposal to perform the work. Once reviewed by MTA C&D will be supplied to LIRR for review and acceptance of the assumptions. In January 2020, LIRR notified MTA C&D that it was rejecting Hitachi’s request for a waiver on the need for EMI testing of the ATT-20 track circuit equipment. Hitachi took issue with this rejection, indicating that the addition of the ATT-20 equipment was done under a change order and there was no mention of EMI testing requirement in the Change

Order. Additional discussions between MTA C&D, Hitachi, and LIRR are needed to resolve this issue. Hitachi has, despite not having a contract modification in hand, begun working on the software redesign for the “light-out” protection issue. The GEC is still preparing a design scope of work for the inclusion of the train departure signaling design and equipment. The GEC is waiting for a Notice to Proceed (NTP) to begin work on the development of the TSR documents. Once the NTP is received, Hitachi estimates that the TSR documents will be available for use in 6 months, based on contractual review times and an assumption that there are no re-designs due to LIRR changes. In January 2020, LIRR raised an issue regarding the method of operation for the “Diamond” track switch, requesting a change to the method originally designed. MTA C&D will discuss this request with MTA and LIRR management to determine if this software change will be implemented.

Equipment Fabrication and Delivery Progress: The contractor previously provided a plan to retrofit and/or replace any equipment that was damaged in transit to the ESA staging areas. The original goal was to have the damaged equipment returned to the VS086 facility for repairs, along with three (3) racks of equipment from Plaza Interlocking that would have the ATT-20 track equipment installed at the same time. All this equipment was to be re-delivered by the end of August 2019, a date that is now delayed to February 2020.

CS086 – Tunnel Systems Package 2 – Signal Installation

Schedule: MTA C&D continues to report a May 23, 2021, SC date. Notice to Proceed (NTP) on this contract was given on September 29, 2018; and, as of the end of October 2019, there had been no substantial “construction” activity on this contract. However, in November 2019, the contractor began mobilization to several work sites. The contractor continues to contend that room and track access and water issues have caused day-to-day delays in the progression of the work. As previously reported by the PMOC, the contractor continues to work on the development of the MTA C&D-requested “recovery” schedule that is based on certain MTA C&D-provided assumptions related to room and track access. The “recovery” schedule was submitted to MTA C&D in January 2020 and it is currently under review. The schedule includes the implementation of two shifts of work on a daily basis to recover some of the lost time.

Design/Construction Progress: The contractor continued to indicate that there were still areas in GCT-4 and GCT-5 with water infiltration issues that need to be addressed. MTA C&D will need to investigate the root cause of any water infiltration and take remediation actions as may be necessary.

While the contractor must still provide a comprehensive list of issues identified at the sites it surveyed, numerous issues regarding site accessibility and equipment layouts have been identified and MTA C&D is either in discussion on how to mitigate them or is already taking action to resolve them. The issues noted thus far that remain open include water infiltration, equipment layout conflicts, and other obstructions and misalignments inconsistent with existing CS086 contract drawings.

In June 2019, the PMOC reported that a significant issue regarding the mounting of signal impedance bonds in the track area. The contractor has obtained a mockup mounting plate and will begin visiting impedance bond locations in February 2020 to determine the extent of any installation issues.

Other noted issues include: 1) missing “grounding” plates for signal cases and signal apparatus; 2) obstructions precluding the installation of signal equipment at the various locations surveyed; and, 3) several areas where the proposed signal equipment was to be located that appear to be too small

for the proposed signal equipment. The contractor has developed, and will deploy in February 2020, a signal case and signal head mockup at the Roosevelt Island location for LIRR inspection and approval. The contractor must still develop a mockup for any signal head that needs to be installed in a tunnel area that has a “curved” wall. The CS179 contractor is handling the issue regarding the “ground” plates, replacing or installing the plates where needed.

As previously reported, MTA C&D indicates that it will be necessary to re-negotiate contract Modification 001 to include updated design drawings and address cable length changes. MTA C&D, the GEC, and the contractor are conducting meetings to identify all the required changes before developing the revised work scope. Two other new requirements requiring contract changes were identified in January 2020 – that of an increase in the quantity of equipment racks and the installation of 91.6 Hz ATS equipment that was not included in the original contract documents.

Harold Interlocking Contracts

Costs and substantial completion dates are tabulated below for active Harold contracts.

| | Current Budget | Appr'd Contract | Rem Budget | Invoice Cost | EAC | Planned Comp | Invoice Comp | Current BL SC | Forecast SC | Notes |
|--------|----------------|-----------------|------------|--------------|------|--------------|--------------|---------------|-------------|-------|
| CH058A | 86.5 | 82.2 | 4.3 | 42.7 | 91.5 | 49.1% | 51.9% | 3/17/21 | 3/17/21 | |
| | +17.1 | +0.1 | +16.9 | +6.1 | nc | +4.7% | +7.2% | nc | nc | |
| | 69.4 | 82.1 | (12.6) | 36.6 | 91.5 | 44.4% | 44.7% | 3/17/21 | 3/17/21 | |

Notes: Costs in millions; line 1 = current value; line 2 = period change, nc = no change; and, line 3 = prior value
Please refer to the contract narratives for additional information.

CH058A – Harold Structures – B/C Approach

Schedule: The contractor completed Milestone #4, Complete Removal of TBM Cutterhead, on January 21, 2020, 25 days late. The Milestone was originally scheduled to be complete on December 27, 2019.

Construction Progress: During January 2020, the contractor completed removal of the TBM cutterhead and continued placement of invert and sidewall re-bar and concrete in the East Approach Structure of the B/C Tunnel. Additionally, the contractor continued installation of piles for the Eastbound Re-Route Tunnel.

Railroad Force Account Contracts

Costs and substantial completion dates are tabulated below for active Force Account packages. Railroad Force Account agreements do not contain schedule requirements, so the PMOC will not report on schedules in this section. Additionally, since adoption of the “ESA First” schedule, ESA discontinued references to the former “Stages” of Harold construction, although it has not done so for the cost components of Harold work.

| | Current Budget | Appr'd Contract | Rem Budget | Invoice Cost | EAC | Planned Comp | Invoice Comp | Current BL SC | Forecast SC | Notes |
|-------|----------------|-----------------|------------|--------------|--------|--------------|--------------|---------------|-------------|-------|
| FHA02 | 61.4 | 61.4 | -- | 61.1 | 61.4 | 100.0% | 99.6% | 8/15/17 | 1/24/21 | 1 |
| | nc | nc | nc | nc | nc | nc | +0.1% | nc | nc | |
| | 61.4 | 61.4 | -- | 61.1 | 61.4 | 100.0% | 99.5% | 8/15/17 | 1/24/21 | |
| FHA03 | 12.4 | 5.2 | 7.2 | 10.4 | 14.2 | 100.0% | 83.9% | 7/25/18 | 6/2/25 | 1 |
| | nc | nc | nc | +0.2 | (-0.2) | nc | +2.1% | nc | nc | |
| | 12.4 | 5.2 | 7.2 | 10.2 | 14.4 | 100.0% | 81.8% | 7/25/18 | 6/2/25 | |
| FHL02 | 123.1 | 123.1 | -- | 124.2 | 125.6 | 100.0% | 100.9% | 11/25/16 | 8/30/21 | 1 |
| | nc | nc | nc | +1.2 | (-0.6) | nc | +1.0% | nc | nc | |
| | 123.1 | 123.1 | -- | 123.0 | 126.2 | 100.0% | 99.9% | 11/25/16 | 8/30/21 | |
| FHL03 | 20.6 | 2.7 | 17.9 | 24.9 | 37.4 | 100.0% | 93.8% | 8/14/17 | 4/28/24 | 1 |
| | nc | nc | nc | +0.2 | nc | nc | +0.7% | nc | nc | |
| | 20.6 | 2.7 | 17.9 | 24.7 | 37.4 | 100.0% | 93.1% | 8/14/17 | 4/28/24 | |

Notes: Costs in millions; line 1 = current value; line 2 = period change, nc = no change; and, line 3 = prior value

Please refer to the contract narratives for additional information

1. Invoice percent complete is calculated using the current approved budget.

FHA02 and FHA03 – Harold Stage 2 and Stage 3 Amtrak:

Construction Progress: During January 2020, Amtrak Electric Traction (ET) personnel continued preparation and construction of an extension of the catenary system, the “PW2 Overrun”, over Port Washington #2 Track in Harold Interlocking. Amtrak C&S personnel continued to install signal wires along the Loop Tracks between Loop and “T” Interlockings.

FHL02 and FHL03 – Harold Stages 2 and 3 LIRR:

Construction Progress: During January 2020, LIRR ET and Signal personnel continued construction/installation/relocation of electric traction and signal appurtenances, respectively, in support of the CH058A contractor’s construction of the Tunnel B/C Approach Structure.

d. Quality Assurance and Quality Control

The PMOC reports Quality Assurance/Control issues in its quarterly comprehensive reports. MTA C&D did not report any significant issues regarding Quality Assurance or Quality Control in its ESA November 2019 MPR. The PMOC continues to monitor developments regarding the following concerns:

1. The Contract CS084 transformer test failures that occurred in 2017 and 2018 as well as the concerns about the condition of the 26 inductive reactors provided by MTA C&D to the CS084 Contractor. No known final resolutions were achieved during January 2020.
2. Potential out of tolerance as-built bench wall clearance for railcars in ESA tunnels. See Section 7.0 (CQ032) for details of survey and remediation.
3. Potential out of tolerance as-built conditions for the new track monuments that house the conduits for the traction power cables at the track connection locations. See Section 1.0c (CM007; CS084) for details of survey and remediation.
4. The replacement of some portion of the rail installed to date by the CM007 contractor due to observed significant deterioration involving pitting and corrosion. The PMOC notes that the CM007 has been directed by MTA C&D to accelerate the completion of installation of the remaining track and third-rail. See Section 1.0c (CM007) for details.

Table 2.2: ESA IPS Primary Critical Path IPS 124 – December 1, 2019

| Activity Name | Duration | Start | Finish |
|---|----------|-----------|-----------|
| CM014B – Concourse and Facilities Fit-Out | | | |
| Design, install Pipe relocation through Chiller on Zone 4 Mech / SIST | 107 | 2-Dec-19 | 17-Mar-20 |
| | 170 | 17-Mar-20 | 2-Sep-20 |
| CS179 System Package 1 – Facilities Systems | | | |
| Phase 3 IST for Fire Alarm | 153 | 2-Sep-20 | 1-Feb-21 |
| IST for Building Management Systems | 120 | 1-Feb-21 | 31-May-21 |
| IST for Fire Life Safety Systems | 92 | 31-May-21 | 30-Aug-21 |
| Program Activities | | | |
| LIRR FRA Signals and Power Testing † | 147 | 30-Aug-21 | 23-Jan-22 |
| LIRR Final Testing and Previews ‡ | 86 | 23-Jan-22 | 18-Apr-22 |
| Target Revenue Service Date | | | 18-Apr-22 |
| b(4) | | | |
| Public Revenue Service Date | | | 13-Dec-22 |

Notes: † Successor to Manhattan/Systems and Queens paths.
‡ Successor Harold Interlocking path.

The IPS schedule incorporates MTA C&D’s Incremental IST plan, which has been incorporated for CS179 and CM014B. Additional schedule adjustments are expected when contract modifications for IST are issued for contracts CM007, VS/CS084, and CS086. Contracts CM007, CS086, and CS084 have near critical work. It is anticipated that the critical path will continue to shift among the various scope elements of these contracts in coordination with their progress.

MTA C&D continues to add coordination point milestone activities to the IPS schedule to track and monitor the progress of inter-contract coordination for the ESA program. The coordination points have experienced month-to-month slippages, which reduces their usefulness in monitoring progress. The milestones are coordinated with the syndicated IST schedule, to which the CS179 and CM014B contractors have agreed. MTA C&D has confirmed that these milestones form its plan for progressing the ESA program and can now be monitored going forward to measure progress. For IPS 124, MTA C&D reported that, of the 28 coordination point milestones for contracts CM007, CM014B, CH058A, VS033, CS084, CS086, and the Rail Activation Plan that were scheduled for completion in November 2019, only one was identified as having been achieved (August 2019 completion date). The PMOC notes that although the coordination points in IPS 124 have in excess of 6 months of total float, there remains the concern that the lack of progress achieving coordination point dates indicates an increasing need for concurrent work in the period leading up to and during IST, which may complicate and impede future progress.

Discussion of Progress along the Critical Path

The Manhattan/Systems critical path completion date in IPS 124 is August 30, 2021, unchanged from the date shown in IPS 123.

The Manhattan/Systems path in IPS 124 includes completing the buildout and systems testing in the GCT concourse. The critical path starts with the CM014B design, approval and relocation of a chiller line in the 270 Park area of the concourse; and followed by simulated installation system testing (SIST) for mechanical/electrical rooms. At this point, the CM014B (and CM007) systems are turned over to CS179 for Phase 3 IST testing for fire alarms; then IST for the building management systems, and, finally IST for the fire/life-safety systems. The Manhattan/Systems path ends with completion of all IST and CS179 substantial completion on August 30, 2021. From

this point, the path runs through LIRR FRA testing, LIRR final system testing, LIRR initial and final previews. The IPS 124 shows the duration of LIRR-FRA testing as 4.8 months; and, the duration of LIRR final testing and previews as 2.8 months. The program longest path concludes with the Target RSD on April 18, 2022, leaving approximately 7.9 months of program float to the public date for the start of revenue service.

90-Day Look-Ahead of Program Critical Activities/Milestones

Appendix B, Table 6, shows the ESA Program activities on the primary critical Manhattan/Systems work path that are planned for the next 90 days as forecast in IPS 124.

Sub Program Longest Path – Harold Interlocking

IPS 124 shows that the Harold Interlocking work path remains as the second longest ESA program path. The Harold Interlocking work path concludes on June 28, 2021, in IPS 124, unchanged from IPS 123. The float on this path is 208 calendar days, also unchanged from IPS 123.

This path includes CH058A, Excavate B/C structure; construct slab and walls; construct benches and parapets; prep subgrade, place ballast, track and turnouts through substantial completion in March 2021. Then placement of catenaries by CH063; followed by LIRR force account cutovers through the end of June 2021. At the completion of the Harold work path, there are approximately 6.8 months of float to the LIRR final testing activity, at which point the path joins the ESA program critical path.

Sub Program Longest Path – Queens

IPS 124 shows that the Queens (Mid-Day Storage Yard) work path remains as the third program path. The finish date for the Queens path is January 22, 2020, in IPS 124, two weeks later than as shown in IPS 123. The scope that comprises the Queens path starts with the construction of CQ033 signal power and communication duct banks, and then completion of PA system/speaker cable pulling and termination in August 2020. This is followed by 4 months for IST leading to CQ033 substantial completion on January 3, 2021, approximately 2 weeks later than in IPS 123. From the end of the Queens path there are approximately 7.8 months of float to the LIRR FRA testing activity on the ESA program critical path (Manhattan/Systems work)

Upcoming Contract Procurements

Table 2.4 shows the status of current and upcoming contract procurements as reported in IPS 124 (December 1, 2019).

Table 2.4: Procurement Schedule

| Contract Description | Advertise Date | Bid Date | NTP | Project Length | Substantial Completion |
|--|-----------------------|-----------------|------------|-----------------------|-------------------------------|
| CH063 ET Catenary Work – 3 rd Party | 9/11/19 | 1/30/20 | 4/1/20 | 24 mos. | 4/1/22 |

CH063 Electric Traction Catenary Work, 3rd Party: As detailed in Section 1.0b, Procurement, above, the RFQ for this contract was advertised earlier in 2019 and MTA C&D received seven proposals, of which four were deemed “pre-qualified”. ESA issued a “Best and Final Offer” solicitation to those four respondents on September 11, 2019, with responses originally due back on December 9, 2019. Due to many questions from the proposers, however, the BAFO responses were delayed through January 2020 and are now due back in later in Q1 2020 with award projected for early Q2 2020.

PMOC Concerns

The PMOC has the following observations and concerns about the ESA schedule:

1. The PMOC has ongoing concerns about the significant schedule changes that resulted in shifts in scope on the Manhattan/Systems schedule path, which drives the

ESA Program Critical Path. While MTA C&D has reached agreement with the CS179 and CM014B contractors for the Incremental IST schedule, other Manhattan/Systems contracts remain near critical and may exert a significant influence on the critical path.

2. The PMOC notes that MTA C&D has reported that the Schedule Contingency is 239 calendar days in IPS 124, which is 36 days less than the 275 day minimum required FTA ELPEP schedule contingency. The ability of the MTA C&D to recover and hold the FTA minimum until the next ELPEP hold point (95% constructed; Q4 2020) is at risk due to the uncertainties about the Manhattan/Systems schedule, the greatest of which is execution of the approved plan and schedule for the Incremental IST.
3. Progress on CS084, Tunnel Systems Package 4 – Traction Power, is slow and is currently reported as 70.2% complete compared with as-planned progress of 99.8%. The PMOC observes that work on CS084 continues to be delayed each quarter. While many of the delays appear to have been absorbed and/or mitigated in the schedule, float has been lost to this important near-critical work. The PMOC believes that a revised schedule will incorporate delays in the delivery of equipment and will push out milestone dates. The PMOC recommends that ESA continue to analyze options to recover lost time with a focus on identifying major issues and determining corrective measures.
4. The PMOC is concerned about the lack of progress to advance IST as indicated by slippages to the coordination point completion dates. For IPS 124, MTA C&D reported that, of the 28 coordination point milestones for contracts CM007, CM014B, CH058A, VS033, CS084, CS086, and the Rail Activation Plan that were scheduled for completion in November 2019, only one was identified as having been achieved (August 2019 completion date). The PMOC notes that although the coordination points in IPS 124 have in excess of 6 months of total float, there remains the concern that the lack of progress achieving coordination point dates indicates an increasing need for concurrent work in the period leading up to and during IST. The slippages and float levels point to a reduction in the usefulness of coordination points for monitoring progress.
5. The CM014B contractor's capability to complete the approximately 18% of its remaining work in the 9 months remaining to the forecast SC in September 2020 is questionable. The PMOC believes that this is overly optimistic based on the contractor's historic construction performance.

3.0 COST DATA

Budget/Cost

In the ESA November 2019 Report, MTA C&D reported that the ESA program is 81.4% complete compared to planned progress of 82.6% of the \$11,133 million April 2018 EAC forecast. The report also shows that construction progress reached 85.8% complete compared with planned progress of 87.1%. Since the ESA July 2018 MPR, the PMT calculates summary construction progress as a percentage of the \$8,014 million April 2018 construction EAC forecast.



b(4)

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Change Orders/Budget Adjustments

The ESA November 2019 Report lists 10 change orders with magnitudes greater than \$100,000 that were executed in November 2019. The aggregate value of these change orders was \$6.1 million.

Table 3.2: Executed Change Order Log (magnitude > \$100,000)

| Contract | Description / Mod No. | Amount |
|-----------------|--|---------------|
| CH058A | Installation of N1 3 rd Rail Conduits (mod. 8) | 135,000 |
| CM014B | MNR - 46 th Street Connector Modification for Ladder N (mod. 197) | 1,000,000 |
| CM014B | Replace B20 & B30 65kVA Breakers with 85kVA Breakers (mod. 267) | 2,778,177 |
| CM014B | CM014B ATC Panels - RFI 1796 (mod. 279) | 300,764 |
| CM014B | Use of 50 th Street Freight Elevator (mod. 288) | 137,624 |
| CQ033 | Dutchkills Catch Basin (mod. 53) | 350,000 |
| CS179 | Transfer of Painting, CM005, CM006, CQ032 (mod. 276) | 669,000 |
| CS179 | Additional Blue Light Stations (mod. 277) | 366,174 |
| CS179 | Fire Alarm Vent Plant Modifications (mod. 271) | 300,316 |

Funding

The ESA program has funding of \$10,335 million through December 2020. The MTA C&D's proposed ESA budget of \$11,133 million was approved by the MTA Board in September 2019 for the 2020-2014 Capital Plan, which will fund the ESA program through completion. The MTA Capital Plan was deemed approved by the Governor of the State of New York in January 2020. The MTA C&D anticipates updating the ESA budgets in the first quarter of 2020.

The Amended FFGA budget is \$12,038 million, which includes \$10,922 million for construction and revenue vehicles, and \$1,116 million for financing costs. The MTA C&D reassessment of April 2018 forecast the ESA program Net ETPC \$11,133 million for the portion of the program that the MTA C&D is managing for the MTA, and it is the subject of their reporting (as agreed in December 2009). The April 2018 forecast includes costs for 50 of the 160 FFGA revenue vehicles. The cost for the balance of 110 revenue vehicles, which are being procured for MTA by LIRR, is funded separately through a dedicated MTA ESA rolling stock reserve of \$463 million. The full cost of the ESA program for construction and revenue vehicles – the MTA Estimated Total Project Cost (MTA ETPC) – is \$11,596 million (refer to Appendix B, table 4).

Federal Funding: The total Federal funding commitment to the ESA project is \$2,698.8 million, of which all of the funds have been effectively drawn down as of December 1, 2019.

Local Funding: The budget for Local Funding is \$7,636.4 million, of which \$6,367.9 million has been expended through December 1, 2019. Financing costs are funded separately from other local sources.

PMOC Concerns and Recommendations

1. The PMOC is concerned that MTA C&D's strategy of holding funding as contingencies rather than funding contract budgets to their projected value results in an overstatement of both the contract completion percentages and the total value of unallocated contingencies. While this strategy retains maximum flexibility for MTA C&D, it differs from the generally accepted practice of committing to budgets for known program costs, tends to artificially inflate the program contingency, and reduces the accuracy of contract completion percentages. At the ESA Cost and Schedule Review Meeting held on January 27, 2020, MTA C&D advised the FTA and PMOC that the ESA budgets will be updated with the additional funding from the MTA 2020-24 Capital Plan in the first quarter of 2020. The PMOC believes that the reported remaining total contingency is sufficient to support the ESA program through March 31, 2020.
2. The PMOC is monitoring a reduced risk that ESA budgets are not replenished in time to match program needs. The MTA C&D anticipates updating the ESA budgets in the first quarter of 2020.
3. MTA C&D is working with CM007 to incorporate the schedule changes to resolve the major open cost and schedule issues and to incorporate Incremental IST. The cost implications of the incremental IST schedule on contracts CS084, VS/CS086, and CQ033 are yet to be determined and the PMOC believes that the cost increases could be significant. The MTA C&D reported that it has agreed with the CM007 contractor on a cost for the contract modification.
4. Ongoing and possible future delays may result in increasing costs for the following contracts:
 - CS084 – the late completion of final design has delayed the completion of fabrication of some traction power equipment; transformer test failures and resolution of potential damage to some of the inductive reactors provided by MTA C&D.
 - VS086 and CS086 – incorporation of Positive Train Control into the ESA signal system and technology issues.

4.0 RISK MANAGEMENT

The PMOC focuses here on discussion of the most critical risks.

Harold Interlocking – ESA Risk

Harold Re-Sequencing Plan (“ESA First”) Risk: Through January 2020, MTA C&D continued to adjust the “ESA First” Harold Re-Sequencing plan, as required, to accommodate any identified railroad force account constraints. The PMOC notes that the noticeable improvements for LIRR direct Force Account work and Amtrak ET support that had been reported starting in Q1 2019 appeared to have been sustained through January 2020.

Amtrak Preparation for Extended East River Tunnel Outages Risk: The PMOC has continuing concerns regarding the impact to the ESA Harold work due to the Amtrak program to harden East River Tunnel (ERT) Lines 1 and 4 in preparation for extended outages for ERT Lines 1 and 2 to complete Hurricane Sandy damage-related reconstruction work, originally planned for 2019 and now deferred until 2025, starting with Line 2. During March 2019, MTA C&D indicated that Amtrak may advance ERT Line 2 reconstruction to 2023, although this has not yet been formalized. The risk remains that tunnel systems reliability or safety issues might require Amtrak to make emergency repairs on either Line 1, 2, or 4 at any time between now and the December 2022 RSD. Should this occur, remaining ESA construction work in Harold Interlocking, as well as systems testing, start-up, and commissioning for Tracks A, B/C, and D, could be delayed and potentially impact the MTA C&D RSD of December 2022. There is less likelihood, however, that this situation would impact the FFGA RSD of December 2023.

LIRR Positive Train Control (PTC) Risk

This risk has two distinct elements, as discussed here.

- a.) LIRR may divert some force account resources away from support for the ESA work to provide support for LIRR’s system-wide, i.e., non-ESA, PTC work currently underway. The PMOC notes that the LIRR PTC Group is reportedly resource constrained and has not been able to provide the needed level of technical and coordination support for the ESA PTC work due to increasing schedule pressure to complete PTC system-wide for the existing LIRR rail network by the current FRA deadline of December 2020.
- b.) MTA C&D-ESA will be installing, testing, and commissioning PTC for all of the new track and signal systems built under the ESA Program. LIRR did not complete PTC design in either Q1 2018, as earlier projected, or January 2019, as subsequently projected, due to resolution of multiple GEC and LIRR technical issues regarding Contracts VS086, CS086, and CS179. See Section 1.0 for details. Accordingly, MTA C&D made the decision during Q4 2019 to work through the CPR and contract modification process with the CS179, VS086 and CS086 contractors for incorporation of as much of the PTC work scope that can be reliably included based on PTC “assumptions” developed by MTA C&D that will be included in the CPRs for the three referenced contracts. Due to continuing delays to completion of the PTC design by LIRR, MTA C&D is now planning to complete installation of PTC after completion of the base signal system under VS086 and CS086, and this will delay substantial completion of both ESA contracts.

Capital Funding Risk

The MTA C&D 2020–2024 Capital Plan included approximately \$800 million to complete the ESA program and it was approved by the MTA in September 2019. The plan was sent to the NYS Capital Plan Review Board and was deemed approved by the Governor of the State of New York in January 2020. The MTA C&D anticipates updating the ESA budgets in the first quarter of 2020. The PMOC remains concerned that, until the ESA program budgets are updated, this potential

funding constraint may impact the program budget and schedule as well as the start of revenue operations.

ESA Vehicle Risk

The PMOC remains concerned about the schedule slippage of the LIRR federal vehicle procurement program for the M-9A vehicles because it has now adversely impacted delivery of the vehicles in time for the MTA C&D's RSD. LIRR is procuring the vehicles in a two-step RFP process, the first step of which, "Qualifications", was completed in December 2018. The second, "Cost/Schedule" part of the procurement, however, has been delayed for various reasons since December 2018. During December 2019, LIRR completed and solicited the second step of the procurement, a "Best and Final Offer" (BAFO) for the vehicles. The proposers' responses were received by LIRR on January 29, 2020, after which LIRR began evaluation. LIRR intends to issue the award and NTP for this procurement in early April 2020. Additionally, in July 2019, ESA informed the PMOC that, based on conditions at that time, delivery of the first M-9A vehicle would not be until April 2023. This would be after MTA C&D's Target (February 14, 2022) and Public RSD dates, but before the FFGA RSD date of December 31, 2023. If that occurs, MTA will need to determine how to supply vehicles from its existing fleet in order to begin LIRR service into GCT. The revised Service Plan, now delayed until June 2021, will detail how this delay will be accommodated.

Manhattan/Systems Performance Risk

The Manhattan/Systems path remains at risk for future open/unresolved issues. Contract modifications for impacts related to JPMC work at 270 Park have not yet been incorporated into the IPS. Additionally, inter-contract coordination points for work leading up to the start of IST have not been achieved month-to-month. Modifications for contracts CS084, CS086, and CM007 have yet to be issued and may have additional negative impacts on the schedule. The impact of delayed installation and testing of PTC may also have a schedule impact to the ESA Program.

JP Morgan Chase Redevelopment at 270 Park Avenue

The foundation and substructure systems required for the planned new JP Morgan Chase (JPMC) building at 270 Park Avenue will impact the ongoing construction of the new LIRR Concourse at Grand Central Terminal. All MTA costs-to-date have been reimbursable by JPMC and all related MTA C&D-ESA work is being performed by a dedicated team so not to impact the management and technical services being provided for the ESA program. The PMOC does note, however, that MTA C&D has advised that the current CS179 Substantial Completion date of June 30, 2021, will be delayed as a result of construction of the new foundations and substructures and the associated extended systems testing.

The PMOC is primarily concerned about potential schedule risks resulting from adverse impacts on completion of the construction of the new LIRR Concourse. Information received during January 2020 has significantly increased the PMOC's concern:

- MTA C&D shut down the JPMC contractor on several occasions due to construction safety violations. Although the issues were resolved and the top level of management of both organizations reportedly agreed to work together to prevent future safety issues, the MTA C&D and JPMC working relationship may be tested again under the increasing schedule pressure to complete the work.
- The PMOC notes that the JPMC contractor was scheduled, in accordance with the MTA C&D/JPMC Construction Agreement of July 31, 2019, to start foundation (caisson/caps) work for Section MA on November 22, 2019 but this work had not yet commenced. MTA C&D advised at the January 27, 2020 that the JPMC engineer and contractor are re-thinking the use of the 300 1.0 ft. diameter caissons and may consider installing fewer, larger diameter caissons. A revised design may provide

some schedule advantages. The PMOC notes that only 16-17 months remain for JPMC to complete all the foundation and shear wall construction. The PMOC believes this to be a significant delay.

MTA C&D/ESA has developed a Contingency Plan, as part of the Construction Agreement, which would be triggered by a significant JPMC delay in advancing the work that could delay the ESA Revenue Service Date. A significant element of the Contingency Plan is the requirement for JPMC to provide temporary pedestrian corridors through the JPMC construction sites to allow full planned use of the LIRR Concourse for revenue service. This would complicate later completion of the remaining ESA work for the LIRR Concourse in the affected area(s).

5.0 ELPEP COMPLIANCE SUMMARY

The current status of each of the remaining main Enterprise Level Project Execution Plan (ELPEP) components is summarized as follows:

- **Technical Capacity and Capability:** MTA C&D indicated that it will review the Technical Capacity and Capability (TCC) Plan and propose revisions, if required, to reflect the current status of the program. MTA C&D updated the TCC Plan in Q3 2017. In April 2018, FTA advised MTA C&D to incorporate its current updates and commence with a subsequent revision that addresses management changes resulting from the MTA C&D Six-Point Plan for ESA. MTA C&D planned to include all aforementioned updates in the draft TCC Plan revision submitted during May 2019.
- **Continuing ELPEP Compliance:** The ESA project should continue to make additional improvements in the following areas: Management of GEC Construction Phase Services; Change Control Committee (CCC) Process and Results; Stakeholder Management; and Risk-Informed Decision Making. The PMOC notes that MTA and MTA C&D have been proactive and diligent in managing the situation with a key stakeholder, JP Morgan Chase, and the impacts that this stakeholder's plans for a new office tower at 270 Park Avenue will have on completing construction of the new LIRR Concourse at Grand Central Terminal.
- **Project Management Plan:** MTA C&D is using the current version of the PMP, Rev. 10, which the PMOC reviewed and the FTA accepted in 2017.
- **Cost/Schedule Contingency:** MTA C&D, the FTA, and the PMOC are in agreement on the ELPEP minimum cost and schedule contingency hold points, levels, and drawdowns. MTA C&D continues to report the cost and schedule contingency levels against the ELPEP minimums in its quarterly reports to the FTA. The PMOC notes that MTA C&D is reporting that the Schedule Contingency 5 weeks less than the ELPEP minimum of 275 calendar days. The total Cost Contingency is \$191 million above the ELPEP minimum contingency of \$260 million.
- **Schedule Management Plan:** The ESA project should continue to make additional improvements to the Schedule Management Plan (SMP) in the following areas: Alternative Integrated Project Schedule (IPS) Updating, Forecasting, and Schedule Contingency Management against a current baseline schedule. MTA C&D is using Rev. 2 of the SMP, dated September 2016. An updated draft was issued in December 2018.
- **Cost Management Plan:** The ESA project should continue to make additional improvements to the Cost Management Plan (CMP) in the following areas: Project Level EAC Forecasting, Project Level EAC Forecast Validation, and MTA C&D Cost Contingency Management and Secondary Mitigation. MTA C&D is using Rev. 2 of the CMP, dated October 2016. An updated draft was issued in December 2018.

- **Risk Management Plan:** ESA submitted the updated Risk Management Plan in Q4 2017. In April 2018, the FTA advised MTA C&D to incorporate its current updates and then commence with a subsequent revision that addresses any changes resulting from the MTA C&D Six-Point Plan for ESA. An updated draft was issued in December 2018.
- **Project Quality Manual:** ESA submitted the updated Project Quality Manual in February 2018. In April 2018, the FTA advised MTA C&D to incorporate its current updates and then commence with a subsequent revision that addresses any changes resulting from the MTA C&D Six-Point Plan for ESA.

The updates of the Project, Cost, Schedule, Risk Management, Contract Packaging, and Technical Capacity and Capability Plans will document the changes called for by the incorporation of the MTA C&D Six-Point Plan for ESA to reduce future programmatic risks. MTA C&D issued updated drafts for the CMP, SMP, and RMP in December 2018, the CPP in January 2019, as well as the TCC in May 2019. During December 2019, the PMOC returned review comments to the FTA on the revised SMP, CMP, RMP and TCC Plan. The PMP will be updated based on changes made to the revised Sub-Plans.

Revisions to the ELPEP Document: MTA C&D submitted an updated ELPEP with suggested revisions in Q3 2017. In April 2018, FTA advised MTA C&D to re-evaluate its proposed updates in consideration of the revised EAC, budget, and IPS, as well as organizational, management, and process changes resulting from implementation of the MTA C&D Six-Point Plan to reduce risk on the ESA project.

6.0 SAFETY AND SECURITY

Based on safety information supplied by MTA, the PMOC-calculated ESA Injury Ratios for December 2019 were 0.81 for Lost Time Injuries (LTI) and 1.61 for Recordable Injuries (RI). Both the LTI and RI injury ratios were below the Bureau of Labor Statistics (BLS) 2019 Safety Guideline of 1.5 for LTI and 2.5 for RI. Additionally, MTA C&D did not report any significant security issues in its ESA November 2019 MPR.

7.0 ISSUES AND RECOMMENDATIONS

Design: The PMT design management team needs to focus on the timely achievement of time-critical intermediate milestones and work closely with the GEC to provide the required design related Construction Phase Services for schedule critical construction/procurement efforts as determined by the PMO Analytics Group. Also, the PMOC has observed the following:

- Approvals from the railroads, both LIRR and Amtrak, and other outside stakeholders, are requiring considerably more time than planned; and,
- LIRR is making changes that alter the design basis and result in time-consuming and costly re-design work by the GEC as well as cost and schedule impacts to construction activities.

The ESA PMT needs to continue to monitor and improve coordinating the interface of design reviews and equipment approvals between the GEC and LIRR for the CS084, CS179, and VS086 contracts. These shortcomings indicate possible technical capacity and capability issues in the particular design support areas.

Water Infiltration Concerns on Contracts CS179, CS084, CS086 and CQ032:

The PMOC remains concerned about the numerous ongoing water infiltration issues in the electrical and electronic equipment rooms either constructed by, or provided for, these contracts. The PMOC notes that, while a number of the water remediation efforts employed have been successful, others have not; and this has caused delays to construction work. The CS179, CS086, and CS084 contractors continue to advise MTA C&D of additional water infiltration issues in areas where work access is available.

Tunnel Clearance Concerns: There remain seven NCRs related to potential out of tolerance as-built railcar clearances in newly constructed ESA tunnel bench walls that require remediation. Current status: Three field changes were executed in July 2019 for the remediation of duct bench at the Bellmouth, GCT 7, and Tunnel D, although no progress was made on this issue during January 2020. ESA’s forecast completion of these repairs is scheduled for March 31, 2020.

Contract CS179: The PMOC recommends that the ESA PMT make improvements regarding the PMOC’s following concerns for CS179:

- Timely delivery and discussion about the contractor’s monthly schedule submissions;
- Identification and mitigation of coordination issues;
- ESA PMT responses to contractor NOCs and issuance of CPRs; and,
- Timely design review/ approvals to contractor’s submittals and RFIs.

Contract CS084: The PMOC remains concerned about the following issues:

1. Transformer hi-pot testing failures and long-term viability of the transformers;
2. Verification of existing conduit and manholes in several substations;
3. Coordination with other contractors;
4. Possible damage to the MTA-provided inductive reactors due to improper storage and handling by MTA;
5. Extent of non-conformance of track monuments;
6. Water infiltration issues in the facilities; and continuing design changes or re-evaluations to equipment or implementation methodology.

Contract VS086: The PMOC remains concerned that there is no accurate and comprehensive schedule in place that addresses all issues and would allow MTA C&D to effectively manage this contract. Completion of a new schedule is essential. Issues regarding the light-out protection design and PTC Application Logic design incorporation need to be expeditiously addressed.

Contract CS086: The PMOC remains concerned that there is no accurate and comprehensive schedule in place that would allow MTA C&D to effectively manage this contract. MTA C&D needs to address the key critical issues discussed in earlier sections of this report and reach agreement with the contractor on a new schedule.

Project Funding: The MTA C&D 2020–2024 Capital Plan, approved by New York State, includes approximately \$800 million to complete the ESA program. The PMOC has a reduced concern that, until the ESA budgets are updated, there is a potential funding constraint that could impact the program budget and schedule, as well as the start of revenue operations.

Project Budget: The PMOC is concerned about MTA C&D’s unconventional strategy of holding significant contingencies that would only be released to specific projects on an as-needed basis commensurate with construction progress and based on future contract modifications. While MTA C&D’s strategy retains maximum flexibility, it differs from the generally accepted practice of committing funds to budgets for known program costs. The PMOC is concerned that the strategy results in an overstatement of both the contract completion percentages and the total value of unallocated contingencies at any point in time.

Project Schedule: The PMOC remains concerned about the remaining program schedule contingency, which is 36 days less than the ELPEP minimum of 275 calendar days. IPS 124 shows that CM014B MEP work for chiller line relocation now controls the Manhattan/Systems area and the Program critical path. Planned critical work then moves through the start of CS179 IST for Building Management Systems and Fire/Life Safety systems. Manhattan/Systems contracts that are not on the critical path, but are quite near to it, include CM007 and CS084, each of which has its own schedule challenges which may impact the program schedule.

Risk Management: The segmentation of construction packages has created multiple inter-contract interfaces and milestones. In the PMOC's opinion, managing inter-contract handoffs and interfaces has been, and will continue to be, very challenging and represents a significant MTA C&D-retained risk. The PMOC believes that achieving any meaningful schedule recovery, especially for Contracts CM014B, CS179, CS086, and CS084, will be difficult at best. The PMOC considers the major remaining risks for the East Side Access Program to be:

1. Program Funding – update of program budgets and inclusion in MTA Capital Plan (long term risk realized Q2 2018; ESA budget approved by MTA and CPRB/governor);
2. Recovery of lost time due to significant schedule delays on CS084;
3. Successful execution of multiple hand-off interfaces across several contracts;
4. Contractor access and work area coordination in Manhattan;
5. Duration of integrated systems testing and effectiveness of Incremental IST;
6. Continued availability of adequate Amtrak and LIRR force account resources;
7. Continued availability of required track outages in Harold Interlocking;
8. Maintaining adequate schedule performance of the remaining work in Harold Interlocking (Improved performance noted through January 2020);
9. Remaining schedule path float will be used in the near future and Manhattan/Systems path will become critical (risk realized in April 2018);
10. Coordination risk retained by MTA C&D in Manhattan and the ESA tunnels with regard to construction and testing interface management for the systems work;
11. CS084 equipment issues involving transformers, 3 hi-pot test failures, and final resolution of concerns about MTA C&D provided inductive reactor equipment;
12. Foundation systems required for the new JP Morgan/Chase (JPMC) building at 270 Park Avenue will impact construction of the new LIRR Concourse at GCT. (Risk significantly increased based on issues revealed during January 2020); and,
13. Correction of out-of-tolerance and unacceptable as-built conditions: traction power track monuments built under 3 earlier contracts; rail installed in tunnels by CM007.

APPENDIX A – ACRONYMS

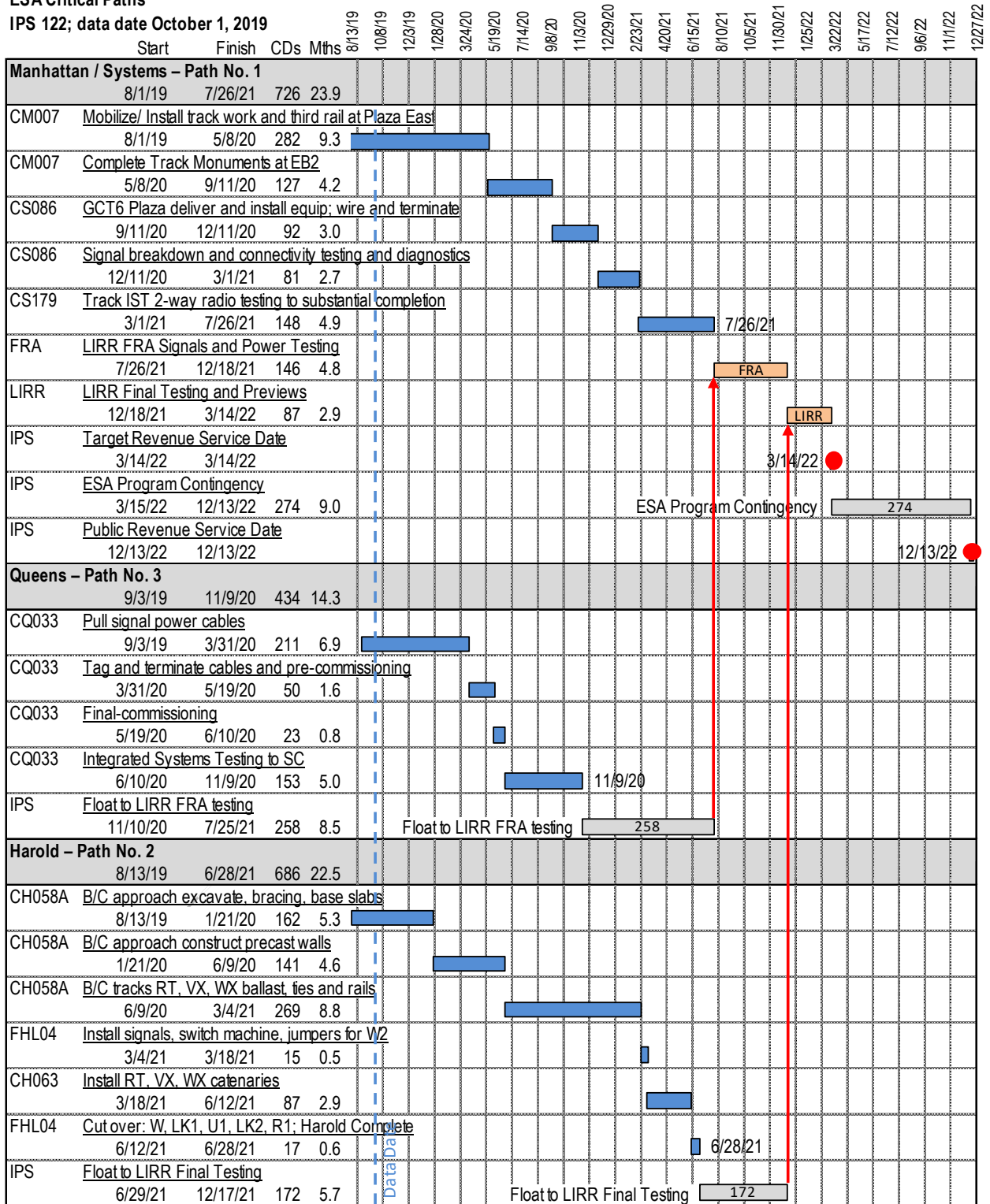
| | | | |
|-------|--|---------|--|
| AFI | Allowance for Indeterminates | IPS | Integrated Project Schedule |
| ARRA | American Recovery and Reinvestment Act | IST | Integrated System Test |
| AWO | Additional Work Order | JPMC | J. P. Morgan Chase |
| BIM | Building Information Model | LIRR | Long Island Rail Road |
| BLS | Bureau of Labor Statistics | LSZH | Low Smoke Zero Halogen |
| BSA | Buy/Ship America | MNR | Metro-North Railroad |
| C&S | Communication and Signals | MOD | Contract Modification |
| CBB | Current Baseline Budget | MPR | Monthly Progress Report |
| CCC | Change Control Committee | MTA | Metropolitan Transportation Authority |
| CCM | Consultant Construction Manager | MTA C&D | Metropolitan Transportation Authority Capital Construction |
| CCTV | Closed Circuit Television | NCR | Nonconformance Report |
| CD | Calendar Day | NOC | Notice of Change |
| CIL | Central Instrument Location | NTP | Notice to Proceed |
| CIR | Central Instrument Room | NYCT | New York City Transit |
| CM | ESA Construction Manager assigned to each contract | OCIP | Owner Controlled Insurance Program |
| CMP | Cost Management Plan | PAC | Pneumatically Applied Concrete |
| CMU | Concrete Masonry Unit | PCO | Proposed Change Order |
| ConEd | Consolidate Edison Company | PLC | Program Logic Control |
| CPOC | Capital Program Oversight Committee | PMOC | Project Management Oversight Contractor (Urban Engineers) |
| CPP | Contract Packaging Plan | PMP | Project Management Plan |
| CPR | Contractor Proposal Request | PMT | ESA Project Management Team |
| DC | Direct Current | QA | Quality Assurance |
| DCB | Detail Cost Breakdown | QPR | Quarterly Progress Report |
| DFE | Direct Fixation Fastener | RFI | Request for Information |
| EAC | Estimate at Completion | RFP | Request for Proposal |
| ELPEP | Enterprise Level Project Execution Plan | RMP | Risk Management Plan |
| ERT | East River Tunnel | ROD | Revenue Operations Date |
| ESA | East Side Access | ROW | Right of Way |
| ET | Electric Traction | RPR | Relocated Primary Route |
| F/A | Force Account | RSD | Revenue Service Date |
| FAT | Factory Acceptance Testing | RTB | Resilient Tie Block |
| FD | Final Design | SC | Substantial Completion |
| FFGA | Full Funding Grant Agreement | SCADA | Supervisory Control and Data Acquisition |
| FIAT | Factory Integrated Acceptance Testing | SDR | Second Design Review |
| FRA | Federal Railroad Administration | SLCS | Signal Local Control System |
| FTA | Federal Transit Administration | SMP | Schedule Management Plan |
| GCT | Grand Central Terminal | SMS | Security Management System |
| GEC | General Engineering Consultant | SWO | Stop Work Order |
| HVAC | Heat, Ventilation and Air Conditioning | TCC | Technical Capacity and Capability |
| | | TPSS | Traction Power Substation |
| | | TSR | Track and Signal Route |
| | | WBY | Westbound Bypass Tunnel |

APPENDIX B – CHARTS AND TABLES

Chart 1: ESA Critical Paths – IPS 124 – December 1, 2019

ESA Critical Paths

IPS 122; data date October 1, 2019



APPENDIX B – TABLES

Table 1: Summary of Critical Dates

| Program Milestone | FFGA | Forecast (F) Date, Actual (A) Date | | Amended FFGA *** |
|-----------------------|------------|------------------------------------|------------------|------------------|
| | | Project Sponsor* | PMOC** | |
| Begin Construction | Sept. 2001 | Sept. 2001 (A) | Sept. 2001 (A) | Sept. 2001 |
| Construction Complete | Dec. 2013 | Dec. 2022 (F) | Sept. 2023 (F)** | Dec. 2023 |
| Revenue Service | Dec. 2013 | Dec. 2022 (F) | Sept. 2023 (F) | Dec. 2023 |

Notes: * Project Sponsor forecast Revenue Operations Date per presentation the MTA CPOC in June 2014.
 ** Source –Based on PMOC 2014 schedule trending analysis representing a medium degree of mitigation.
 *** Source – Amended FFGA, August 2016

Table 2: Project Budget/Cost Table
 (Cost shown in millions)

| | FFGA | | | MTA Current Baseline Budget (CBB) | | | Expenditures December 1, 2019 | |
|-----------------------|---------------|--------------|--------------|-----------------------------------|----------|-------------------|-------------------------------|-------------|
| | Original FFGA | Amended FFGA | Pct. of FFGA | Obligated | CBB | Pct. of Total CBB | Expenditures | Pct. of CBB |
| Grand Total | 7,386.0 | 12,038.5 | 100.0% | 10,271.6 | 11,451.5 | 100.0% | 9,515.8 | 83.1% |
| Financing Cost | 1,036.0 | | 14.0% | 617.6 | 1,116.5 | 9.7% | 617.6 | 55.3% |
| | | 1,116.5 | 9.3% | | | | | |
| Total Project Cost | 6,350.0 | | 86.0% | 9,654.0 | 10,335.1 | 90.3% | 8,898.2 | 86.1% |
| | | 10,922.0 | 90.7% | | | | | |
| Federal Share | 2,683.0 | | 36.3% | 2,698.8 | 2,698.8 | 23.6% | 2,698.8 | 100% |
| | | 2,698.8 | 22.4% | | | | | |
| 5309 New Starts share | 2,632.0 | | 35.6% | 2,436.7 | 2,436.7 | 21.3% | 2,436.7 | 100% |
| | | 2,436.7 | 20.2% | | | | | |
| Non New Starts share | 51.0 | | 0.7% | 66.6 | 66.6 | 0.6% | 66.6 | 100% |
| | | 66.6 | 0.6% | | | | | |
| ARRA | 0.0 | 195.4 | 1.6% | 195.4 | 195.4 | 1.7% | 195.4 | 100% |
| Local Share | 3,667.0 | | 49.6% | 6,955.3 | 7,636.2 | 66.7% | 6,199.4 | 81.2% |
| | | 8,223.2 | 68.3% | | | | | |

Table 3: Project Budget and Invoices
(Cost shown in millions)

| Elements | Baseline Total Budget June 2014 | April 2018 MTA ETPC | December 1, 2019 | | | | Invoice Pct. of MTA ETPC |
|----------------------------|--|------------------------------|--------------------------------|------------------|-------------------|------------------------------|-----------------------------------|
| | | | Current Budget (interim) | Actual Awards | Invoiced Costs | Invoice Pct. of Budget | |
| Construction | 7,379.3 | 8,014.1 | 7,639.3 | 7,437.4 | 6,877.3 | 90.0% | 85.8% |
| Soft Cost Subtotal | 2,157.5 | 2,650.2 | 2,358.3 | 2,299.7 | 2,189.0 | 92.8% | 82.6% |
| Engineering | 720.6 | 871.8 | 795.5 | 767.5 | 763.3 | 96.0% | 87.6% |
| OCIP | 282.6 | 457.4 | 384.2 | 379.2 | 372.7 | 97.0% | 81.5% |
| Project Management | 972.2 | 1,117.3 | 1,053.6 | 1,032.9 | 934.4 | 88.7% | 83.6% |
| Real Estate | 182.1 | 203.7 | 124.9 | 120.1 | 118.6 | 94.9% | 58.2% |
| Rolling Stock [†] | 665.0 | 665.0 | 7.5 | 2.7 | 0.3 | 3.7% | 0.0% |
| Contingency | 439.0 | 267.0 | 330.0 | -- | -- | -- | -- |
| Subtotal | 10,640.8 | 11,596.3 | 10,335.1 | 9,739.9 | 9,066.7 | 87.7% | 78.2% |
| Financing | 1,036.0 | 1,116.5 | | | | | |
| Total | 11,676.8 | 12,712.8 | | | | | |

Note:† MTA ESA Rolling Stock Reserve of \$463 million added to June 2014 Budget and April 2018 Forecast to account for the cost of 160 revenue vehicles.

Table 4: Comparison of Standard Cost Categories: FFGA, MTA ETPC, CBB
(Cost shown in millions)

| Standard Cost Category | FFGA Dec 2006 | June 2014 Project Budget | Amend ed FFGA | April 2018 MTA ETPC | Sep 2019 CBB | Oct 2019 CBB | Nov 2019 CBB | CBB / FFGA Var. | CBB / Amend FFGA Var. |
|---|------------------------------|---|------------------------------|--|-----------------------------|-----------------------------|-----------------------------|--------------------------------|--|
| 10 Guideway & Track Elements | 1,989 | 3,405 | 3,353 | 3,479.7 | 3,402 | 3,402 | 3,403 | 71.1% | 1.5% |
| 20 Stations, Stops, Terminals, Intermodal | 1,169 | 2,238 | 2,327 | 2,473.6 | 2,378 | 2,378 | 2,378 | 103.5% | 2.2% |
| 30 Support Facilities (Yards, Shops, Admin) | 356.3 | 474.2 | 450.8 | 612.7 | 575 | 575 | 575 | 61.5% | 27.6% |
| 40 Site Work and Special Conditions | 205.1 | 610.6 | 562.5 | 591.9 | 519 | 520 | 518 | 152.6% | -7.9% |
| 50 Systems | 619.3 | 605.6 | 627.7 | 810.9 | 721 | 721 | 720 | 16.3% | 14.8% |
| 60 ROW, Land, Existing Improvements | 165.3 | 219.4 | 192.2 | 241.0 | 162 | 162 | 162 | -1.8% | -15.6% |
| 70 Vehicles | 494.0 | 672.9 | 879.5 | 209.9 | 15 | 15 | 15 | -96.9% | -98.2% |
| 80 Professional Services | 1,184 | 1,975 | 1,809 | 2,446.5 | 2,228 | 2,233 | 2,233 | 88.6% | 23.5% |
| 90 Unallocated Contingency | 168.5 | 439.0 | 720.2 | 730.0 | 333 | 328 | 330 | 95.8% | -54.2% |
| Subtotal | 6,350 | 10,641 | 10,922 | 11,596 | 10,335 | 10,335 | 10,335 | 62.8% | -5.4% |
| 100 Financing Cost | 1,036 | 1,036 | 1,116 | 1,116 | 1,116 | 1,116 | 1,116 | 7.8% | 0.0% |
| Total | 7,386 | 11,677 | 12,038 | 12,713 | 11,452 | 11,452 | 11,452 | 55.0% | -4.9% |

Table 5: Summary by FTA Standard Cost Categories
(Costs shown in millions)

| Standard Cost Category | FFGA | June 2014 | | December 1, 2019 | | |
|---|---------|----------------|--------------|------------------|---------------|--------------|
| | | Project Budget | Amended FFGA | Current Budget | Awarded Value | Paid to Date |
| 10 - Guideway & Track Elements | 1,988.7 | 3,405.5 | 3,353.4 | 3,402.7 | 3,350.6 | 3,129.4 |
| 20 - Stations, Stops, Terminals, Intermodal | 1,168.7 | 2,238.2 | 2,326.8 | 2,377.7 | 2,311.5 | 2,043.1 |
| 30 - Support Facilities (Yards, Shops, Admin) | 356.3 | 474.2 | 450.8 | 575.3 | 564.8 | 480.6 |
| 40 - Site Work and Special Conditions | 205.1 | 610.6 | 562.5 | 518.1 | 493.0 | 500.6 |
| 50 - Systems | 619.3 | 605.6 | 627.7 | 720.3 | 672.4 | 521.7 |
| 60 - ROW, Land, Existing Improvements | 165.3 | 219.4 | 192.2 | 162.3 | 157.4 | 155.9 |
| 70 - Vehicles | 494.0 | 209.9 | 879.5 | 15.4 | 10.6 | 5.8 |
| 80 - Professional Services | 1,184.0 | 1,975.4 | 1,809.0 | 2,233.4 | 2,179.6 | 2,061.1 |
| 90 - Unallocated Contingency | 168.5 | 439.0 | 720.2 | 330.0 | -- | -- |
| Subtotal | 6,349.9 | 10,177.8 | 10,922.0 | 10,335.1 | 9,739.9 | 8,898.2 |
| 100 - Finance Cost | 1,036.1 | 1,036.1 | 1,116.5 | 1,116.5 | | |
| Total | 7,386.0 | 11,213.9 | 12,038.5 | 11,451.6 | | |

Table 6: Program Critical Dates 90 Day Look-Ahead – IPS 124 – December 1, 2019

| Act. Id. | Name | Start | Finish | Float |
|---------------|---|-----------|-----------|-------|
| CM014B | GCT Concourse and Facilities Fit-Out | | | |
| CMB-002-1230 | Prepare & Submit Pipe Re-Route Drawings – JPMC #02 Rev. 1 | 2-Dec-19 | 30-Dec-19 | 2 cd |
| CMB-002-1063 | Review & Approve Pipe Re-Route Drawings – JPMC #02 Rev. 1 | 31-Dec-19 | 28-Jan-20 | 2 cd |
| CMB-002-1190 | Install new pipe in area 1 | 29-Jan-20 | 9-Feb-20 | 2 cd |
| CMB-002-1090 | Weld Spool Pieces | 10-Feb-20 | 12-Feb-20 | 2 cd |
| CMB-002-1080 | Install Twin Pipes | 13-Feb-20 | 18-Feb-20 | 2 cd |
| CMB-002-1210 | Connect to pumps / VFD | 19-Feb-20 | 24-Feb-20 | 2 cd |
| 360329 | Hydronic Testing – HVAC piping | 24-Feb-20 | 5-Mar-20 | 4 cd |

Table 7: ESA Core Accountability Items

| Project Status | | Original at FFGA | Amended FFGA | Current | ELPEP ** |
|--|--|--------------------------|---|---------------------------|----------------|
| Cost | Cost Estimate (including finance and rolling stock) | \$7,386.0 m | \$12,038.5 m | \$12,712.8 m* | \$9,155.1 m |
| Contingency | Unallocated /Risk Contingency | \$169.0 m | \$720.2 m | \$330.0 m | \$260.0 m |
| | Total Contingency (Allocated plus Unallocated) | \$738.7 m | \$1,068.2 m | \$450.9 m | \$722.0 m |
| Schedule | Start of Revenue Service | Dec. 31, 2013 | Dec. 31, 2023 | Dec. 2022 | April 30, 2018 |
| Total Project Percent Complete | | Based on Invoiced Amount | 81.4% actual vs. 82.6% planned (ESA calc. †) | | |
| Project Performance Rate Since 2014 ESA Re-Plan | | Based on Earned Value | 83.0% (PMOC calculation of construction spending at Q3 2019 planned vs. actual since re-baselining) | | |
| Contracts | Total contracts awarded to date | | \$9,739.9 m | 87.5% (PMOC calculation†) | |
| | Total construction contracts awarded to date | | \$7,437.4 m | 92.8% (PMOC calculation†) | |
| Major Issue | Status | | Comments | | |
| Project Funding and Budget | The total program budget is \$10,335.1 million, including \$330.0 million in unallocated contingencies. The MTA included an additional approximately \$800 million for the ESA program in the 2020-2024 Capital Plan. The Capital Plan was deemed approved by the Governor of the State of New York in January 2020. | | The MTA C&D needs an additional approximately \$800 million in the 2020-2024 Capital Plan to complete the ESA program. Unallocated contingencies will be used to fund contracts that are not currently fully budgeted until additional funds are available. The MTA C&D anticipates updating the ESA budgets in the first quarter of 2020. | | |
| Project Cost | The MTA ETPC is \$12,712.8 million, including costs for financing and 160 vehicles, \$674.3 million above the Amended FFGA Baseline Cost Estimate of \$12,038.5 million. | | With the approval of the 2020-2024 Capital Plan, potential impacts to the completion of current contracts, award of remaining contracts, and/or completion of railroad force account work have been reduced. Concerns remain about the time elapsed in resolving the open cost and schedule issues and, ultimately, their cost impacts. | | |
| Project Schedule | The primary critical and near-critical paths to target RSD, including float, are: <ul style="list-style-type: none"> ▪ Manhattan/Systems - no float (critical path) ▪ Harold Interlocking - 208 CDs ▪ Mid-day Storage Yard (Queens) - 238 CDs The target RSD forecast remains April 18, 2022; and the public RSD remains December 13, 2022. The Amended FFGA Revenue Operations Date is December 2023. | | There remain 29 months to the target RSD, which is followed by 7.9 months of program float to the public RSD. The PMOC is concerned that until uncertainties related to Incremental IST performance and redevelopment of 270 Park Avenue are known, future schedules may show the shifts in the critical path, further delays, and potentially may impact the program schedule contingency. | | |
| Manhattan/Systems Schedule Path | IPS 124 shows that the ESA Program Critical Path runs through the Manhattan/Systems contracts. This work path has major open/unresolved performance issues regarding execution of incremental IST and the redevelopment of 270 Park Avenue that have potentially significant schedule impacts. | | Concerns continue for the ESA program Manhattan/Systems critical path. The Manhattan/Systems path completion date is August 30, 2021, in IPS 124. Progress along this schedule path relies heavily on the effectiveness of MTA C&D/ESA coordination efforts and contractor performance across the seven area contracts. | | |

Notes: * The cost forecast total budget was established in the April 2018 and includes costs for financing and 160 revenue vehicles.
 ** 2010 Enterprise Level Project Execution Plan (ELPEP) reflecting medium level of risk mitigation and includes costs for financing and 160 revenue vehicles.
 † ESA April 2018 EAC forecast: Construction \$8,014.1 million; Engineering \$871.8 million; Soft Costs (OCIP; Project Management; Real Estate) \$1,778.4 million; Rolling Stock \$202.0 million; and Contingency \$267.0 million.