Washington Metropolitan Area Transit Authority

Board Action/Information Summary

○ Action ◉ Information	MEAD Number: 202171	Resolution: ○ Yes ◉ No

TITLE:

Silver Line Phase 2 - Outstanding Issues

PRESENTATION SUMMARY:

Staff will present the Board with an update on the status of Silver Line Phase 2, including quality issues previously presented to the Safety and Operations Committee on September 12, 2019, November 21, 2019, and January 16, 2020, and on project schedule drivers.

PURPOSE:

To inform the Safety and Operations Committee of the current status of open issues that were previously presented on September 12, 2019, November 21, 2019, and January 16, 2020. Additionally, staff will discuss the primary issues driving the Project's schedule.

DESCRIPTION:

Capital Rail Constructors, a joint venture of **Clark Construction Group, LLC** and **Kiewit Infrastructure South Co.**, is the design-build contractor for Package A of the Silver Line Phase 2 (mainline and stations), and **Hensel Phelps Construction Company** is the design-build contractor for Package B (Dulles Rail Yard). Major subcontractors and consultants under these entities include **Mass. Electric Construction Company, Parsons Corporation, Dewberry, Systra,** and **M.C. Dean**.

Major consultants and contractors supporting Metro's efforts on the project include **Mott MacDonald, Gannett Fleming, HNTB,** and **Cubic Transportation Systems.**

Key Highlights:

- As part of Metro's ongoing review of the Silver Line Phase 2 project, 12 major quality issues were identified and presented to

the Safety and Operations Committee on September 12, 2019. Subsequently four of these quality issues have been resolved, five are currently being remediated, and three are pending resolution.

- Weekend shutdowns of the Wiehle-Reston East Station in January and February 2020 to facilitate the ATC tie-in of Phase 2 to the existing system were cancelled by Metro due to insufficient ATC software documentation to ensure that there would be no adverse effect on the existing system.

  Adding the Silver Line to the summer shutdown allows the opportunity to expedite completion of the required software documentation and completion of the tie-in work.

- Metro, as intended future owner and operator, determines when all the conditions necessary for Metro acceptance have been satisfied, and whether Phase 2 of the project is accepted into the Adopted Regional System (ARS).

- The unresolved quality issues and the delays in ATC testing for the tie-in at Wiehle-Reston East Station create risk of further delaying Metro acceptance of the project.

- Metro will establish a revenue service date after all identified deficiencies have been resolved to meet acceptance standards.

Background and History:

Phase 2 of the Silver Line will extend the Metrorail system into Loudoun County, Virginia, and provide 11.4 miles of new track from the interim terminus at Wiehle-Reston East Station, through the Washington Dulles International Airport, to a terminus in Loudoun County. It includes six new Metrorail stations (Reston Town Center, Herndon, Innovation Center, Washington Dulles International Airport, Loudoun Gateway, and Ashburn), and a new service & inspection yard.

Metro's role and responsibilities for the design-build phase of the Silver Line Phase 2 project are as defined in the Cooperative Agreement executed between the Airports Authority and Metro on August 7, 2013.

The Board of Directors amended the ARS to incorporate the Dulles Metrorail Extension (Silver Line) subject to the fulfillment of certain "ARS Contingencies" adopted in Resolution 2012-24. Additional conditions precedent for acceptance are established in Article 6 of the Cooperative Agreement.

Discussion:

Construction of the Silver Line Phase 2 is well advanced. Facility construction is essentially complete, and systems installations and testing are advancing. The Dynamic Testing Readiness milestone has been achieved, and testing using Metro railcars has been underway since February 2019.

In addition to Dynamic Testing Readiness, the project will advance through several milestones moving towards the start of revenue service. These milestones are defined and summarized as follows:

Dynamic Testing Readiness – determination that the contractor has completed the work in accordance with the contract documents which renders the project safe and capable of supporting dynamic testing. This determination is supported by documentation of the following: final alignment and track configuration; operational traction and third rail power; co pletion of prerequisite automatic train control static testing; activation of contractor start-up railroad safety procedures; and verification of train, track and structure clearances.

System Performance Demonstration (SPD) – activities conducted by the contractor to demonstrate that the integrated subsystems of the project perform, both individually and collectively, in accordance with the contract requirements. The SPD testing addresses normal, abnormal, and simulated emergency operations, and includes both static and dynamic tests.

Substantial Completion (SC) – the work is substantially complete, all conditions of substantial completion have been met, and the project is ready for operational readiness testing. Conditions to substantial completion include performance of contractor inspections and tests, delivery of record documents and spare parts, completion of training and contractor safety certification, correction of all defects that materially adversely impact the operations of the Project, and provision of O & M manuals and punch list completion schedule.

Operational Readiness Date (ORD) – the date on which Metro determines that the Project is sufficiently complete for Metro to commence simulated rail service, and that the conditions to operational readiness have been met. A condition of operational readiness is the successful completion of operational readiness testing conducted by Metro.

Pre-Revenue Activities – between ORD and Acceptance, Metro has

provisional care, custody and control of the project, and performs activities in preparation for revenue service. These activities include verification that conditions precedent for acceptance have been met; simulated service; emergency drills; safety certification; mobilization of stations and yard; re-keying all facilities; providing escorts to support contractor punch list completion; control right-of-way operations; and performance of preventive maintenance inspections.

Metro's acceptance determination is supported by the completion of certain ARS Acceptance Tasks, verification that all conditions precedent for acceptance have been met, and Metro's determination that Phase 2 is eligible and ready for Metro Acceptance.

The conditions precedent for acceptance of Phase 2 into the ARS as established in the Cooperative Agreement are summarized as follows:

Condition 1. Punch List – all punch list work completed to Metro's satisfaction. If not completed, Metro has the right to complete punch list items at the Airport Authority's expense.

Condition 2. Property Transfers – The Airports Authority shall have transferred to Metro the appropriate property interests as indicated in the approved Right-of-Ways plans.

Condition 3. Spare Parts and Training – Metro shall have received all spare parts, O&M manuals, and necessary training.

Condition 4. Record Deliverables – record deliverables have been received by Metro.

Condition 5. Assignment of Warranties – all warranties have been assigned to Metro, and all documentation necessary to enforce the warranties has been provided to Metro.

Condition 6. Permits – The Airports Authority shall have obtained for Metro all land use and permitting approvals necessary for Metro's operations.

Condition 7. Payments – The Airports Authority shall have paid Metro all funds due and owing.

Condition 8. Safety and Security – project has achieved certification by Metro Chief Safety Officer.

Condition 9. Insurance – Metro shall have received all certificates of insurance.

Condition 10. Storm Water Management – The Airports Authority shall have obtained maintenance agreements as required.

A series of quality issues have been documented on the project, including the following that have previously been presented to the Safety & Operations Committee, categorized to reflect their current status:

Resolved

- Aerial track girder cracking
- Pedestal deficiencies at Dulles Airport Station screen wall
- Roadway pavement failures at Dulles Yard building
- Buy America issues with bridge cranes at Dulles Yard

Underway

- Precast concrete wall panel cracks at Dulles Yard Buildings
- Tight gauge at switches in Dulles Yard
- Concrete tie deficiencies
- Track plate deficiencies
- Cross level deficiencies at special track work

Unresolved

- Track insulated joint (IJ) deficiencies at Dulles Yard
- Ballast deficiencies at Dulles Yard
- Precast concrete panel deficiencies at stations

The Airports Authority has identified three primary issues currently driving the Project schedule as follows:

- Automatic Train Control Tie-In - the completion of Automatic Train Control (ATC) tie-in to Phase 1 impacts completion of Dynamic Testing
- Dynamic Testing - completion of Dynamic Testing impacts the start of Systems Performance Demonstration (SPD)
- SCADA Testing - the completion of supervisory control and data acquisition (SCADA) acceptance testing impacts the start of SPD

As identified in the January 16, 2020 presentation to the Safety and Operations Committee, weekend shutdowns of the Wiehle-Reston East Station in January and February 2020 to facilitate the ATC tie-in of

Phase 2 to the existing system were cancelled by Metro due to insufficient ATC software documentation having been submitted to ensure that there would be no adverse effect on the existing system.

Adding the Silver Line to the summer shutdown allows the opportunity to expedite completion of the required software documentation and completion of the tie-in work.

Updates on the status of these quality and schedule issues are discussed in the attached presentation.

FUNDING IMPACT:

There is no impact on funding for presenting this update. However, based on future assessment of Silver Line Phase 2 revenue service ramp up in FY2021, amendment to the FY2021 Budget may be required.	
Project Manager:	Neil Nott
Project Department/Office:	Capital Delivery/Project Implementation and Planning (CAPD/PICO)

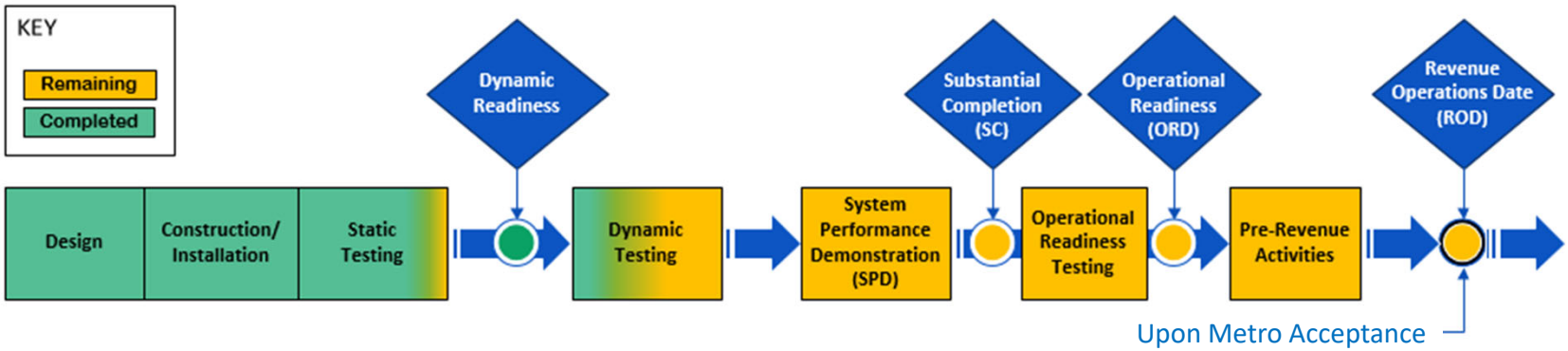
TIMELINE:

Previous Actions	August 2013 – Metro and MWAA executed the negotiated Cooperative Agreement that provides for Metro support throughout the design-build phase of the Silver Line Phase 2 project.
Anticipated actions after presentation	Acceptance of Silver Line Phase 2.

Silver Line Phase 2 Update

Safety and Operations Committee
May 14, 2020

Silver Line Phase 2 Milestones/Sequence



- Phase 2 Schedule Drivers identified by Airports Authority

1. Automatic Train Control Tie-In - the completion of Automatic Train Control (ATC) tie-in to Phase 1 impacts completion of Dynamic Testing
2. Dynamic Testing - completion of Dynamic Testing impacts the start of Systems Performance Demonstration (SPD)
3. SCADA Testing - the completion of supervisory control and data acquisition (SCADA) acceptance testing impacts the start of SPD

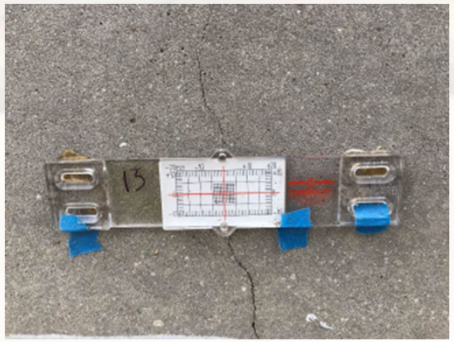
Identified Quality Issues

- ✓ Aerial track girder cracking
- ✓ Pedestal deficiencies at Dulles Airport Station screen wall
- ✓ Roadway pavement failures at Dulles Yard
- ✓ Buy America issues with bridge cranes at Dulles Yard
- !! Precast concrete wall panel cracks at Dulles Yard buildings
- !! Tight gauge at switches in Dulles Yard
- !! Concrete tie deficiencies
- !! Track plate deficiencies ⬆
- !! Cross-level deficiencies at special trackwork ⬆
- × Track insulated joint (IJ) deficiencies at Dulles Yard ⬇
- × Ballast deficiencies at Dulles Yard
- × Precast concrete panel deficiencies at stations

✓ Resolved !! Underway × Unresolved

!! Precast concrete wall panel cracks at Dulles Yard buildings

- Airports Authority concluded cracking on surface of exterior wall panels due to panel connections restraining panel thermal and shrinkage movement, and have stabilized
- Cracks are narrow, though pose risk of potential reduced durability
- Contractor proceeding with sealer but;
  - No agreement on need for future reapplications (~10 years)
  - Contractor submitted lifecycle analysis suggesting 150-year service life of panel without sealer — WMATA has not accepted the analysis
  - Metro awaits contractor and Airports Authority response to Metro comments on contractor lifecycle analysis
- Metro acceptance or rejection to be in conjunction with OIG assessment



!! Tight gauge at switches in Dulles Yard

- Condition exists at 39 switches in Dulles Yard
- Contractor was able to achieve gauge within Metro maintenance tolerances
- Dynamic testing allowed to proceed conditioned on further remediation to achieve construction tolerances after test train activity
- Metro acceptance or rejection will be based on Metro's final review of the rework

!! Concrete tie deficiencies

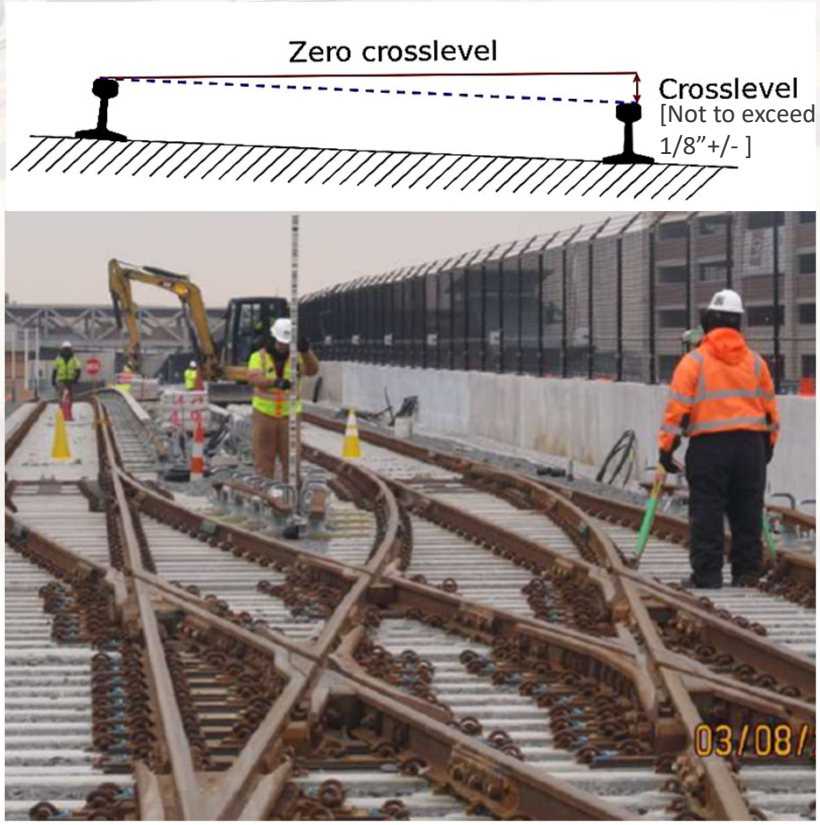
- Some concrete switch ties exceed contractual design requirements for allowable camber
- Remediation or replacement of cambered ties continues to be reviewed in conjunction with resolution of cross-level deficiency
- Discussion underway regarding possible replacement of ties at a few turnout locations to achieve cross-level compliance

!! Track plate deficiencies

- Track plates at special trackwork exhibited curvature in excess of contractual requirements for flatness, creating gap between plate and tie
- At locations where removal of non-compliant hardware and re-tamping effort is completed, gaps at track plates appear to be resolved
- Metro will require remedy to address any gaps at track plates remaining that could result in fatigue failure

!! Cross-level deficiencies at special trackwork

- Mainline turnouts throughout ballasted areas (29 turnouts/7 locations) - inability to achieve compliance with the requirements for maximum allowed cross-level (1/8" +/-)
- Original remedy of unique hardware rejected. Airports Authority's contractor re-tamping with specialty contractor
- Re-tamping exercise at 1st location (4 turnouts) yielded results conditionally accepted by Metro; work in progress at other locations
- Metro will accept or reject remediation at other locations on a turnout-by-turnout basis



Track insulated joint (IJ) deficiencies at Dulles Yard

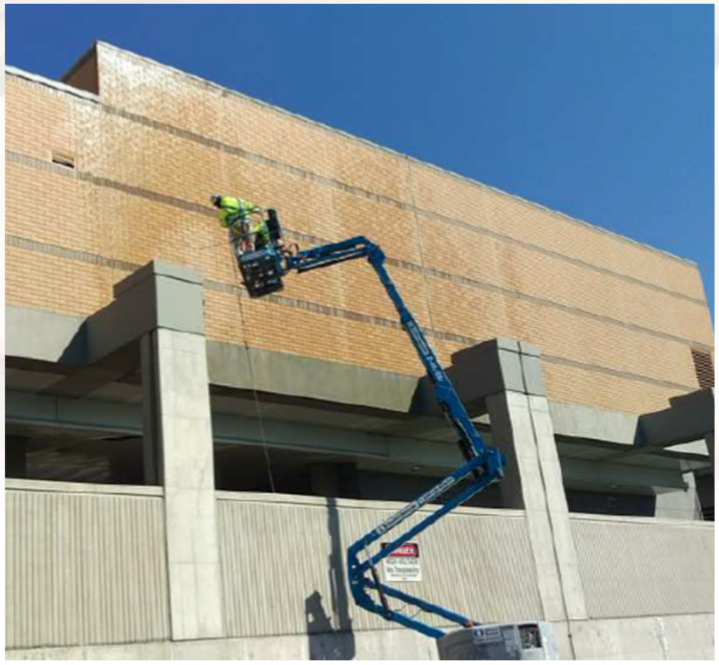
- Mechanical (misaligned/oversized holes) and electrical resistance deficiencies identified
- Airports Authority directed contractor to disassemble, inspect, replace and re-test remaining field installed IJ's
- No action yet taken by contractor to proceed with remediation
- Metro acceptance or rejection will be based on Metro's final review of the rework

Ballast deficiencies at Dulles Yard

- Ballast contaminated with materials of inappropriate size/consistency; condition can lead to drainage issues, affect ability to constrain tracks, and pose a potential safety risk
- Metro OIG recommended complete survey and testing of ballast
- Representative samples collected throughout the site were analyzed by Metro's consultant - remediation requirements were conveyed to Airports Authority
- Airports Authority directed contractor to proceed with remediation work
- No action yet taken by contractor to proceed with remediation
- Metro acceptance or rejection will be based on complete and thorough remediation of the fouled ballast in the Yard to meet required standards

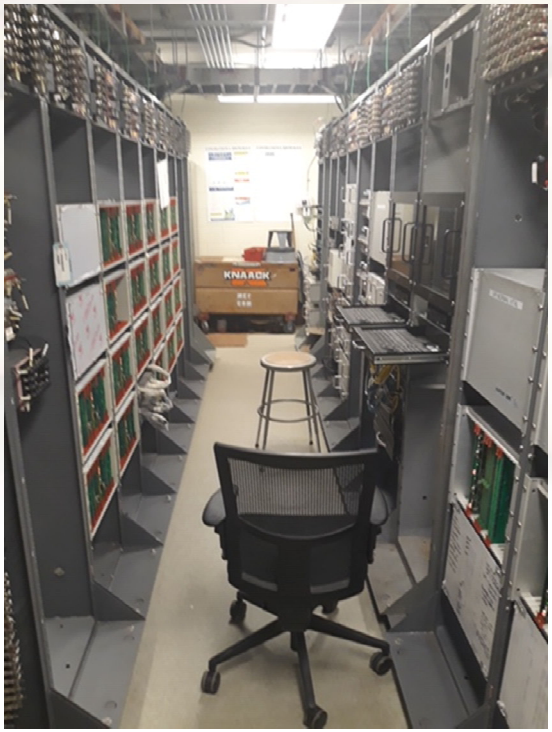
Precast concrete panel deficiencies at five at-grade stations

- Deficiencies include high water content; low air content; insufficient cover of reinforcing; potential Alkali-Silica Reactivity (ASR)
- Airports Authority's contractor applied Silane sealer as remedy
- Metro's OIG noted test results indicating insufficient penetration of sealer
- Contractor applied additional sealer and submitted test results identifying sufficient penetration
- Metro OIG recommended that all panels (approximately 1700) would require visual inspection for rust/cracks every 3 months
- Inspection of current conditions by OIG consultant delayed (Covid-19)
- Metro rejects the remediation and the panels unless and until the Airports Authority proposes a safe and effective long-term solution



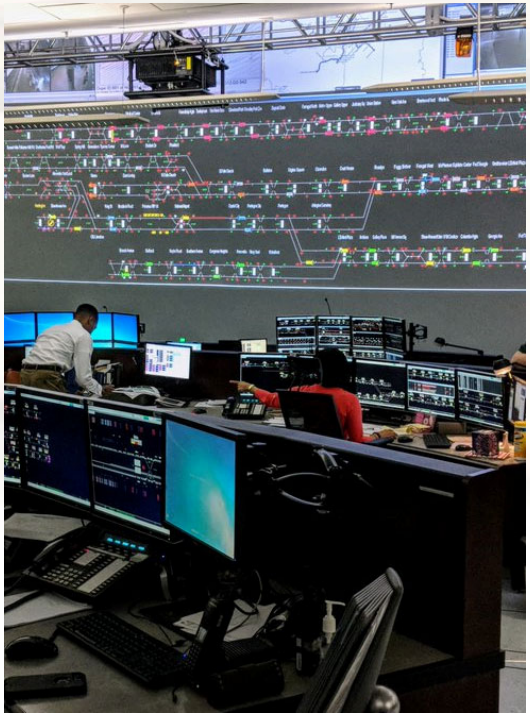
ATC software tie-in to Phase 1

- Airports Authority currently identifies ATC tie-in as the project's critical path
- Prior tie-in work cancelled due to insufficient ATC software documentation to ensure no adverse affect on existing system
- Performing tie-in during summer shutdown allows use of existing system as "test bed", eliminating the need for lab simulation prior to download of new software on existing system
- Other ATC software documentation requirements remain as prerequisites to downloading software and starting ATC tie-in, including completion of Hazard Analysis
- Window for completion of tie-in is June-August.



Delay to completion of SCADA testing

- Sequence of prerequisite actions to acceptance of supervisory control and data acquisition (SCADA) system include:
  - Provision of final design data from Airports Authority's contractors;
  - Metro use of data in programming and graphic display interface updates at ROCC; and
  - Conduct final "point-to-point" acceptance testing demonstrating integration between Phase 2 and ROCC
- Delay in receipt of final design data from Airports Authority's contractors has delayed subsequent actions
- Airports Authority identifies SCADA system acceptance as near critical path

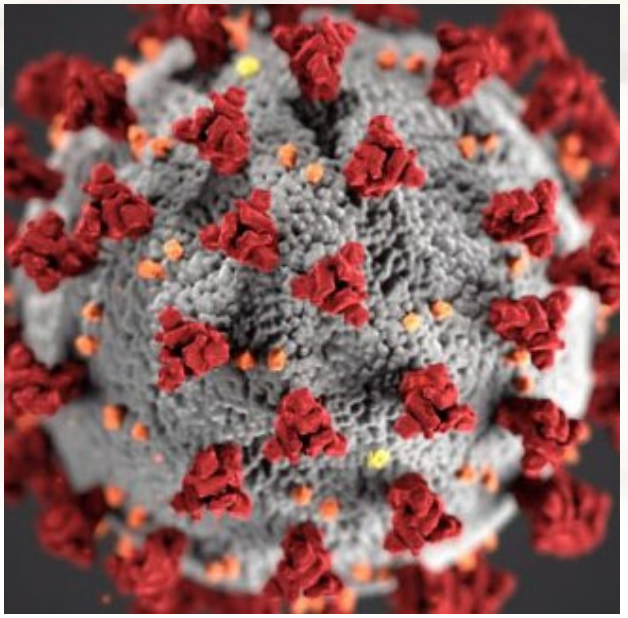


Delays to completion of Dynamic Testing

- Delays to Dynamic Testing have included the following:
  - Insufficient progress of prerequisite ATC static testing
  - Constraints of working around cross-level remediation efforts
  - Disruptions of traction power due to systemic failures of surge arrestors
  - ATC system provider lack of manpower to support
- Indicator of delays; Metro's test trains only used on 34% of days trains were available
- Airports Authority identifies completion of Dynamic Testing as near critical path

Covid-19 – Project policies and impacts

- Abide by social distancing guidelines and follow recommendations issued by CDC
- Metro start-up train operators and contractor office staff on split shifts - masks worn at construction sites
- Contractor regularly closing jobsite trailers Friday-Sunday based on NIH research that coronavirus may self-expire in three days
- Possible impacts:
  - Lack of staffing (contractor, Airports Authority, Metro) needed to support testing activities
  - Quarantine of subcontractors from out of state
  - Supply chain limitations and jobsite inefficiencies



Summary

- Airports Authority's contractor projects Substantial Completion in March 2021 (Package A), a forecast that predates announcement of summer shutdown to enable acceleration of ATC tie-in work
- Awaiting updated schedule from MWAA, reflecting progress on top three critical paths
- Metro will not set a target service date until all identified issues have been resolved to meet acceptance standards
- Airports Authority's response to the unresolved issues will determine path forward and timing for Metro acceptance or rejection of the project