Safety and Operations Committee

Board Information Item IV-B

October 8, 2020

Silver Line Phase 2 Update

Washington Metropolitan Area Transit Authority

Board Action/Information Summary

○ Action ◉ Information	MEAD Number: 202212	Resolution: ○ Yes ◉ No

TITLE:

Silver Line Phase 2 Update

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, January 16, 2020, and May 14, 2020, and project schedule drivers identified by the Airports Authority.

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, January 16, 2020 and May 14, 2020. Additionally, staff will discuss the primary issues driving the Project's schedule as identified by the Airports Authority.

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. Since then seven of these quality issues have been resolved, and five are currently being remediated.

- Subsequent to the May 14, 2020, presentation to the Safety and Operation Committee, two additional quality issues have been identified, which are included in the list of issues below and discussed in the attached presentation.

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

- Remaining unresolved quality issues and the delays to supervisory control and data acquisition (SCADA) testing and Dynamic Testing create risk of further delaying Metro acceptance of the project.

- Adding the Silver Line to the summer shutdown expedited completion of required Automatic Train Control (ATC) System tie-in work at the Wiehle-Reston East Station and mitigated further delays to the completion of the Project related to 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).

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 complete, and systems installations and testing are well advanced. 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; completion 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, and two new issues added to this presentation regarding the rail car hoist equipment at the Dulles Yard, and cross bond spacing deficiencies. These issues have been categorized as follows 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
- Track insulated joint (IJ) deficiencies at Dulles Yard

- Track plate deficiencies
- Concrete tie deficiencies

Underway

- Precast concrete wall panel cracks at Dulles Yard Buildings
- Tight gauge at switches in Dulles Yard
- Cross level deficiencies at special track work
- Ballast deficiencies at Dulles Yard
- Precast concrete panel deficiencies at stations
- Rail Car Hoists at Dulles Yard (new issue)

Unresolved

- Cross Bond Spacing Deficiencies (new issue)

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

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

Adding the Silver Line to the summer shutdown expedited completion of required Automatic Train Control (ATC) System tie-in work at the Wiehle-Reston East Station and mitigated further delays to the completion of the Project.

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	Board Action approving Service Plan and Title VI Equity Analysis Acceptance of Silver Line Phase 2

Silver Line Phase 2 Update

Safety and Operations Committee
October 8, 2020

Purpose

- Review current status of Identified Quality Issues
- Review Schedule
  - Drivers identified by MWAA
  - Status/Mitigations

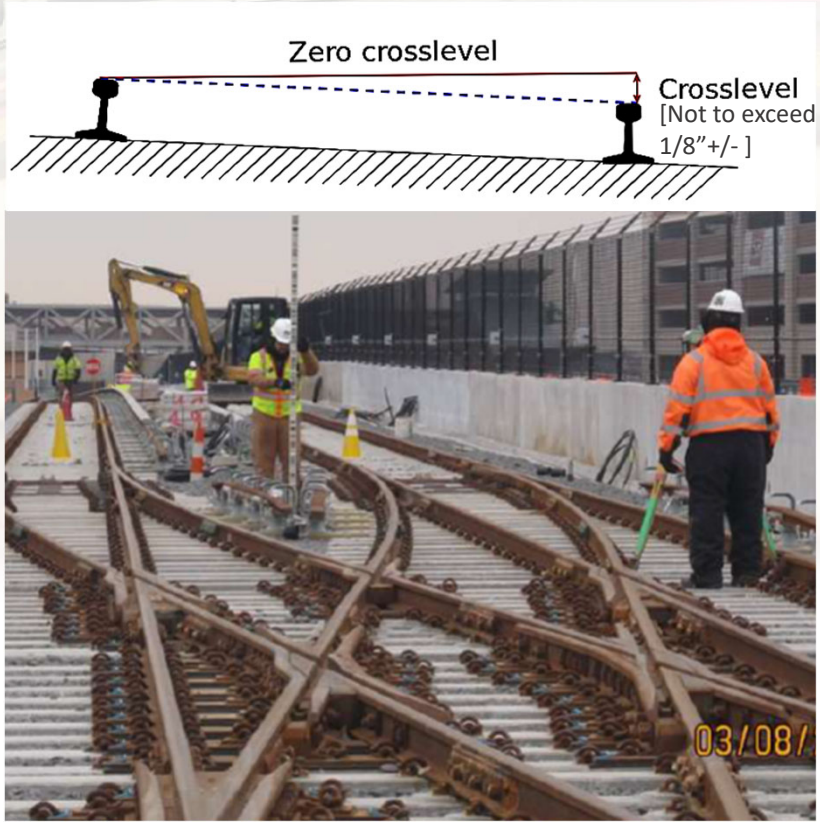
Identified Quality Issues

- ✓ 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
- ✓ Track insulated joint (IJ) deficiencies at Dulles Yard ⬆
- ✓ Track plate deficiencies ⬆
- ✓ Concrete tie deficiencies ⬆
- !! Cross-level deficiencies at special trackwork
- !! Tight gauge at switches in Dulles Yard
- !! Ballast deficiencies at Dulles Yard ⬆
- !! Precast concrete wall panel cracks at Dulles Yard buildings
- !! Precast concrete panel deficiencies at stations ⬆
- !! Rail Car Hoist Equipment ⬆
- ✗ Cross Bond Spacing Deficiencies

✓ Resolved !! Underway ✗ Unresolved

!! 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 by Metro
- Airports Authority's contractor completed re-tamping effort at all locations
- Re-tamping results sufficient to allow Metro to accept 24 of the 29 non-compliant turnouts
- Metro reviewing contractor proposal to accept remaining five turnouts without further remediation



!! Tight gauge at switches in Dulles Yard

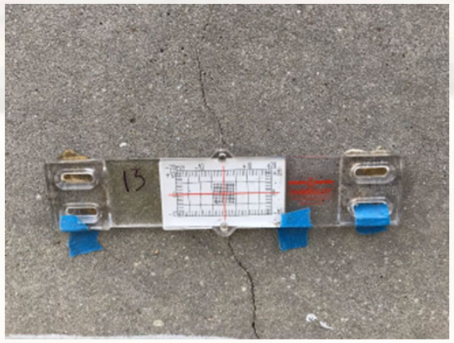
- Tight gauge identified at 39 switches in Dulles Yard
- With remedial work Contractor was able to achieve gauge within Metro maintenance tolerances
- Dynamic testing allowed to proceed conditioned on verification of construction gauge tolerances after test train activity – await completion of testing
- 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 which was performed
- Ballast remediation work expected to be completed in early Oct. 2020, followed by random sampling to verify compliance
- 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 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 completed sealer application at all locations
- Metro OIG Sept. 2020 report concluded that sealer application is acceptable remediation; however, costs for future re-application of sealer should be considered

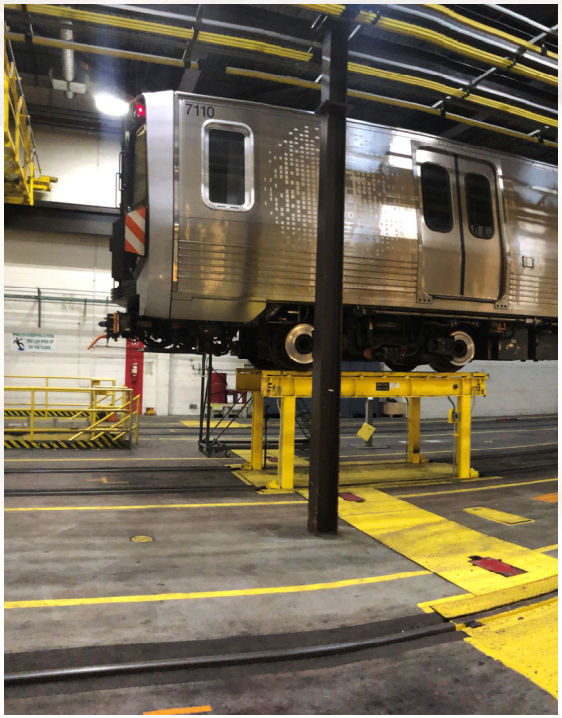


!! Precast concrete panel deficiencies at five at-grade stations

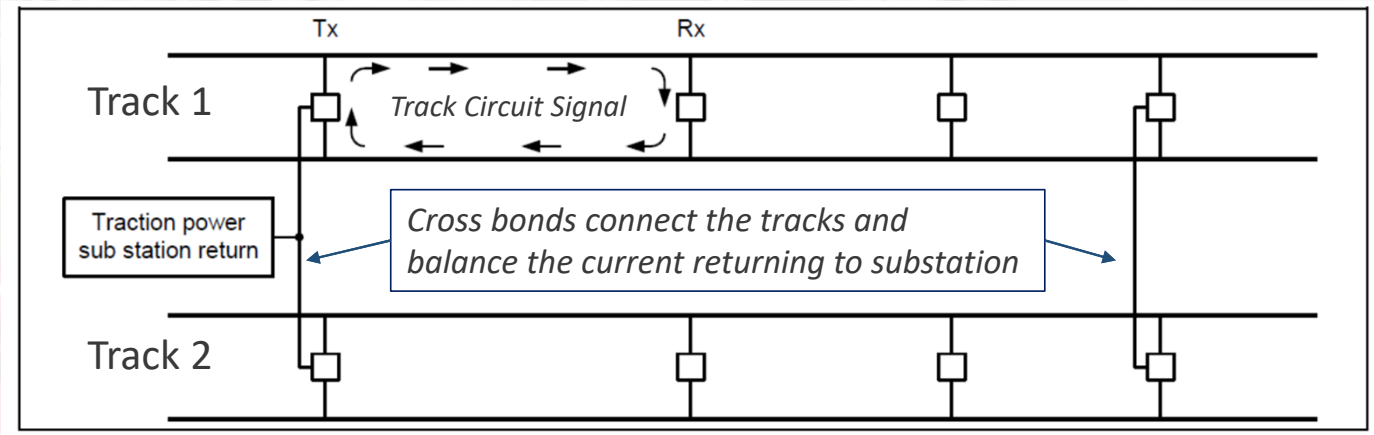
- Deficiencies include high water content; low air content; insufficient cover of reinforcing; potential Alkali-Silica Reactivity (ASR)
- Airports Authority's contractor applied Silane sealer as remedy
- Metro OIG completed inspections of current panel conditions in Aug. 2020 - inspection reports identified 184 panels with cracks (342 cracks total)
- Metro OIG provided 8 recommendations addressing panel documentation, crack repairs, future inspections, sealer re-application frequency, and escrow cost considerations
- Metro concurs with the OIG's findings and recommendations

!! Railcar Hoists at Dulles Yard

- Nov, 2018, prior to delivery of all parts and completion of installation, equipment manufacturer went out of business
  - March 2019 assets acquired by successor manufacturer
- Installation completed, testing and inspection underway
  - Contractor achieved synchronization of jacks at all hoists
  - Functional performance testing of hoists using WMATA rail cars started Sept 2020
- Metro concerns remain:
  - Sustained durability and reliability of equipment – performance testing will inform
  - General contractor (HP) has assumed warranty responsibility – capacity to meet Metro warranty and service needs TBD

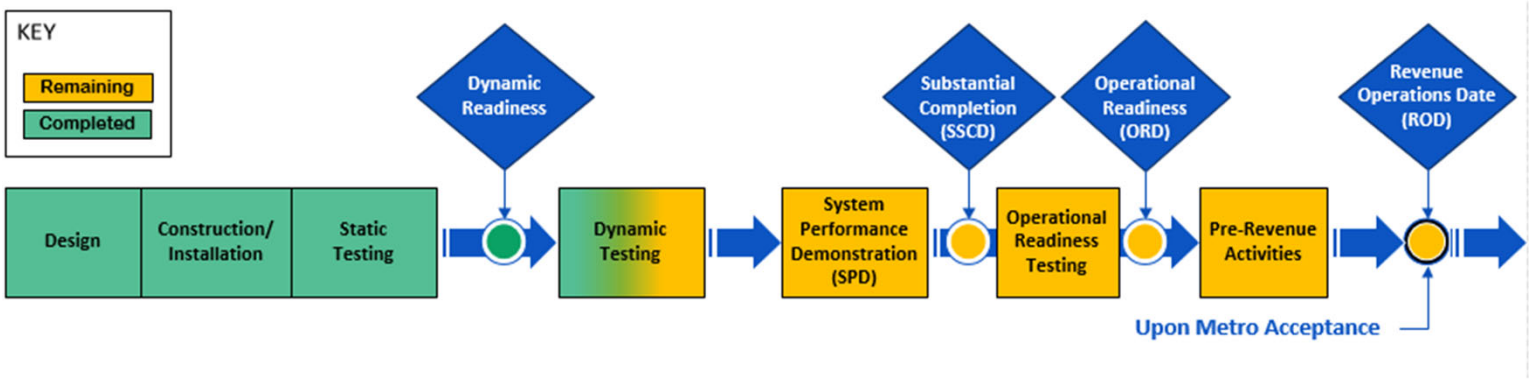


Cross Bond Spacing Deficiencies



- Metro identified deviations from Design Criteria and industry practice for spacing of cross bonds
- Could result in broken rails not being detected; risk loss of train detection or derailment
- Airports Authority has requested that contractor respond to Metro's concerns

Silver Line Phase 2 Milestones/Sequence



- Phase 2 Schedule Drivers identified **by Airports Authority**

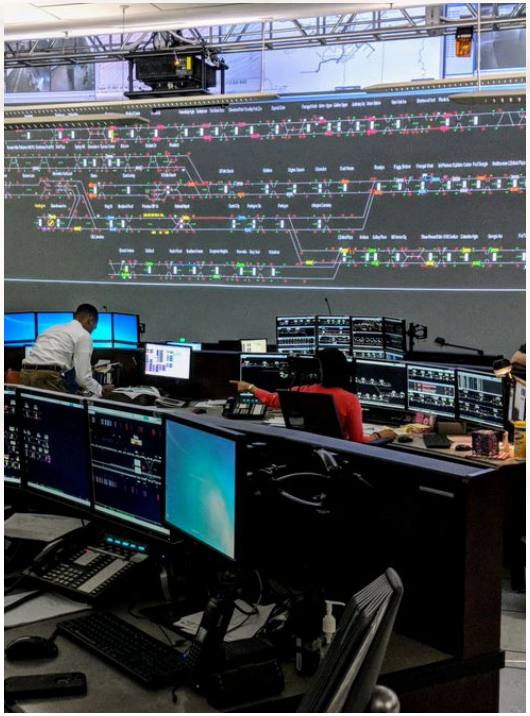
1. Dynamic Testing - delays in Dynamic Testing impact the start of Systems Performance Demonstration (SPD)
2. SCADA Testing – delays in completion of supervisory control and data acquisition (SCADA) acceptance testing impact completion of Dynamic Testing
3. Completion of Tie-In at Wiehle-Reston East – three weekend shutdowns required in Nov. and Dec. to complete final automatic train control (ATC) and power systems cut-over

Delays to completion of Dynamic Testing

- Airports Authority identifies completion of Dynamic Testing as critical path
- Efforts to mitigate delays to Dynamic Testing have included the following:
  - Increased utilization of test train availability
  - Implementation of split (day and night) testing shifts
  - Increased rate of submission and review of prerequisite test reports
- Causes for delay include:
  - Corrective actions to address unacceptable test results and required regression testing

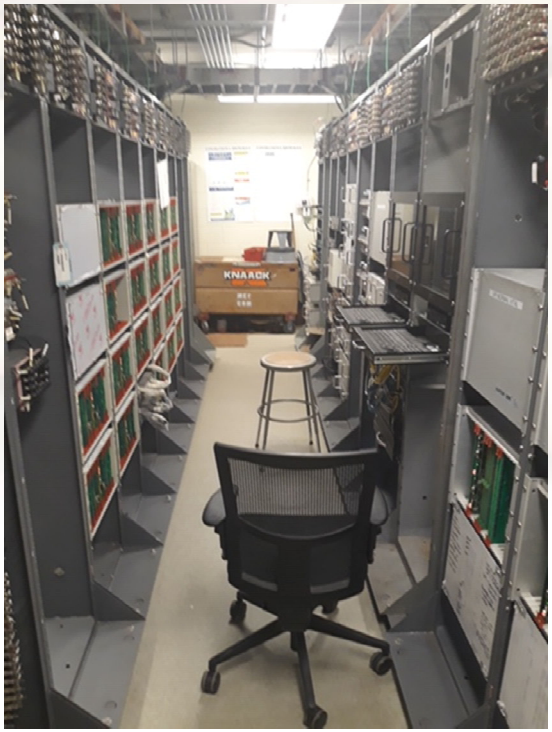
Delay to completion of SCADA testing

- Airports Authority identifies supervisory control and data acquisition (SCADA) system acceptance as near critical path
- Delay in receipt of final design data from Airports Authority's contractors has delayed subsequent actions
  - Metro requires final data to develop programming and graphic display interface updates for ROCC
  - Programming updates required to conduct final acceptance testing demonstrating integration between Phase 2 and ROCC
- Metro working with Airports Authority to expedite SCADA testing



ATC software tie-in to Phase 1

- Airports Authority currently identifies ATC tie-in as near critical path
- Performing tie-in work during summer shutdown allowed use of existing system as “test bed”, eliminating the need for lab simulation prior to download of new software on existing system
- ATC work remains near critical path since final cut-over dependent on successful weekend outages in Nov. and Dec. and required to complete Dynamic Testing



Summary

- Airports Authority currently projects Substantial Completion in February 2021 (Package A)
- 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