Massachusetts Bay Transportation Authority

Safety Update

MBTA Board of Directors – Safety, Health and Environmental Sub-Committee

October 20, 2022

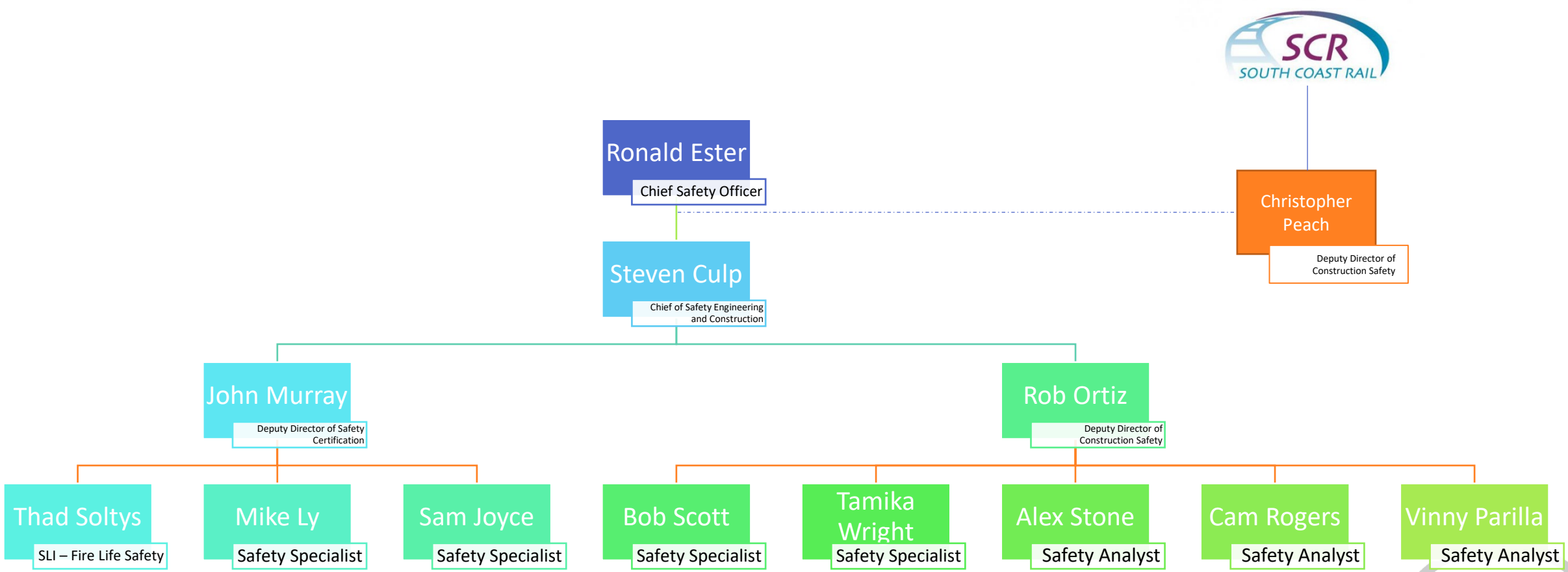
Steven V. Culp, Chief of Safety Engineering and Construction

Agenda

Safety Department Engineering Team Update

- Engineering Team Structure
  - Org Chart
  - Project Assignments
- Safety Certification
  - Overview
- Orange Line Surge

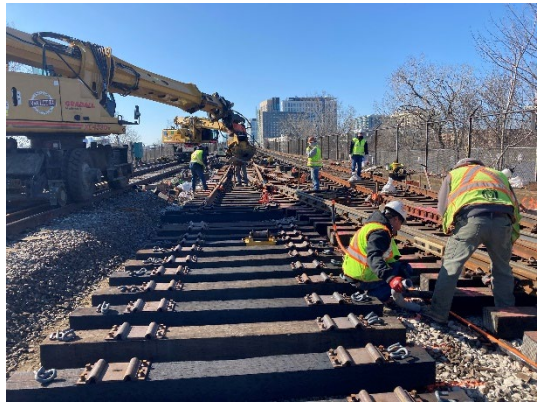
Engineering Team – Org Chart



Engineering Team – Project Assignments

	Phase		
Type	**Construction**	**Design**	**Total**
Infrastructure	44	37	**81**
TOD	21	11	**32**
Vehicles/Systems	13	5	**18**
Total	**78**	**53**	**131**

Construction Oversight	
Staff	**Projects**
Bob	12
Tamika	12
Alex	15
Cam	13
Vinny	13
Total	**65**



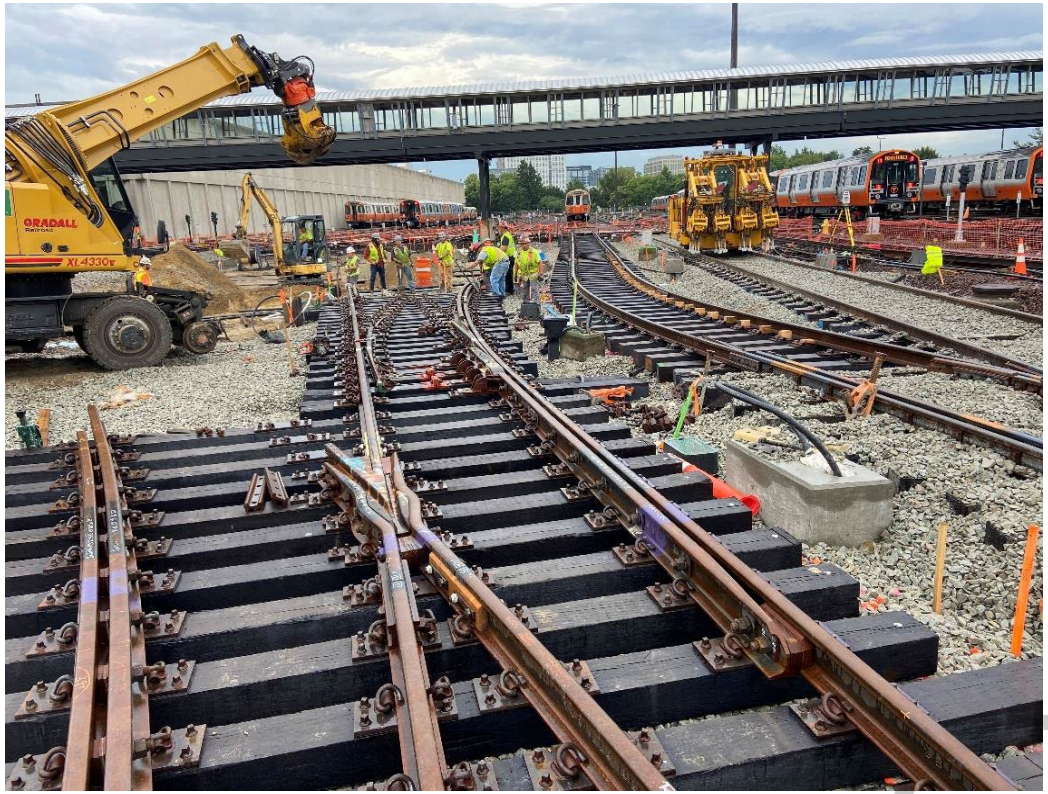
Safety Certification – Overview

- Required by FTA and MA Dept of Public Utilities (DPU)
- Purpose: ensure that safety concerns and hazards are adequately addressed prior to final completion.
- Process includes:
  - Identification of specific safety requirements from project specifications
  - Development of Certifiable Items Lists (CIL)
  - Verification of compliance with the MBTA Safety Plan, appropriate codes, guidelines, standards, and design criteria
  - Identification and resolution of non-compliance (open items)
  - Final sign off and certification letter

Safety Certification – Overview

- 2019 – Presented at APTA as a Best Practice

- 2022 – During the SMI, the FTA identified: "MBTA must modify safety engineering and certification requirements for its capital projects and vehicle procurements and ensure they are addressed through additional E&M and Safety Department staffing, contractor resources, or a combination of approaches."
  - ➢ MBTA has developed and submitted a Corrective Action Plan to the FTA to address.



Safety Certification –Tier Levels

To ensure that MBTA's Safety & Security Program is applied to all infrastructure projects, a two-tiered system is utilized:

Tier I

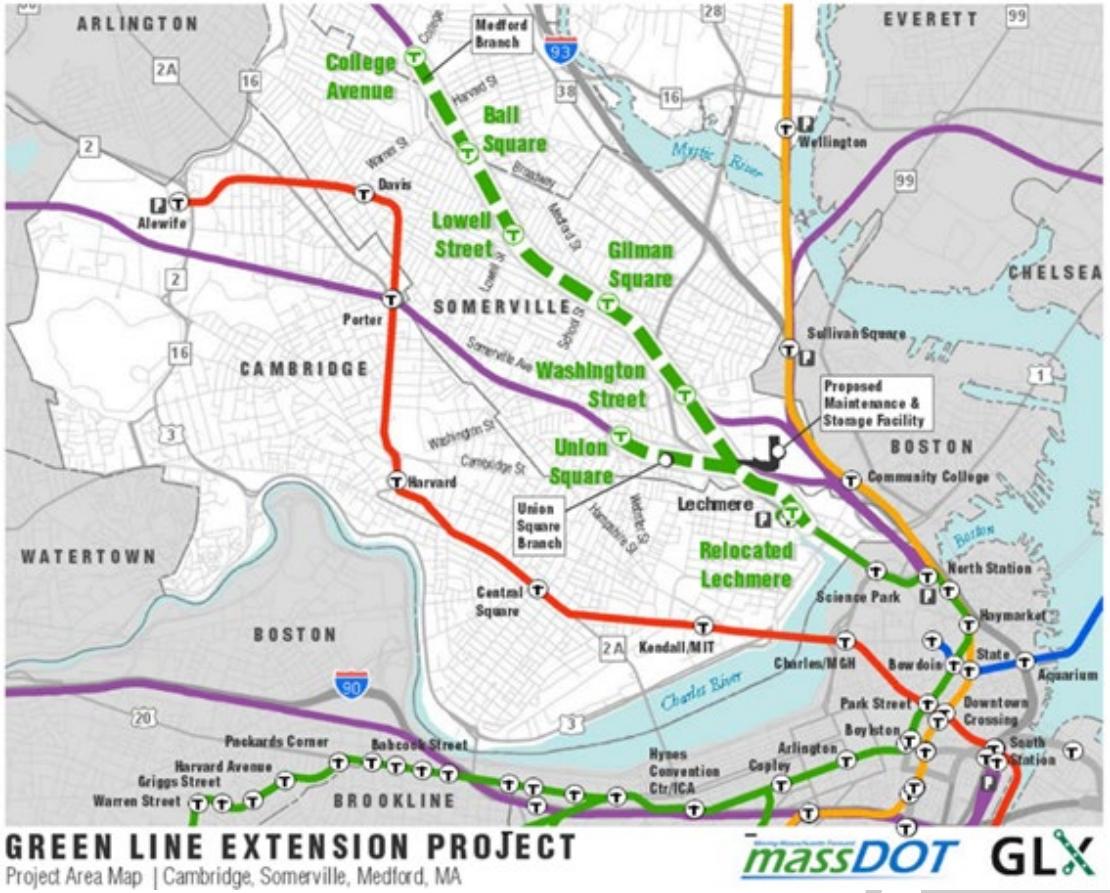
- Major capital projects over $100m
- Comprehensive certification process
- Ex) GLX, SCR, RLOL Signals Upgrades, Quincy Bus Garage

Tier II

- All other capital projects < $100m
- Modified certification process
- Ex) Columbus Ave Bus Lane, RL Test Track, East Cambridge Viaduct

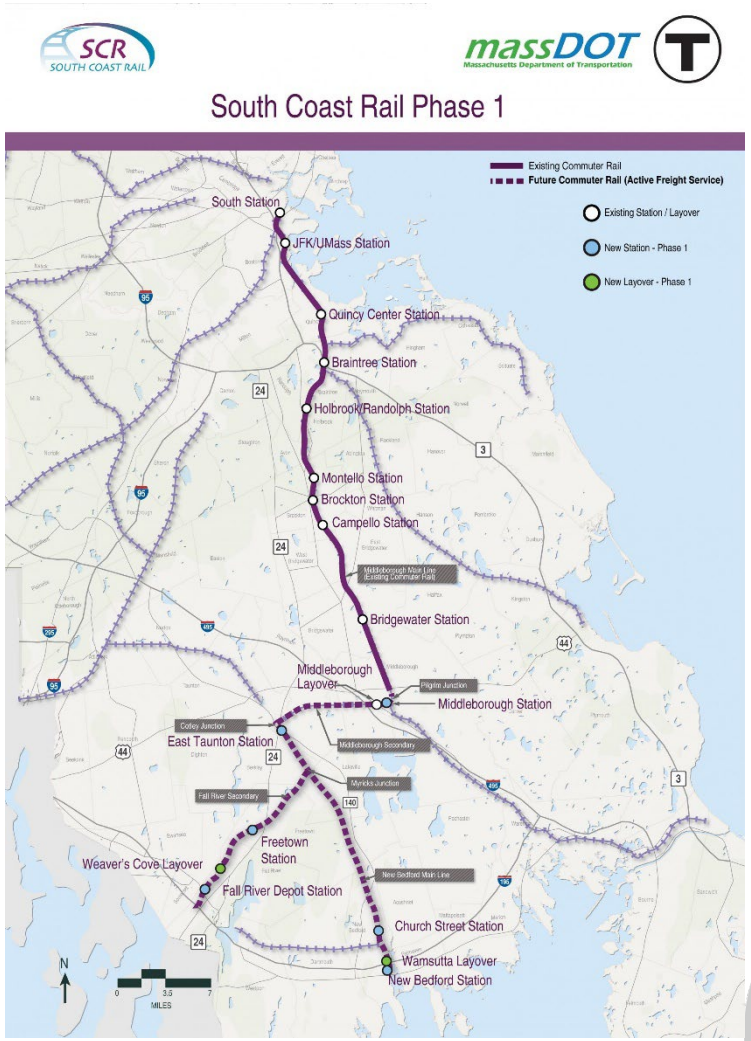
Safety & Security Certification Infrastructure

- Extensive Tier I Safety Certification Process
  - ➢ Establishment of Safety & Security Safety Management Working Group
  - ➢ Development of Safety & Security Certification Plan (SSCP)
  - ➢ Development of Preliminary Hazard Analysis (PHA) Report
  - ➢ Development of Threat & Vulnerability Assessment (TVA) Report



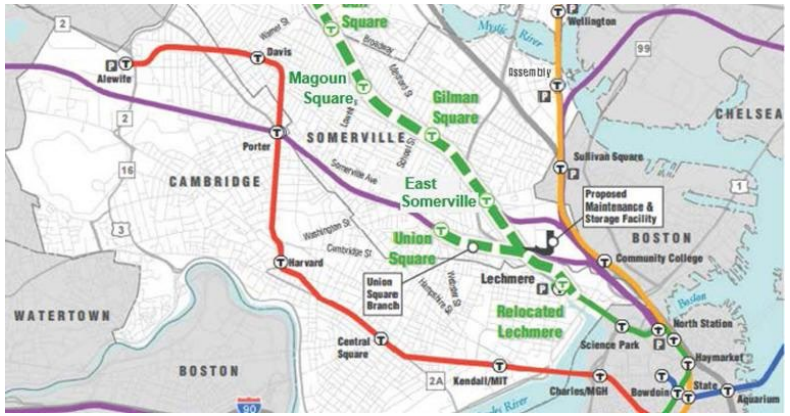
Safety & Security Certification Infrastructure

- Extensive Tier I Safety Certification Process - continued
  - ➢ Identification of Certifiable Elements (CEL) and Items (CIL) Lists
  - ➢ Development of Safety & Security Certification Checklists (SSVC)
  - ➢ Develop a Rail Activation Plan and System Integration Plan
  - ➢ Multiple committees – Fire Life Safety, Rail Activation
  - ➢ Coordination with other agencies



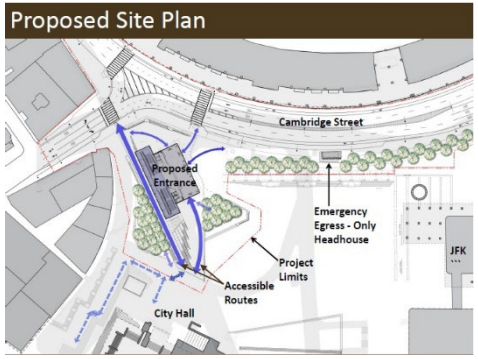
Example – Tier 1 - Safety Certification – GLX

Certification Document	Items
Certifiable Elements List (CEL)	72
Certifiable Items List (CIL)	3200
Preliminary Hazard Analysis (PHA)	671
Threat & Vulnerability Analysis	598
Safety & Security Verification Checklists (SSVCs)	64
Safety & Security Certification Verification Report	1



Safety & Security Certification Infrastructure

- Tier II Safety Certification Process
  - ➢ Simplified PHA and TVA process incorporated into design reviews
  - ➢ General Certifiable Elements (CEL) and Items (CIL) Lists
  - ➢ Simplified Safety & Security Certification Checklists (SSVC)



Safety & Security Certification - Vehicles and Systems

Vehicles

- Green Line Type 10 – 102 vehicles
- Orange Line #14 – 152 vehicles
- Red Line #4 – 252 vehicles
- New Flyer Excelsior – 325+ vehicles
- Commuter Rail Bi-Level Coaches
  - 43 Control Trailer Coaches
  - 40 Blind Trailer Coaches
- Work Trains – Wire Cars, Crane Car

Systems

- Green Line Train Protection
- Red & Orange Line Signals Program
- Automatic Fair Collection

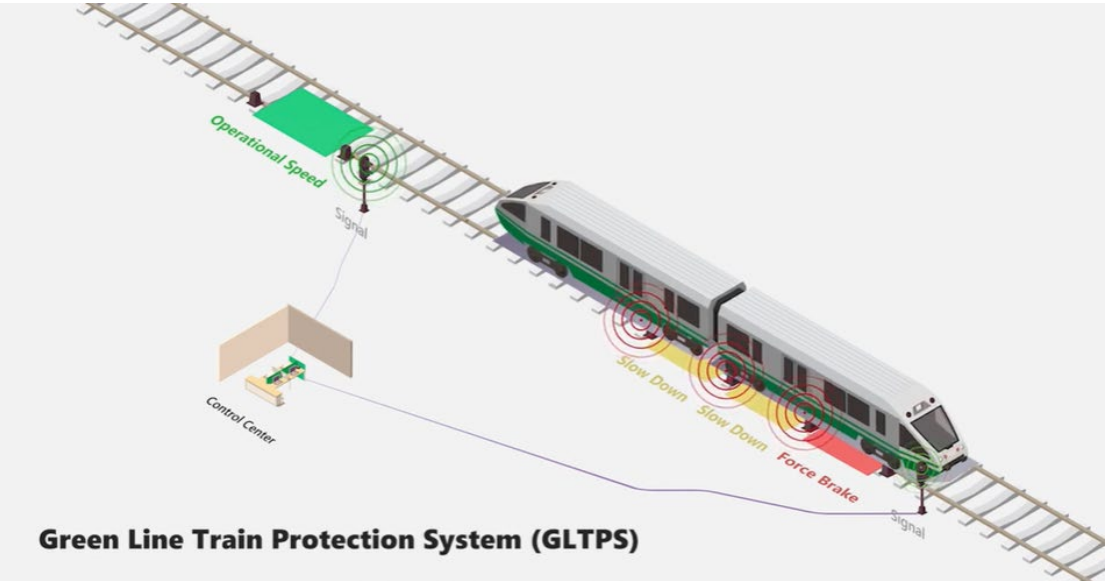
Multiple Overhaul Programs for Bus, Rail, and Commuter Rail

Safety & Security Certification Vehicles and Systems

- Establish Vehicle Safety and Certification Working Group
- Participate in Vehicle Design Reviews
  - Provide Safety Input
- Develop Preliminary Hazard Analysis
- Certifiable Items List

Safety & Security Certification Vehicles and Systems

- Participate in Manufacturing Oversight
- Perform First Article Inspections
- Installations
- Monitor Vehicle Testing and Integration



The Green Line Train Protection System (GLTPS) combines vehicle and wayside equipment to avoid train-on-train collisions, add red-light signal protection, and incorporate speed enforcement.

Orange Line 30-Day Super Surge

- MBTA Safety integral to surge planning team
- Received and Reviewed 49 Work Plans and Project Safety Plans
- Participated in Safety Briefings at Multiple Locations and Multiple Times per day throughout the project
- Adjusted team schedule to ensure project safety coverage and observations
  - 6AM – 2:30AM - Monday through Friday
  - 6AM – 2:30PM and 6PM – 2:30 AM - Saturday and Sunday

Orange Line 30-Day Super Surge

- Performed 640 Safety Observation over the entire surge
  - 51 Opportunities were identified
- Only three major incidents occurred
  - Hi-Rail Derailment – Wellington – 08/22/22
  - Hi-Rail Derailment – Gainsboro Pad – 08/23/22
  - Test Train 3rd Rail Shoe Contacted Discarded Rail – 09/18/22
- Each project signed off by project, Capital Transformation and Safety before acceptance and test trains

Conclusion

Questions?