



Massachusetts Bay Transportation Authority

MBTA Capital Program | Focus on Safety and System Reliability

Audit and Finance Subcommittee

October 13, 2022

Overview | Board Request

- In August, the MBTA Board requested that staff review the capital plan and highlight projects that can particularly contribute to the safety of the system and then identify opportunities to accelerate those projects to the extent possible.
 - Staff was requested to come back to the Board with their findings.
- MBTA has undertaken and continues to advance an aggressive program to improve system safety. The ability to execute this work and to further accelerate these efforts depends upon available resources including 1) operations staff, and 2) access on the right-of-way.
- The MBTA is committed to exploring opportunities for enhanced work that aligns with the findings and required actions identified in the FTA's Safety Management Inspection Final Report.



FTA SMI | Key Findings and Required Actions

- In response to the FTA's Safety Management Inspection, the MBTA remains focused on the strategic and thoughtful implementation of improvements across the agency to address the documented findings and to respond to the required actions.
- Special directive 22-4 and 22-9 both include findings and required actions that will impact the MBTA's approach to implementing maintenance and capital activities, including a refined approach for planning access to the right-of-way.

Special Directive 22-4, Finding 4: MBTA does not provide adequate time to complete necessary MOW maintenance activities

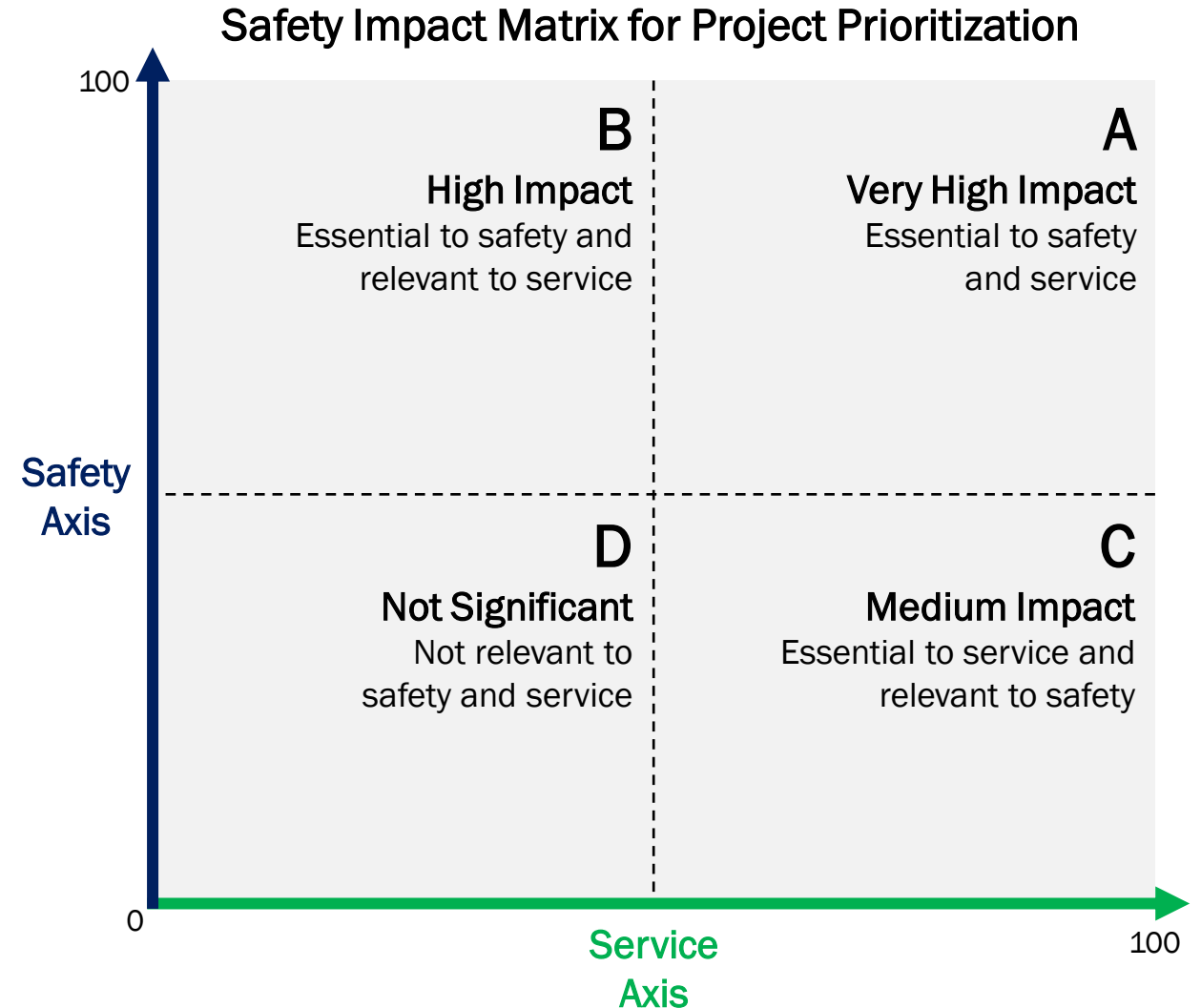
Corrective Action Plan approved by FTA on August 10th; implementation activities include the Special Maintenance Repair Plan which outlines how identified defects will continue to be prioritized for repair

Special Directive 22-9, Finding 1: MBTA staffing levels are not commensurate with the demand for human resources required to carry out current rail transit operations and maintenance in addition to expanding capital program activities

Corrective Action Plan submitted to FTA on September 30th; implementation activities include developing a workforce model to project staffing levels to fully support, safety, operations, maintenance and capital activities

Identifying Key Safety Projects | Safety Impact Matrix

- To support the agency in prioritizing and elevating key safety projects, a new safety impact matrix has been developed
- In this initial framework, safety impact is conceptualized as the relationship between Safety and Service and builds upon the safety score collected during CIP prioritization
- The framework relies on existing data to distinguish different levels of safety impact and can be applied to all projects in the MBTA's Capital Plan
- The goal is to elevate projects that address safety-critical elements that can negatively impact the highest number of riders and cause service disruption



Safety Matrix | Using Existing Data to Focus on Safety

Key considerations:

- **Safety** is measured using scores provided by the Safety Department during CIP project scoring, in addition to the current condition of the asset impacted by a project and whether the asset aligns with E&M’s safety-critical definitions
- **Service** brings in a ridership element to weigh the impact the primary asset type has on the MBTA’s ability to provide service and the volume of riders impacted if an asset goes out of service
- A final indicator is included to elevate projects that directly respond to the **FTA directives**

Axis	Indicator	Description
Safety	1. Safety	Consider whether a project addresses identified documented safety/security issues
	2. System Preservation	Consider the extent to which the project contributes to a state of good repair on the transportation system and aligns with asset management goals
	3. Safety Criticality	Consider whether an asset impacted by a project is defined as safety-critical by E&M PM&I Plan
Service	4. Service Criticality	Consider if the primary asset type affected by a project is essential, relevant, or not relevant to service
	5. Ridership Impact	Consider the volume of riders impacted should an asset fail or go out of service
FTA Directives	6. FTA Relationship	Consider whether a project is directly related to the FTA’s directives
	Safety Impact	Consider the safety impact of CIP projects based on the sum of points from indicators 1-6

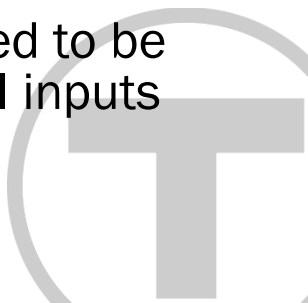
Initial Outcomes | Applying Safety Matrix to the CIP

An initial effort to apply the safety matrix to the capital plan was developed, which included 420 projects in the FY23-27 CIP (75% of total, 100% of all the new projects)

- **78 CIP projects** identified as having a **very high safety impact**, 23 of them directly related to the FTA's directives
- **Maintenance and passenger facilities, and infrastructure projects (structures, track, power, and signal)** represent 82% of the very high safety projects, 64 projects in total
- **28 of these projects with very high safety impact are under construction** and **25 are in planning or design**, highlighting opportunities for near-term project prioritization and enhanced work

Near-term next steps include the full application of the safety matrix framework to all suitable projects in the MBTA's capital plan and the on-going analysis of the findings to inform and support agency decision-making

- While applying a safety specific lens to capital project prioritization is helpful, it is not expected to be the only input into decision-making and will need to be balanced with a range of other critical inputs



Prioritization of System Safety | Accomplishments





As with recent Orange Line full closure, the MBTA will continue to identify, accelerate and successfully execute critical projects that contribute to the safety and reliability of the system.

- The 30-day full closure of the Orange Line on August 19 achieved five years of work and advanced track and signal infrastructure improvements while addressing safety actions identified by the FTA
- It was a monumental opportunity that allowed the MBTA to conduct critical maintenance operations aggressively. Accomplishments of this effort are listed in the graphic on the right.



Prioritization of System Safety | Underway

The following projects are a sample of safety-critical investments the agency is focused on executing and that have been prioritized for additional resources to ensure success.

	Project	Description	Status
Ongoing	 Green Line Train Protection (P0370)	Procurement and installation of on-board and wayside equipment for a train protection and information system on the Green Line to mitigate red signal violations, train-to-train collisions, derailments, and intrusions into work zones.	Project was previously accelerated to achieve substantial completion 6 months ahead of schedule. Design for wayside equipment completed in July 2022, and design for vehicle equipment is currently underway. Vehicle installation will complete in June 2023 and the system will achieve full operational integration in December 2023.
Ongoing	 Positive Train Control (P0148 / P0913) and Automatic Train Control (P0606)	Installation of Positive Train Control (PTC) monitoring system to prevent unauthorized speeds and unexpected movements and reduce the risk of collision. Includes installation of Automatic Train Control (ATC) signal cab equipment to support full implementation of PTC on north-side Commuter Rail lines.	PTC installation completed across the Commuter Rail system in 2020. ATC is currently in full operation on all south-side Commuter Rail lines, and on the Lowell and Fitchburg lines. Installation and testing are underway on the Newburyport/Rockport and Haverhill lines and are expected to complete in 2024.
Ongoing	 Safety Management System Implementation (P0931)	Development and implementation of a Safety Management System (SMS) to support occupational, personnel, and electrical health and safety across the agency. This system is required in accordance with 49 CFR Part 673 and 220 CMR 151.	The MBTA Transit Safety Plan was revamped in 2020 with implementation ongoing. In response to the SMI Final Report the agency is currently planning a significant update of the plan to ensure effective implementation and operation of its SMS.
New	 Special Maintenance Repair Plan (NEW)	Development of plan and initial draft schedule for performing maintenance to address the highest priority speed restrictions in the immediate and mid-term, including sustainably increasing ROW access time in support of ongoing maintenance needs.	Developed in direct response to the SMI Special Directives, the plan has supported the reduction and elimination of the highest priority speed restrictions. The full schedule will continue to be refined through the end of 2022, with a focus on the development of a sustainable, steady-state approach.

Next Steps

The MBTA will continue to **advance key underway or planned safety investments** that are instrumental to reducing safety risks, increasing system reliability, lowering maintenance costs and improving system performance

- Opportunities for acceleration of key projects continues to be actively explored with all relevant stakeholders, but remain constrained by available resources and access to the right-of-way

The agency is aggressively working to respond to the **FTA Safety Management Inspection Final Report** through the development of Corrective Action Plans (CAPs) that outline how the organization will address all findings and required actions

- The implementation of the required actions is being led by the Office of Quality, Compliance and Oversight
- Required actions are interrelated and will require the MBTA to sequence implementation activities in a strategic and thoughtful manner

The **FY24-28 CIP Development Process**, will be aligned with the FTA Safety Management Inspection report findings by continuing to advance key underway and planned safety projects, while refining the identification of key safety-critical activities

- The MBTA kicked-off the FY24-28 CIP with a call for projects on September 12th
- The new safety impact matrix can be applied during CIP prioritization and sequencing to help inform the allocation of limited resources to key safety investments

