



Massachusetts Bay Transportation Authority

Red Line/Orange Line Transformation Program Update

Fiscal and Management Control Board

January 25, 2021

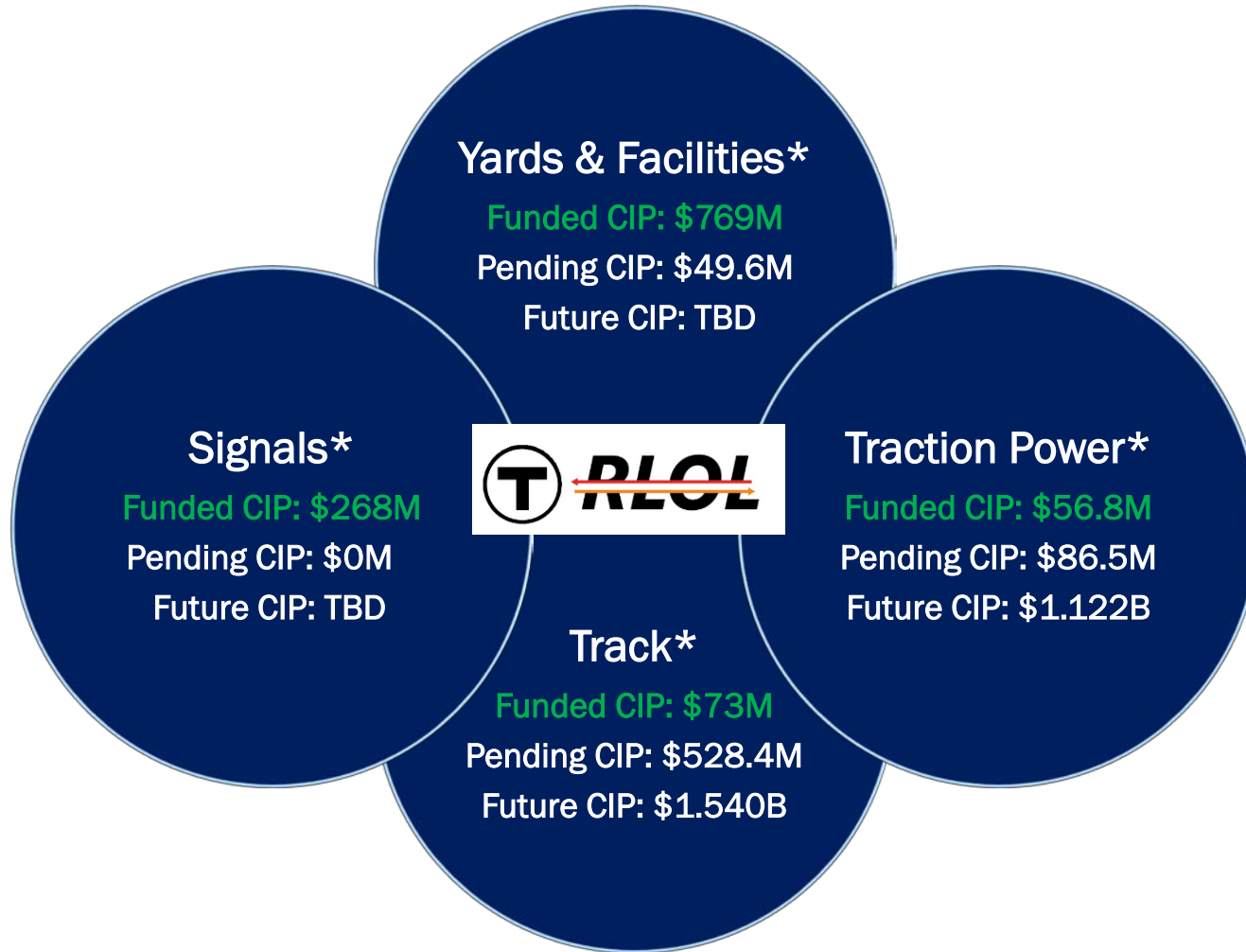
Maysoon Tawfik

Agenda

- Vision
- Program Goals
- Program Office
- Achievements to Date
- Program Look Ahead (FY22-26)
- Project Updates
- Next Steps



RL/OL Transformation Vision



Red Line/Orange Line Transformation Program to support:

- Customer Benefits
 - Headways & Reliability
- Operational Readiness
- New Vehicles

Project	2021				2022				2023				2024				2025				2026			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Yards & Facilities																								
Traction Power																								
Track																								
Signals																								
Legend																								

2nd Phase of RL/OL Transformation Program Planning
Track and Power Renewals to improve headway and reliability

*Programmatic costs for Vehicle Procurement \$1.018B, Operational Readiness \$76M (OCE & E&M), Professional Services (PM/CM & Owners Rep) \$324M, Emergency Response \$4.3M, and Stations/Garages improvements \$811M are not included above.

RL/OL Transformation Program Goals

Includes the set of vehicle and infrastructure investments needed to fully modernize the Red and Orange Line fleets and achieve the service goal of three-minute headways on the Red Line (Winter 2024) and four and a half minute headways on the Orange Line (Summer 2023).

Red Line/Orange Line Transformation: Notable Projects								
	Project Name	Investment Type	Target Completion	Reliability	Modernization	Capacity	Safety	Accessibility
Vehicles	RL/OL Fleet Procurement	Procurement of heavy rail vehicles to expand capacity and improve reliability	Fall 2024	✓	✓	✓	✓	✓
	Red Line Test Track	Construct delivery track, test track, and Vehicle Testing Facility (VTF) for new RL vehicle testing.	Winter 2021	✓	✓	✓	✓	
Yards & Facilities	Cabot Yard & Maintenance Facility Improvements	Replacement of all elements in the existing Yard to allow for safe operation, proper maintenance, and reliable service.	Fall 2022	✓	✓	✓	✓	✓
	Codman Yard Expansion and Improvements	Replace existing tracks, signals, and power infrastructure in kind to address reliability and modernization needs. Install 6 additional tracks to support increased new fleet size.	Summer 2024	✓	✓	✓	✓	✓
	Wellington Yard & Maintenance Facility	Rehabilitation, modernization and expansion of existing Facility to support augmented vehicle fleet. Replacement of all yard elements in the existing Yard to allow for safe operation, proper maintenance, and reliable service.	Summer 2022	✓	✓	✓	✓	✓
Signals	RL/OL Mainline Signals Upgrade	Upgrade and modernize signaling and train control systems to support the delivery of the new vehicles.	RL: Winter 2022 OL: Spring 2022	✓	✓	✓	✓	✓
Track	Red Line Floating Slabs	Repair and replacement of track	Spring 2021	✓	✓		✓	
	Alewife Crossover Improvements	Replace track crossing between Alewife and Davis stations.	Fall 2022	✓	✓	✓	✓	✓
Power	Orange Line Traction Power Upgrade	Modernization of 4 Traction Power Substations (TPSS) ; capable of supplying power to the new fleet.	Fall 2025	✓	✓		✓	
Emergency Work	Recovery Effort	Recovery effort for JFK Red Line Derailment and Cabot Flood Mitigation.	December 2019 & Spring 2021	✓	✓		✓	

RL/OL Transformation Program Office

- MBTA Program Manager set up the Program Office in Fall 2015, supplemented by a PM/CM contract in April 2015
- In Summer 2016, the Red/Orange Line Improvement Program issued the final draft of the Strategic Program Plan to implement critical infrastructure improvements to support the new vehicle procurement
- To improve revenue service, reliability, and customer experience, the FMCB and MBTA established the Red Line/Orange Line Transformation Program in Fall 2019
- RL/OL Steering Committee held a kick-off meeting in October 2020
- Current PM/CM contract will expire at the end of CY 2021, and funding for subsequent contract is currently unprogrammed
- Developing next PM/CM contract to deliver currently scoped program beyond FY21

Program Office									
Investment Type	2015	2016	2017 - 2018	2019	2020	2021	2022	2023 - 2025	2026
RL/OL Transformation Program Office		Red Line/Orange Line Improvements Program Established			<ul style="list-style-type: none"> • Deputy Chief Started (February) • Red Line Senior Director (March) • Orange Line Senior Director (March) • Chief Started (April) • Steering Committee Established (October) 				
		PM/CM Under Contract					PM/CM Unprogrammed		
				Owners Rep Under Contract					OR Unprogrammed

★ Transformation Program

RL/OL Transformation Achievements to Date

Key Program Achievements:

- Currently operating 3 new OL trains with 4 additional trains expected to enter service by the end of FY21
- Currently operating 1 new RL train with 1 additional train expected to enter service by the end of FY21
- \$103.3M spent in FY20

Red Line / Orange Line Transformation: Program Achievements																													
Investment Type	Project	2015				2016				2017				2018				2019			2020			2021			Total Project Spent to Date		
Vehicles	Red Line Fleet Procurement									New RL Car Design						New RL Pilot Car Delivery and Testing			New RL Car Manufact., Testing, and Acceptance			\$318,567,386							
	Orange Line Fleet Procurement					New OL Car Design						New OL Cars Pilot Delivery & Testing			New OL Cars Manufacturing, Testing, and Acceptance														
Yards & Facilities	Red Line Test Track					Design Procur.	Design / Contractor Procurement			Ongoing Construction													\$24,468,018						
	Cabot Yard & Maintenance Facility Improvements					Design Procurement			Design / Contractor Procurement				Ongoing Construction								\$60,311,674								
	Codman Yard Expansion and Improv.															Design Procurement			Design			Procur. & Construct		\$676,395					
	Wellington Yard & Maintenance Facility				Design/Contractor Procurement						Ongoing Construction											\$155,973,528							
Signals	RL/OL Mainline Signals Upgrade															Ongoing Design Build							\$23,186,208						
Track	Red Line Floating Slabs																			Slab Repairs							\$28,316,500		
	RL/OL Track Replacement																		Preliminary Planning						N/A				
	Alewife Crossover Improvements															Design Procurement		Design	Material Procurement					\$1,166,395					
Power	Orange Line Traction Power Upgrade		Ongoing Construction																				\$33,579,289						
Emergency Work	Recovery Effort																		JFK Derailment						Cabot Flood Mitigation				

RL/OL Transformation Look Ahead

- The Red Line/Orange Line Transformation program has developed a robust and multi-phase program to improve headways and reliability through 2029, as well as to support ongoing repairs and maintenance of assets in the long term beyond 2029
- Vehicle delivery schedules have been adjusted due to Covid and manufacturing impacts
- For FY21 we are projecting \$167M spent

Red Line / Orange Line Transformation: Look Ahead																							
Investment Type	Project	2021			2022				2023				2024			2025			2026				
Vehicles	Red Line Fleet Procurement	New RL Cars Continue to Enter Service - Programmed																					
	Orange Line Fleet Procurement	New OL Cars Continue to Enter Service - Programmed																					
Yards & Facilities	Red Line Test Track	Programmed																					
	Cabot Yard & Maintenance Facility Improvements	Construction - Programmed																					
	Codman Yard Expansion and Improv.	Design & Construction - Partially Programmed												Unprogrammed									
	Wellington Yard & Maintenance Facility	Construction - Programmed						Unprogrammed															
Signals	RL/OL Mainline Signals Upgrade	Design Build - Programmed																					
Track	Red Line Floating Slabs	Programmed																					
	Alewife Crossing Improvements	Programmed																					
	Orange Line Track Renewal	Partially Programmed							Unprogrammed														
	Red Line Track Renewal	Partially Programmed							Unprogrammed														
Power	Orange Line Traction Power Upgrade	Partially Programmed							Unprogrammed														
	Red/Orange Power Renewals	Partially Programmed							Unprogrammed														

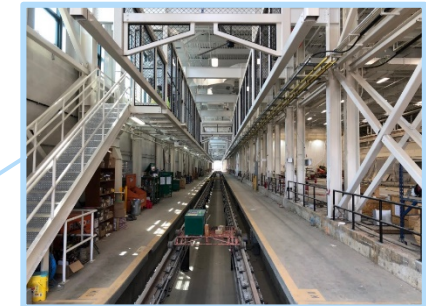
 **2nd Phase of RL/OL Transformation Program Planning**
Track and Power Renewals to improve headway and reliability

Orange Line Updates

- Wellington Yard Expansion Tracks 33-38 put in service to support new vehicle delivery and storage
- Wellington Maintenance Facility Track 11 Building Addition turned over
- Installed upgraded lighting in the yard
- Installed new wheel truing machine
- Replaced yard rail and switches on Tracks 15-18
- Installed new signal bungalow for Wellington Yard
- Installed new AC substation
- Construction ongoing in North Yard & Storage Tracks
- OL Traction Power Substation Upgrade project - Load Break Switches (LBSs) are now installed and in use
- Signals Mainline Upgrades Progressing location specific design



33-38 in service



Inside Track 11 Building Addition

Red Line Updates

- MBTA completed bridge stabilization repairs over Test Track
- RL Test Track Vehicle Testing Facility (VTF) SCADA nearing completion; final testing underway
- Codman Yard 75% design submitted 1/8/21
- Cabot Yard flood recovery advanced; Bus Alley returned to service 12/28/20; sprinklers returned to service 1/4/21
- Cabot construction on parts storage building, substation, and switch houses #1 and 2 are ongoing
- Mainline Signals Upgrades
 - Alewife racks and equipment delivered, Factory Acceptance Testing (FAT) For Davis performed week of 01/05/21, and completed AFTC-5 Trial Site period
 - Manufacturing progressing for Red Line locations (Porter, Harvard)
 - Material procurement underway, and change order for installation being worked on for Alewife Crossover Improvements



Yard 61 – Vehicle Testing Facility



Paved Bus Alley Returned to Service



Cabot Substation



Vehicle Acceptance Status

Red Line Update

- The first Red Line train entered revenue service on December 30, 2020. This allowed the MBTA to begin the final phase of Red Line Operator training - operation in revenue service.

Orange Line Update

- 26 Orange Line cars have been Conditionally Accepted.
- Another married pair was delivered to Wellington carhouse the week ending January 15th (cars 1424-25).

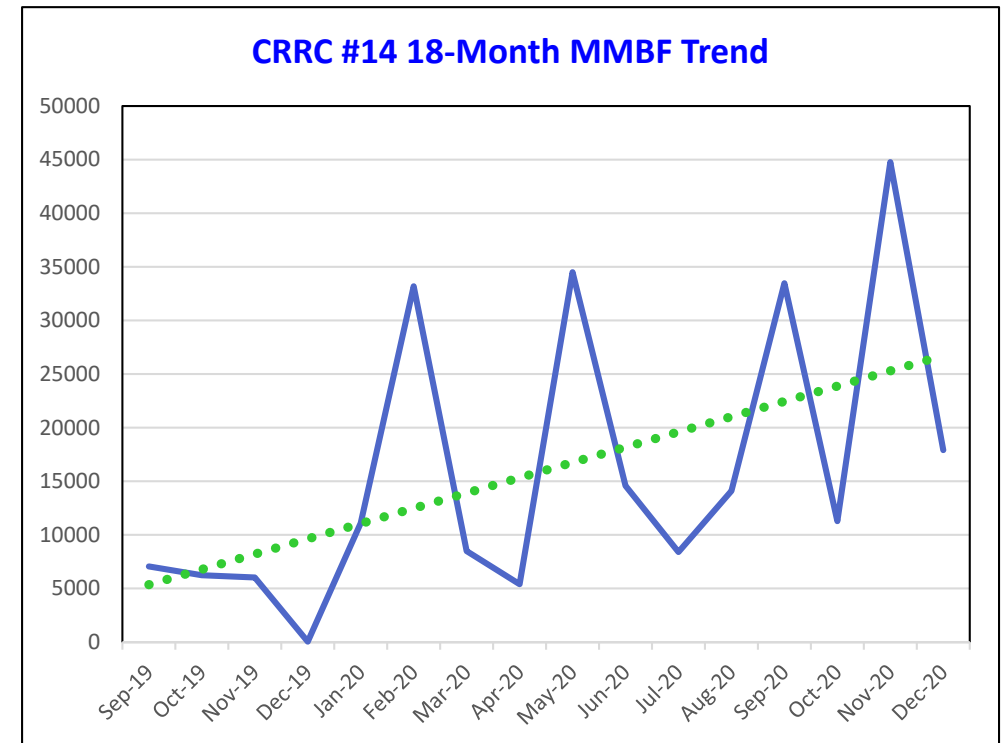


Vehicle Reliability

The new vehicles have system and component reliability requirements to help ensure the availability of the vehicles for service. These requirements are broken down by subsystem, defining the “Mean Miles Between Failures” for key systems which allows for the calculation of vehicle reliability and a fleet availability target.

- The Orange Line Type 14 vehicles entered revenue service in August 2019 – previously the project focused on qualifying the vehicles for service, now the project is transitioning its focus to the contractual reliability requirements.
- Currently 3 full consists (18 cars total) are in service on a daily basis.
- The overall Orange Line reliability and availability will continue to increase as more vehicles are conditionally accepted.

December Monthly	
Miles	53,702
Days	377
Failure in Service	3
MMBF	17,901
Miles per Day	142



Goal Resetting

Assessing the impacts of COVID-19

- Short- and long-term impacts on the program funding
- Resource constraints
- Lower ridership
- Vehicle procurement and manufacturing

Continue delivering programmed projects for Yards, Facilities, Signal, and Power to **deliver reliability, modernization, capacity, safety, and more accessibility** to the customer

Receive funding for asset renewal scope gaps – Track, Power, Stations, and other critical assets

Continue to work on a holistic systems integration **road map** and gap analysis

Vehicle production continues with **active monitoring** to address previous production issues

Identify and develop a plan for **Operational Readiness** that allows operations and maintenance personnel to optimize the performance of the newly delivered assets.

Realigning and adapting Red/Orange Line Transformation program to continue to progress toward holistic goals of achieving 3- and 4.5-minute rush-hour headway and reliability at 95% or greater on-time performance by 2029

Next Steps

- Steering Committee and Task Force continue to hold regular meetings. Currently working on a holistic systems integration road map and gap analysis
- Delivery of vehicles continue. Vehicle production continues with active monitoring to address previous production issues
- Currently working on PM/CM Support Services contract which expires at the end of CY21 currently unprogrammed - (CIP Request Submitted)
- Construction NTP for Alewife Crossover Improvements and Codman Yard – programmed, and additional requests made for CIP funding
- Five Year Plan for the 2nd phase of the RL/OL Transformation Program to improve headway and reliability:
 - 5 Track projects; Southwest Corridor, Back Bay to Chinatown, North Station to Community College, Fields Corner station area, and Andrew station area – unprogrammed (CIP Request Submitted)
 - 5 Power substations; Dewey Square, Alewife, Porter Square, Berkeley, and Ashmont – unprogrammed (CIP Request Submitted)



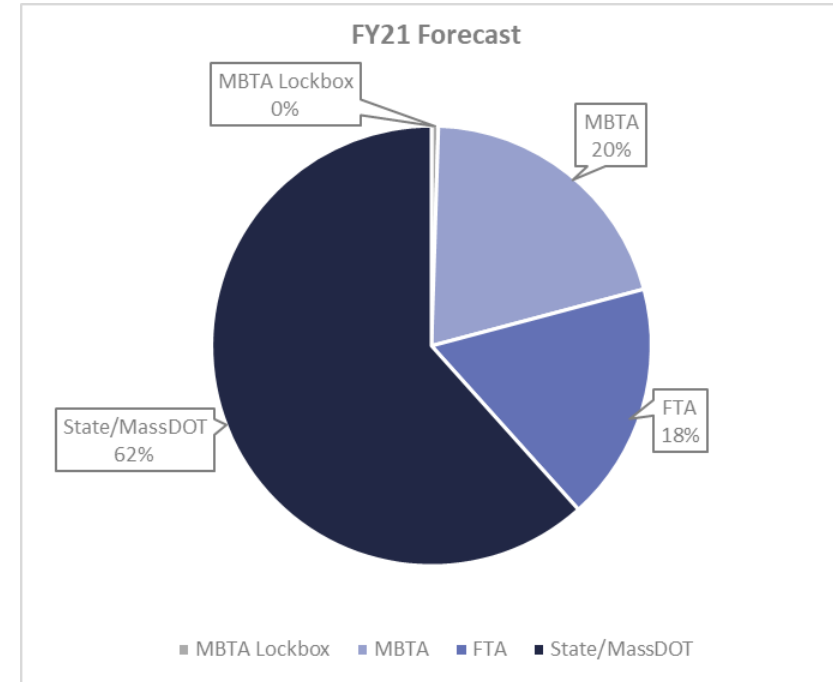
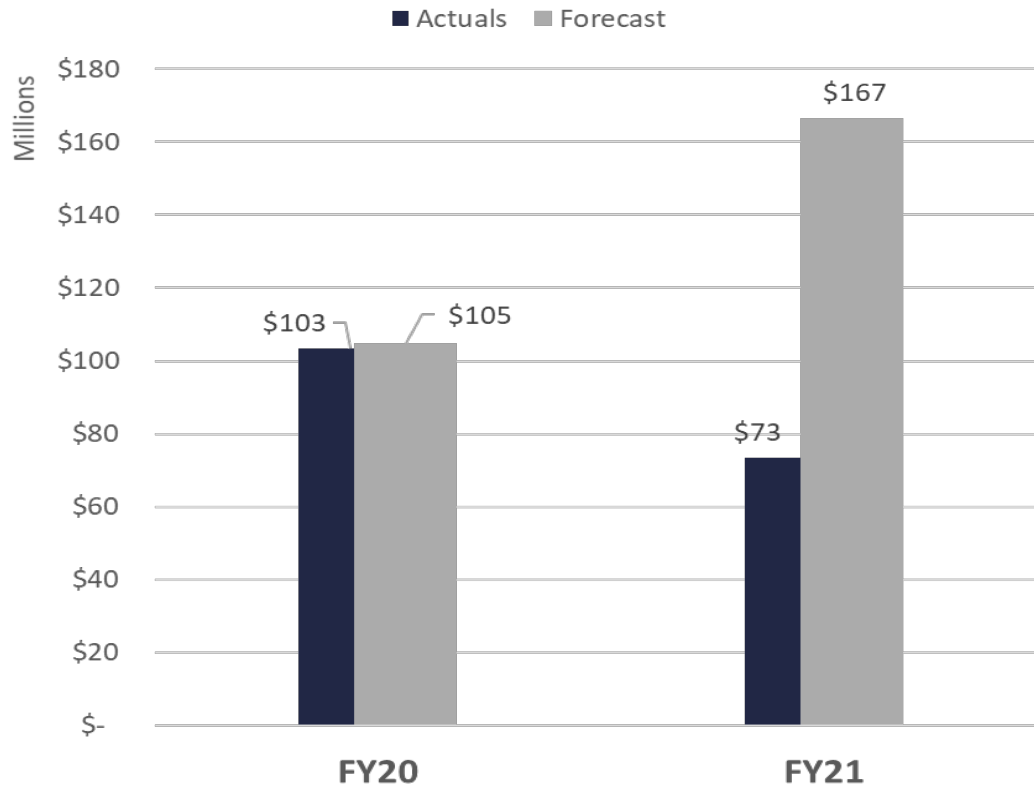
Appendix



Cashflow and Funding Forecasts

FY21

- Forecast: \$166,630,193
- Actual Paid Through 12/31/20: \$73,374,769



Funding Source	FY21 Forecast
MBTA	33,889,013
MBTA Lockbox	\$843,514
FTA	29,176,332
State/MassDOT	102,721,335
Total	\$166,630,193



CIP Requests

Funded CIP Projects

\$1.171 Billion

Track (\$73M total)

- RL Floating Slabs - Alewife to Harvard (\$8.8M)
- RL/OL Track Replacement (\$42.5M)
- Alewife Crossing Improvements (\$21.7M)

Power (\$56.8M total)

- OL Traction Power Upgrade (\$56.8M)

Yards and Facilities (\$769M total)

- RL/OL Infrastructure Improvements (\$470.4M)
- Cabot Yard Complete Upgrade (\$174M)
- Wellington Yard Complete Upgrade (\$61M)
- Codman Yard Expansion and Improvements (\$64M)

Signaling Upgrades (\$267.6 total)

- Signals Program – RL/OL (267.6M)

Emergency Work (\$4.3M total)

- JFK Red Line Derailment (\$2.8M)
- Cabot Facility Flood Mitigation (\$1.5M)

FY22-26 CIP Request

\$747.3 Million

Track (\$528.4 total)

- RL/OL Track Replacement – OCE (\$528.4M)
 - Southwest Corridor, Back Bay to Chinatown, North Station to Community College, Fields Corner station area, and Andrew station area

Power (\$86.5M total)

- P0139 - Orange Line Traction Power Substation Upgrades (\$11.5M)
- OCE Power Request (\$75M)
 - Dewey Square, Alewife, Porter Square, Berkeley, and Ashmont

Yards and Facilities (\$49.6M total)

- P0514 - Wellington Maintenance Facility (\$8.6M)
- P0679 - Codman Yard (\$34M)
- P0157, P0514 - Wellington Yard Rebuild (\$7M)

Professional Services (\$82.8M total)

- PM/CM (\$81.3M)
- OR (\$1.58M)

Future CIP Requests

\$2.662 Billion

Track

- RL/OL Transformation Future Track Renewals - 2029 & Beyond (\$1.540B)

Power

- RL/OL Transformation Future Power Renewals - 2029 & Beyond (\$1.122B)



Funding

