Customer Commitments

At the August 13, 2018 FMCB, we made the following commitments to our customers:

**Red Line**
- 95% Reliability
- @ 3 Minute headways

**Orange Line**
- 96% Reliability
- @ 4 ½ minute headways
Red/Orange Line Task Force Progress

• Started Summer 2019
• Collaboration – MBTA, Red/Orange Line Transformation and Network Rail
• Coordination – Reviewed system capacity, traction power, capital projects through 2025
• Definition – New critical track and power investments by 2025 and beyond
• Identification – Enabling actions across the MBTA
• Policy recommendations supporting Red/Orange Line service outcomes
Red/Orange Task Force Approach

• Developing a transformation plan for one part of an incredibly complex system is an inherently difficult task

• We made a few major assumptions to help focus our efforts
  • Considered Red/Orange Lines as a stand alone system
  • Time constraint of 2025 headway and reliability targets
  • Adopt an asset management driven lifecycle cadence for asset renewal & maintenance

• The outcome of this approach will be tangible recommendations for the Board to consider as they weigh against other needs of the Authority
Red/Orange Line Transformation Program

Red Line Customer Benefits Plan

**Faster journeys**
- Reduction in speed restriction delays
- Fewer delays (more reliable service)
  - Renewal work between Harvard & Alewife

**Fewer delays (more reliable service)**
- More new Red Line trains operating

**Faster journeys**
- Greater Passenger Comfort
  - All old Red Line trains phased out of service;
  - Signals speeds updated;
  - Shorter wait times & 3 minute headways
  - All new Red Line Trains delivered & operating;
  - Codman Yard Complete

**95% Reliability & 3 minute headways**
- Infrastructure renewals completed; Asset health monitoring in place, further reducing failures

**Better wait times**
- Headway regulation introduced
- Greater Passenger Comfort
  - 1st new Red Line train starts operating

**Fewer delays (more reliable service)**
- Greater Passenger Comfort
  - More new Red Line trains operating; Signals upgraded; Cabot Yard complete

**Fewer delays (more reliable service)**
- Infrastructure renewals completed in downtown core;
- Fewer asset failures through better preventative maintenance

**Maintain Service reliability & headways**
- Ongoing maintenance and renewal programs to maintain service levels
Orange Line Customer Benefits Plan

**2019**
- Better wait times
- Headway regulation introduced

**2020**
- Improved reliability
- Faster Journeys
- Greater passenger comfort

**2021**
- Improved reliability
- Faster Journeys
- Greater passenger comfort
  - All old Orange Line trains phased out of service; Signals upgraded & speeds updated
  - Shorter wait times & 4½ minute headways
  - All new Orange Line trains delivered & operating

**2022**
- Fewer delays (more reliable service)
  - Infrastructure renewals completed in downtown core; Fewer asset failures through better preventative maintenance

**2023**
- Fewer delays (more reliable service)
  - Infrastructure renewals completed in downtown core; Fewer asset failures through better preventative maintenance

**2024**
- 96% Reliability & 4½ minute headways
  - Infrastructure renewals completed; Asset health monitoring in place, further reducing failures

**2025**
- Maintain reliability & headways
  - Ongoing maintenance and renewal programs to maintain service levels

**2025+25**
- 96% Reliability & 4½ minute headways
  - Infrastructure renewals completed; Asset health monitoring in place, further reducing failures
Customer Benefit Initiatives

• Operational Policies and Practices
  • Dwell time reduction
  • Train headway adherence
  • Training for operators & maintainers
  • Rail system simulation
  • New public performance measures: headway adherence, excess trip time
  • Passenger demand forecasts and capacity planning for 2050
System Reliability Initiatives

• Implementation of Asset Management
  • Data-driven identification of age and condition
  • Automated collection of asset performance
  • Remote condition monitoring

• Investment in Capital Renewals and Upgrades
  • 5-year capital project implementation
  • New investment in infrastructure renewal identified by asset management
  • Future shift in both inspection and maintenance regimes
  • Long term capital program investments to achieve and maintain state-of-good repair including remote condition monitoring of new assets
Implementation of Asset Management

- Early stages of data collection, classification, and condition assessment of assets. This enables us to begin applying asset management practices that will achieve customer benefits.

- This organization-wide initiative began over 3 years ago with significant progress on vehicle maintenance and track to date.

- Ultimate transition from reactive to preventative maintenance practices

Reduction in Speed Restrictions (minutes delay)
Existing Capital Programs: Red Line Projects

**Current Program Projects**

**Total Value:** $622,643,711  
(fully funded)

**Construction Phase Projects**
- Red Line Test Track
- Cabot Yard & Maintenance Facility Improvements
- Signals Upgrade Project (Design-Build)

**Design Phase Projects**
- Alewife Crossover Improvements
- Codman Yard Rebuild & Expansion

Mainline Projects in the 5 Year CIP – Time and Location
Existing Capital Programs: Orange Line Projects

Current Program Projects
Total Value: $447,237,902
(fully funded)

Construction Phase
• Wellington Maintenance Facility
• Wellington Yard Rebuild
• Signals Upgrade Project (Design-Build)

Completed
• Wellington Yard Expansion (Tracks 33-38)
• Orange Line Test Track

Mainline Projects in the 5 Year CIP – Time and Location
Identification of Additional Investments Through 2025

- We have confidence in delivery of existing and funded capital projects

- But our asset management information has identified additional investment needs for track and power through 2025 and beyond.

- The need to renew the infrastructure and sustain performance will result in a new cadence of capital project implementation for the future.

- We recognize that innovative ways to deliver those investments in addition to the current program will be critical.
New Track Investment Needs

• Track asset management has collected age and condition data for the Red Line and Orange Line

• An analysis was performed for all track asset types indicating that on both lines there is a total of 220,000 feet of track that will require renewal or extended maintenance through 2025.
Track Age and Condition: Red Line
Red/Orange Line Transformation Program

Track Age and Condition: Orange Line

Track Due for Renewal or Extended Maintenance
Orange Line

- Linear feet of track per year
- Linear feet of track (cumulative)

Yearly (ft) vs Cumulative (ft)
Track Service Life: Management Options

- Replacement of all identified track immediately is neither practical or essential
- Strategies for management of track condition:
  1. Reactive maintenance: higher costs, reliability reduces, least disruptive
  2. Life extension: higher short-term costs, improves reliability in short term
  3. Renewal: lowest whole life cost, significant reliability benefits.
- Our plan utilizes a blend of options, balancing current service quality and future reliability
- Plan also seeks to combine power system renewal at the same time as track renewal is undertaken
Identifying and Scoping New Red Line Projects

**Track**
- 62,000 ft. full-depth renewal
- 82,000 ft. extended maintenance

**Power System Renewal**

**Alewife to Beacon Portal**
- DC power cables replacement

**Kendall to Harvard**
- Full-depth track renewal

**Braintree & Ashmont**
- Rail & Tie extended maintenance
- Full renewal anticipated 2035 – 2045

**Downtown Core (Beacon Portal to Dorchester Ave Portal)**
- Full-depth track renewal
- DC power cables replacement
Identifying and Scoping New Orange Line Projects

**North Station to Oak Grove**
- Rail & Tie extended maintenance
- Full renewal anticipated 2030 – 2035

**Downtown Core (North Station to Tufts)**
- Full-depth track renewal
- DC power cables replacement

**Southwest Corridor (Tufts to Forrest Hills)**
- Full-depth track renewal
- DC power cables replacement
- Concept planning already underway

**Track**
- 58,000 ft. full-depth renewal
- 18,000 ft. extended maintenance

**Power System Renewal**
Significant Initiatives to Support Capital Program/Sustain Reliability

To reduce the time to complete this major renewal program and sustain system condition requires:

• Major new engineering, construction, and material vendor capacity
• Investment in people: new roles, new skills, new recruits, training
• System capacity, performance, and operations modelling
• Asset reliability policies for engineering, maintenance, and capital programs
• Remote Condition Monitoring of asset ‘health’ for infrastructure and vehicles
• Investment in systems: data management, analytics
• Procurement of new technologies and equipment
Risks

• Funding to achieve system performance commitments
• Infrastructure delivery
  • Industry capacity
  • Integrated access / substitute service program
• Sufficient Capital & Operations staffing with appropriate skills & training
• Succession planning
• ‘Whole Team’ understanding, acceptance, and engagement
• Future ridership growth and system capacity
## Estimated Additional Investment Needs

### 2020 – 2025 ($ in millions)
- Track and drainage: 470
- Power: 398
- Signals: 10
- Facilities: 5
- Program Delivery Costs*: 409
  *Force Account, Design, Diversions, Admin, Escalation, Real Estate, etc.
- E&M: 25
- IT, “smart” systems: 15
- Business changes: 30
**TOTAL**: $1,362M

### 2025 – 2050
Under development

*Operating Costs are NOT Included*
Next Steps

• Whole organization participation in task force and steering Committee
• Establish Action Teams by March
• Perform traction power load flow study based on recommendation from 2019 power study
• *Orange Line Southwest Corridor:* develop procurement-ready design/build package
• Develop remaining construction packages for renewal of track and power for Red and Orange Line
• Develop additional transformational passenger and station customer benefit programs
• Reporting and updates to FMCB
Next Steps

Action Teams by March

• Stakeholder communications and engagement strategy
• Project delivery/procurement strategy
• Substitute service strategy
• Reliability metrics
• System modelling
• Passenger forecasting
• Operations trials for headway adherence and dwell times
• Update CIP/5-year operating projection for Red/Orange Line
• Further develop capital needs for 2025–2050