Commuter Rail at a Glance

Commuter Rail Routes
- 5 North Side
- 9 South Side

Route Miles: 388
Stations: 138
Parking Spaces:
- 12,174 North Side
- 27,072 South Side

Weekday Boardings: 129,075
Annual Ridership: 35 million
Revenue Fleet
- 90 Locomotives
- 410 Coaches

Maintenance Facilities: 3
Layover/Storage Facilities: 14

MBTA parking data based on http://www.mbta.com/riding_the_t/parking/.
Revenue Fleet info based on Draft FY 2016-2030 Commuter Rail Fleet Management Plan.
Overview of the System
Comparison to Other Services

National Transit Database: 2013 Transit Profiles.
Ridership
Passenger Volume Flow

NORTH SIDE TYPICAL WEEKDAY RIDERSHIP
Newburyport/Rockport 16,254
Haverhill 8,843
Lowell 11,965
Fitchburg 9,556
North Side Typical Weekday Ridership 46,618

SOUTH SIDE TYPICAL WEEKDAY RIDERSHIP
Framingham/Worcester 16,293
Needham 6,972
Franklin 12,480
Providence/Stoughton 26,465
Fairmount 1,038
Middleborough/Lakeville 7,182
Kingston/Plymouth 6,560
Greenbush 5,411
South Side Typical Weekday Ridership 82,401

TOTAL TYPICAL WEEKDAY COMMUTER RAIL RIDERSHIP 129,019

CTPS MBTA Commuter Rail Passenger Count Results, 2012
Commuter Rail Stations
Station Accessibility

- **143 total stations** (includes Foxboro, seasonal stations, and stations under construction)
- **51 fully accessible stations**, including 2 stations under construction
- **57 partially accessible stations** with “mini-high” platforms
- **34 stations not accessible**

Back Bay is fully accessible, except for Worcester Line platform with “mini-high”.
Parking is provided at 114 of the total 138 Commuter Rail stations

Of the 39,246 total commuter rail spaces, 25,977 are owned by the MBTA

4,639 North Side
21,338 South Side

Parking is a revenue generator

Daily rates between $4-$7 per day

Commuter Rail Vehicle Fleet
Statistics about the Vehicle Fleet

- 92 switching, MOW, and wreck response vehicles in support fleet
- 500 active locomotives and coaches in revenue fleet
- Minimum target service life is 25 years
- 240 revenue vehicles at/beyond 25-year service life
- 37 locomotives are beyond their 25-year service life, with another 13 approaching their 25-year service life within the next six years

Commuter Rail Vehicle Fleet
Mean Miles between Failure for CR Locomotive Fleet

- Combi

MMBF (miles)

Source: FY 2016 – 2030 MBTA Commuter Rail Fleet Management Plan - DRAFT.
Commuter Rail Vehicle Fleet
“Legacy” vs. HSP Locomotive MMBF Comparison

MMBF By Locomotive Class (FY15 – FY16)
Rolling 6-Month Average

Source: MMBF Reports provided by Leanna Green, MBTA.
Revenues from Commuter Rail

OPERATING REVENUES
$215M

NON-OPERATING REVENUES: $70M

- PARKING $17M
- ADVERTISING $6M
- RETAIL SPACE + OTHER LEASES $3M
- REAL ESTATE $12M
- REVENUE ASSESSMENTS (TOWNS WITH CR ONLY) $12M
- REVENUE ASSESSMENTS (10% TOWNS WITH SUBWAY AND BUS) $14M
- UTILITIES & TELECOMM $6M

TOTAL ANNUAL REVENUE GENERATED BY COMMUTER RAIL = $285M

* Rounded to nearest million/Annual Revenue Generated
Source: CTPS MBTA Revenue Report, Fiscal Year 2015.
Costs to Operate Commuter Rail

**FIXED PRICE**
$320M

**OTHER COSTS: $77M**

- SERVICES: $47M
- FUEL: $30M

*Costs rounded to nearest Million $

**TOTAL ANNUAL COST TO OPERATE COMMUTER RAIL = $397M**

**NDT-Reported Farebox Recovery** 50%

**Farebox Recovery Considering Non-Operating Revenues** 72%
Ridership Counts

**CURRENT**

- Manual Ridership Reports
  - Ridership as reported by conductors
  - On-board only, no station-level breakdown
  - Conductors must multi-task; focus is on safety
  - No incentive to improve accuracy

- Bi-Annual Peak Passenger Counts
  - Platform counts at Boston terminals
  - Peak period only
  - On-board only, no station-level breakdown
  - Primary purpose is to determine equipment and staffing needs – not to collect accurate ridership

- Comprehensive Count Audits
  - Focused on capturing ridership at all stations
  - Expensive and time consuming
  - Last done in 2012
  - None currently planned

**POTENTIAL**

- Automated Passenger Counters
  - On-board for each commuter rail coach
  - Pilot car is being tested now – successful
  - Wider rollout possible

- Automated Fare Collection 2.0
  - Pay with phone (no app), contactless credit card, Charlie2 issued card
  - No cash on-board vehicle
  - Readers added at all rail stations and on platforms at South Station North Station / Back Bay
  - Automatically captures ridership from the tap made at each station (on, off)
## Ridership
### Daily Inbound Boardings by Station Characteristics

#### Highest Ridership Stations

<table>
<thead>
<tr>
<th>No.</th>
<th>Commuter Rail Station</th>
<th>Daily Inbound Boardings</th>
<th>Parking Capacity</th>
<th>Accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Salem</td>
<td>2,389</td>
<td>700</td>
<td>Fully</td>
</tr>
<tr>
<td>2.</td>
<td>Mansfield</td>
<td>2,077</td>
<td>806</td>
<td>Partially</td>
</tr>
<tr>
<td>3.</td>
<td>Lowell</td>
<td>1,770</td>
<td>695</td>
<td>Partially</td>
</tr>
<tr>
<td>4.</td>
<td>Beverly</td>
<td>1,681</td>
<td>500</td>
<td>Partially</td>
</tr>
<tr>
<td>5.</td>
<td>Attleboro</td>
<td>1,665</td>
<td>780</td>
<td>Partially</td>
</tr>
<tr>
<td>6.</td>
<td>Route 128</td>
<td>1,604</td>
<td>2,589</td>
<td>Fully</td>
</tr>
<tr>
<td>7.</td>
<td>Anderson</td>
<td>1,502</td>
<td>1,541</td>
<td>Fully</td>
</tr>
<tr>
<td>8.</td>
<td>Worcester</td>
<td>1,475</td>
<td>500</td>
<td>Partially</td>
</tr>
<tr>
<td>9.</td>
<td>South Attleboro</td>
<td>1,462</td>
<td>568</td>
<td>Partially</td>
</tr>
<tr>
<td>10.</td>
<td>Providence</td>
<td>1,341</td>
<td>330</td>
<td>Fully</td>
</tr>
</tbody>
</table>

Source: MBTA Ridership Counts, April 2016 (select stations).
MBTA parking data based on [http://www.mbta.com/riding_the_t/parking/](http://www.mbta.com/riding_the_t/parking/)
## On-Time Performance

### Top 10 Causes of Delay (2015)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause of Delay</th>
<th>No. Incidents (2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Extreme Weather</td>
<td>4,743</td>
</tr>
<tr>
<td>2.</td>
<td>Heavy Ridership</td>
<td>3,801</td>
</tr>
<tr>
<td>3.</td>
<td>Gate Crossing Protection</td>
<td>1,136</td>
</tr>
<tr>
<td>4.</td>
<td>Amtrak Intercity Conflict</td>
<td>980</td>
</tr>
<tr>
<td>5.</td>
<td>Signal System</td>
<td>905</td>
</tr>
<tr>
<td>6.</td>
<td>Speed Restriction</td>
<td>805</td>
</tr>
<tr>
<td>7.</td>
<td>Other Extraordinary Delay</td>
<td>845</td>
</tr>
<tr>
<td>8.</td>
<td>Signal Code Line Failure</td>
<td>713</td>
</tr>
<tr>
<td>9.</td>
<td>Commuter Conflict</td>
<td>657</td>
</tr>
<tr>
<td>10.</td>
<td>Switch Failure</td>
<td>650</td>
</tr>
</tbody>
</table>

### Residual delays, not included in this list, when taken together are by far the greatest reason for delay.

Several of the top causes of delay in 2015 related to **extreme weather**.

How **delays are coded** makes a difference.
On-Time Performance
The Importance of Residual Delays

Residual Delays
One initial incident can create a ripple effect of delay, as several commuter rail trains are impacted downstream, and sometimes on multiple lines.

Within the Last 12 Months...
Residual delays comprised 30% of the number of incidents causing delay, compared to all other causes combined.

- Residual Delays Alone
- All Other Causes COMBINED
Since August 2015, the North Side OTP has seen its best performance in the last 5 years.

Completion of Fitchburg construction results in OTP improvements.

### NORTH SIDE ON-TIME PERFORMANCE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>62.2%</td>
<td>89.6%</td>
<td>89.2%</td>
<td>82.6%</td>
<td>81.3%</td>
<td>92.2%</td>
</tr>
<tr>
<td>Feb</td>
<td>68.9%</td>
<td>91.6%</td>
<td>90.2%</td>
<td>76.7%</td>
<td>25.4%</td>
<td>90.4%</td>
</tr>
<tr>
<td>Mar</td>
<td>89.4%</td>
<td>90.6%</td>
<td>92.3%</td>
<td>88.7%</td>
<td>81.6%</td>
<td>95.0%</td>
</tr>
<tr>
<td>Apr</td>
<td>88.2%</td>
<td>88.8%</td>
<td>93.7%</td>
<td>89.3%</td>
<td>89.5%</td>
<td>95.4%</td>
</tr>
<tr>
<td>May</td>
<td>92.1%</td>
<td>91.9%</td>
<td>91.7%</td>
<td>85.8%</td>
<td>86.7%</td>
<td>92.5%</td>
</tr>
<tr>
<td>Jun</td>
<td>80.7%</td>
<td>80.5%</td>
<td>89.5%</td>
<td>84.7%</td>
<td>86.9%</td>
<td>N/A</td>
</tr>
<tr>
<td>Jul</td>
<td>86.8%</td>
<td>86.7%</td>
<td>89.6%</td>
<td>82.8%</td>
<td>88.4%</td>
<td>N/A</td>
</tr>
<tr>
<td>Aug</td>
<td>87.4%</td>
<td>85.0%</td>
<td>89.4%</td>
<td>84.6%</td>
<td>92.3%</td>
<td>N/A</td>
</tr>
<tr>
<td>Sep</td>
<td>87.3%</td>
<td>93.7%</td>
<td>86.6%</td>
<td>88.5%</td>
<td>94.5%</td>
<td>N/A</td>
</tr>
<tr>
<td>Oct</td>
<td>83.1%</td>
<td>91.7%</td>
<td>83.4%</td>
<td>76.3%</td>
<td>92.2%</td>
<td>N/A</td>
</tr>
<tr>
<td>Nov</td>
<td>79.1%</td>
<td>89.5%</td>
<td>82.0%</td>
<td>77.2%</td>
<td>91.0%</td>
<td>N/A</td>
</tr>
<tr>
<td>Dec</td>
<td>90.4%</td>
<td>89.6%</td>
<td>83.8%</td>
<td>85.7%</td>
<td>94.4%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Source: Actual (Unadjusted) OTP Performance Percentages provided by MBTA.
# On-Time Performance

## South Side, Past 5 Years

Construction work has impacted Worcester Line OTP

### Significant events have impacted OTP:
- Amtrak Forest Interlocking
- Amtrak Tower 1 interlocking
- Amtrak Centralized Electrification and Traffic Control (CETC) dispatching
- Heat restrictions on Worcester Line

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>80.1%</td>
<td><em>95.2%</em></td>
<td>90.2%</td>
<td>89.6%</td>
<td>89.4%</td>
<td>91.8%</td>
</tr>
<tr>
<td>Feb</td>
<td>81.0%</td>
<td><em>96.3%</em></td>
<td>94.9%</td>
<td>89.8%</td>
<td>37.1%</td>
<td>88.0%</td>
</tr>
<tr>
<td>Mar</td>
<td>89.7%</td>
<td><em>95.5%</em></td>
<td>93.7%</td>
<td>94.5%</td>
<td>79.5%</td>
<td>91.5%</td>
</tr>
<tr>
<td>Apr</td>
<td>89.2%</td>
<td><em>95.9%</em></td>
<td>95.8%</td>
<td>95.3%</td>
<td>78.0%</td>
<td>91.5%</td>
</tr>
<tr>
<td>May</td>
<td>87.9%</td>
<td><em>93.8%</em></td>
<td><em>94.8%</em></td>
<td>92.5%</td>
<td>86.3%</td>
<td>87.9%</td>
</tr>
<tr>
<td>Jun</td>
<td>86.0%</td>
<td><em>93.8%</em></td>
<td>92.3%</td>
<td>89.9%</td>
<td>88.5%</td>
<td>N/A</td>
</tr>
<tr>
<td>Jul</td>
<td>81.9%</td>
<td>91.4%</td>
<td><em>93.4%</em></td>
<td>92.4%</td>
<td>90.5%</td>
<td>N/A</td>
</tr>
<tr>
<td>Aug</td>
<td>84.5%</td>
<td>92.5%</td>
<td><em>94.0%</em></td>
<td>92.6%</td>
<td>88.8%</td>
<td>N/A</td>
</tr>
<tr>
<td>Sep</td>
<td>92.6%</td>
<td><em>95.8%</em></td>
<td>94.9%</td>
<td>94.4%</td>
<td>90.8%</td>
<td>N/A</td>
</tr>
<tr>
<td>Oct</td>
<td>90.7%</td>
<td><em>94.8%</em></td>
<td>94.5%</td>
<td>91.5%</td>
<td>90.2%</td>
<td>N/A</td>
</tr>
<tr>
<td>Nov</td>
<td>90.7%</td>
<td><em>92.3%</em></td>
<td>91.8%</td>
<td>89.7%</td>
<td>86.3%</td>
<td>N/A</td>
</tr>
<tr>
<td>Dec</td>
<td><em>94.6%</em></td>
<td>93.4%</td>
<td>92.3%</td>
<td>92.9%</td>
<td>91.7%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Source: Actual (Unadjusted) OTP Performance Percentages provided by MBTA.
# On-Time Performance – < 5 Minutes Late

By Line, Past 6 Months

<table>
<thead>
<tr>
<th>Line</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rockport</td>
<td>93.0%</td>
<td>93.2%</td>
<td>89.8%</td>
<td>95.6%</td>
<td>96.0%</td>
<td>95.1%</td>
</tr>
<tr>
<td>Newburyport</td>
<td>94.7%</td>
<td>92.3%</td>
<td>91.1%</td>
<td>94.8%</td>
<td>96.9%</td>
<td>93.2%</td>
</tr>
<tr>
<td>Haverhill</td>
<td>94.8%</td>
<td>86.8%</td>
<td>88.3%</td>
<td>94.4%</td>
<td>93.6%</td>
<td>88.5%</td>
</tr>
<tr>
<td>Lowell</td>
<td>95.7%</td>
<td>92.6%</td>
<td>91.6%</td>
<td>94.9%</td>
<td>96.2%</td>
<td>95.0%</td>
</tr>
<tr>
<td>Fitchburg</td>
<td>93.6%</td>
<td>96.3%</td>
<td>91.3%</td>
<td>95.4%</td>
<td>94.1%</td>
<td>90.1%</td>
</tr>
<tr>
<td>Worcester</td>
<td>84.2%</td>
<td>88.4%</td>
<td>86.0%</td>
<td>88.2%</td>
<td>78.0%</td>
<td>64.9%</td>
</tr>
<tr>
<td>Needham</td>
<td>91.5%</td>
<td>91.9%</td>
<td>86.9%</td>
<td>95.7%</td>
<td>96.6%</td>
<td>94.1%</td>
</tr>
<tr>
<td>Franklin</td>
<td>87.3%</td>
<td>86.0%</td>
<td>78.6%</td>
<td>82.4%</td>
<td>87.2%</td>
<td>82.7%</td>
</tr>
<tr>
<td>Providence</td>
<td>88.5%</td>
<td>89.0%</td>
<td>83.2%</td>
<td>86.3%</td>
<td>89.4%</td>
<td>82.5%</td>
</tr>
<tr>
<td>Stoughton</td>
<td>88.8%</td>
<td>86.3%</td>
<td>77.8%</td>
<td>88.0%</td>
<td>92.0%</td>
<td>88.0%</td>
</tr>
<tr>
<td>Fairmount</td>
<td>97.1%</td>
<td>96.5%</td>
<td>90.7%</td>
<td>93.6%</td>
<td>93.8%</td>
<td>94.3%</td>
</tr>
<tr>
<td>Middleboro</td>
<td>94.9%</td>
<td>95.4%</td>
<td>94.1%</td>
<td>95.4%</td>
<td>94.4%</td>
<td>93.1%</td>
</tr>
<tr>
<td>Kingston/Plymouth</td>
<td>95.1%</td>
<td>96.7%</td>
<td>96.0%</td>
<td>97.1%</td>
<td>96.3%</td>
<td>96.1%</td>
</tr>
<tr>
<td>Greenbush</td>
<td>97.5%</td>
<td>95.9%</td>
<td>98.6%</td>
<td>97.1%</td>
<td>95.7%</td>
<td>96.1%</td>
</tr>
</tbody>
</table>

Source: Actual (Unadjusted) OTP Performance Percentages provided by MBTA.

**Trains Less than 5 Minutes Late by Service Line**

- Providence, Stoughton and Franklin Lines impacted by significant events.
- Worcester Line impacted by ongoing construction.
- Steady performance continues on lines with no construction.
- **8 lines** had OTP higher than 92% in May.
- **7 lines** had OTP higher than 90% for each of the last 6 months.

---

**Lines connected to Amtrak North East Corridor**
# On-Time Performance - 0-9 minutes Late

By Line, Past 6 Months

## Trains Less than 9 Minutes Late by Service Line

<table>
<thead>
<tr>
<th>Line</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rockport</td>
<td>96.8%</td>
<td>97.3%</td>
<td>95.1%</td>
<td>98.5%</td>
<td>98.8%</td>
<td>97.6%</td>
</tr>
<tr>
<td>Newburyport</td>
<td>97.8%</td>
<td>96.7%</td>
<td>95.4%</td>
<td>98.1%</td>
<td>99.0%</td>
<td>97.6%</td>
</tr>
<tr>
<td>Haverhill</td>
<td>97.8%</td>
<td>91.9%</td>
<td>94.2%</td>
<td>97.4%</td>
<td>97.1%</td>
<td>94.7%</td>
</tr>
<tr>
<td>Lowell</td>
<td>98.2%</td>
<td>96.9%</td>
<td>96.6%</td>
<td>98.3%</td>
<td>98.6%</td>
<td>97.9%</td>
</tr>
<tr>
<td>Fitchburg</td>
<td>96.2%</td>
<td>98.1%</td>
<td>95.7%</td>
<td>97.2%</td>
<td>96.8%</td>
<td>95.7%</td>
</tr>
<tr>
<td>Worcester</td>
<td>92.9%</td>
<td>94.2%</td>
<td>92.0%</td>
<td>94.9%</td>
<td>88.6%</td>
<td>81.6%</td>
</tr>
<tr>
<td>Needham</td>
<td>95.2%</td>
<td>97.3%</td>
<td>91.4%</td>
<td>98.8%</td>
<td>99.3%</td>
<td>98.3%</td>
</tr>
<tr>
<td>Franklin</td>
<td>95.0%</td>
<td>95.5%</td>
<td>87.1%</td>
<td>92.5%</td>
<td>95.2%</td>
<td>94.1%</td>
</tr>
<tr>
<td>Providence</td>
<td>95.3%</td>
<td>95.5%</td>
<td>99.0%</td>
<td>96.3%</td>
<td>95.1%</td>
<td>91.3%</td>
</tr>
<tr>
<td>Stoughton</td>
<td>94.0%</td>
<td>95.2%</td>
<td>86.9%</td>
<td>95.4%</td>
<td>97.3%</td>
<td>95.4%</td>
</tr>
<tr>
<td>Fairmount</td>
<td>98.6%</td>
<td>98.8%</td>
<td>93.7%</td>
<td>97.7%</td>
<td>96.9%</td>
<td>98.5%</td>
</tr>
<tr>
<td>Middleboro</td>
<td>97.9%</td>
<td>97.6%</td>
<td>96.0%</td>
<td>97.4%</td>
<td>97.5%</td>
<td>97.0%</td>
</tr>
<tr>
<td>Kingston/Plymouth</td>
<td>97.0%</td>
<td>98.0%</td>
<td>97.3%</td>
<td>98.4%</td>
<td>98.2%</td>
<td>98.5%</td>
</tr>
<tr>
<td>Greenbush</td>
<td>98.4%</td>
<td>97.4%</td>
<td>99.5%</td>
<td>97.7%</td>
<td>97.2%</td>
<td>96.8%</td>
</tr>
</tbody>
</table>

Source: Actual (Unadjusted) OTP Performance Percentages provided by MBTA.

Lines connected to Amtrak North East Corridor
Train Seating Capacity

Over the last year, MBTA operated over 140,000 trains. Less than 2,500 of them, or only 1.67%, were over capacity. That means that 98% of commuter rail trains had a seat for every passenger.
Systemwide Challenges

Single track constraints and limited right-of-way
- Newburyport Line, between North Beverly and Newburyport
- Haverhill Line, between Reading and Andover
- Old Colony Main Line, between Boston and Braintree
- Worcester Line, adjacent to the Massachusetts Turnpike

Drawbridge rehabilitation/replacement
- Gloucester Draw
- Beverly Draw
- Saugus Draw
- Draw 1 (North Station)

Parking constraints
- 25 commuter rail stations are at or over parking capacity
Systemwide Challenges

Station accessibility
- 34 stations are not accessible
- Challenges with upgrading to fully accessible stations in corridors that require special freight clearances

Maintenance/layover facility capacity
- Overnight layover constraints on the North Side (Rockport, Bradford, Lowell, Fitchburg)
- Overnight layover constraints on the South Side (Worcester, Needham, Franklin, Stoughton)
- Midday layover constraint on the South Side

Coach capacity
- Of 410 coaches in the active fleet, 203 or approximately 50% are single-level

PTC construction

Source: FY 2016 – 2030 MBTA Commuter Rail Fleet Management Plan - DRAFT.
Capital Needs
Positive Train Control (PTC)

• Implementation Schedule
  ▪ Phase I – PTC Equipment Installation
    • Plan to complete PTC Hardware installation by December 2018.
  ▪ Phase II – Commuter Rail
    • South Side – Implement PTC on South Side where most of the railroad is already equipped with cab signals (2019).
    • North Side – Implement PTC on North Side where there are no cab signals and a derivative of the PTC technology will be deployed which requires additional testing (2019-2020).
  ▪ Phase III – Freight Main Line (North Side)
    • Implement PTC on the Freight Main Line as an overlay to the passenger rail PTC. This will require additional testing and integration. Plan to complete PTC Project by end of 2020.

• Total estimated project cost
  ▪ $451.3 M with 15% contingency
• Invest in existing locomotives
  ▪ Replace major components on 10 active locomotives (UTEX)
    • Typical 2 year process
    • Not life extending; reliability improvements
  ▪ Rehab 10 active locomotives
    • Life extending – 10 to 15 years
  ▪ Remanufacture 10 locomotives currently stored
    • Life extending – 15 to 20 years

• Possible procurement of new locomotives
  ▪ Will be addressed in Fleet Plan
  ▪ Typical 7 year procurement until final acceptance of fleet
Capital Needs
Potential Fleet Investments - Coaches

• Invest in existing coaches
  ▪ Kawasaki rebuild program
    • 118 coaches undergoing rebuild
    • Life extending – 10 to 15 years
  ▪ Possible procurement of new coaches
    ▪ Coach for coach replacement
      • Single levels replaced by bi-levels
    ▪ Explore potential options on Rotem procurement
      • Significantly reduces delivery time for known product
Capital Needs
Infrastructure

**Structures**
- Draw 1/Tower A at North Station
- East Street Bridge
- Bacon Street Bridge

**Stations**
- Construct Blue Hill Avenue Station (Fairmount Line)
- Provide platform and upgrade Ruggles Station
- Upgrades to Ballardvale and Andover Stations
- Design and plan for accessibility improvements at Winchester, Auburndale, Natick Center, Mansfield, South Attleboro Stations

**South Station Expansion**
- South Station is at capacity today
- Provides ability to grow on South Side
- Addresses need for midday layover

**South Coast Rail**
- Expands service to New Bedford/Fall River region

**Systemwide Track & Signal Upgrades**
- Replace jointed rail with CWR
- Restore double track
- Modernize signal system
Overview of the System
Operations – Train Volumes

Train Schedules, Effective December 14, 2015.
Overview of the System
Ownership and Agreements

MBTA owns the right of way used for existing passenger service within Massachusetts

Amtrak is the primary owner of the Northeast Corridor outside of Massachusetts

Proposed extension of service to Wachusett Station would operate over a segment of Pan Am track

Proposed extension of service beyond Forge Park would operate over CSX track
### Overview of the System

**Operations – Service Delivery Policy**

<table>
<thead>
<tr>
<th>Service Area</th>
<th>Service Delivery Policy Standard</th>
<th>Commuter Rail Actuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Span of Service</td>
<td>• Weekday: 7AM – 10PM</td>
<td>• Weekday: 3:30AM-1:40AM</td>
</tr>
<tr>
<td></td>
<td>• Saturday: 8AM – 6:30PM</td>
<td>• Saturday: 6:35AM-11:30PM</td>
</tr>
<tr>
<td>Minimum Frequency</td>
<td>• AM/PM: 3 peak direction trips</td>
<td>• AM/PM: 4 peak direction trips</td>
</tr>
<tr>
<td>(weekday)</td>
<td>• All others: 180 minutes each</td>
<td>• All others: 100 minutes each direction</td>
</tr>
<tr>
<td></td>
<td>direction</td>
<td></td>
</tr>
<tr>
<td>Safety and</td>
<td>• AM, Midday, PM Peak: 110%</td>
<td>• AM, Midday, PM Peak: 98.58% trains met standard</td>
</tr>
<tr>
<td>Comfort</td>
<td>passengers/seat</td>
<td>• Off-Peak: 100% trains met standard</td>
</tr>
<tr>
<td></td>
<td>• Off-Peak: 100% passengers/seat</td>
<td></td>
</tr>
<tr>
<td>Schedule</td>
<td>• 92% On-Time Performance</td>
<td>• 92.5% On-Time Performance (March 2016)</td>
</tr>
<tr>
<td>Adherence</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: MBTA Service Delivery Policy. MBTA Service Reliability Metrics Presentation (2/29/16).

Proposed On-Time Performance Targets:
- **Commuter Rail**: 92%
- **Subway**: 90%
- **Bus**: 75%

**Commuter Rail’s reliability target is the highest in the MBTA system**
Overview of the System
Dispatching – North Side

**MBTA controls**
dispatching on much, but not all, of the commuter rail network

**Pan Am controls**
dispatching on segments of the Haverhill, Lowell, and Fitchburg Lines
Amtrak controls dispatching along the entire Northeast Corridor, at South Station, and over a small segment of the Dorchester Branch.

Mass Coastal controls dispatching along the Framingham Secondary, Middleborough Secondary, and Cape Main Line.
Commuter Rail Vehicle Fleet
Mean Miles between Failure for CR Coach Fleet

Source: Modified from FY 2016 – 2030 MBTA Commuter Rail Fleet Management Plan - DRAFT.
Commuter Rail Vehicle Fleet
Coach Equipment Type MMBF Comparison

Source: MMBF Reports provided by Leanna Green, MBTA.
Maintenance and Layover Facilities

Maintenance Facilities

- Commuter Rail Maintenance Facility (CRMF)
- South Side Service & Inspection
- Readville Interim Repair Facility
## Maintenance and Layover Facilities

### Overnight and Midday Layover Facilities – North Side

<table>
<thead>
<tr>
<th>Location</th>
<th>Consist</th>
<th>Capacity</th>
<th>Sets Needed for Service</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OVERNIGHT LAYOVER FACILITIES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rockport</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Newburyport</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Bradford</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Lowell</td>
<td>0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Fitchburg (Wachusett replaces Fitchburg in 2016)</td>
<td>5 (6)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Commuter Rail Maintenance Facility (CRMF)</td>
<td>12</td>
<td>1 (spare)</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>29 (30)</td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

| **MIDDAY LAYOVER FACILITIES**   |         |          |                         |
| Commuter Rail Maintenance Facility (CRMF) | 12      |           |                         |
| **Subtotal**                    | 12      |           |                         |
### Overnight Layover Facilities – South Side

<table>
<thead>
<tr>
<th>Location</th>
<th>Consist Capacity</th>
<th>Sets Needed for Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worcester</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Needham</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Franklin</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Pawtucket</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Stoughton</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Boston (Readville)</td>
<td>12</td>
<td>N/A</td>
</tr>
<tr>
<td>Middleborough</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Kingston</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Greenbush</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Boston (Amtrak SHSY)</td>
<td>8</td>
<td>2 (Fairmount)</td>
</tr>
<tr>
<td>Boston (Amtrak Front Yard)</td>
<td>2</td>
<td>1 (spare)</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>53</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

### Midday Layover Facilities

<table>
<thead>
<tr>
<th>Location</th>
<th>Sets Needed for Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston (Readville)</td>
<td>12</td>
</tr>
<tr>
<td>Boston (Amtrak SHSY)</td>
<td>8</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>
Revenues
Monthly MBTA Commuter Rail Unallocated Revenue

First 11 months of FY2015

$186.7M

First 11 months of FY2016

$197.6M
6%↑

Note: Chart above shows “unallocated” commuter rail revenue, prior to CTPS allocation for linked trips to other modes.
Source: CTPS MBTA Unit Sales for Fiscal Year 2015, 2016.
There are 11 commuter rail zones (Zone 1a through Zone 10) with one-way fares between $2.10 and $11.50.

There are 14 stations¹ in Zone 1a alone.

The Needham and Fairmount Lines are entirely within Zones 1 and 2.

The Providence Line is the only one extending beyond Zone 8, with one station (T.F. Green) in Zone 9 and one (Wickford Junction) in Zone 10.

¹ Including North Station and South Station
Ridership
Characteristics of High Ridership Stations

Source: MBTA Ridership Counts, April 2016 (select stations).

Why Boarding Rate is High

More frequent service
Higher density land use and mix of uses
Located at the end of the line
Ample parking supply and highway access
Higher train speeds are allowed
Stations are fully or partially accessible
Ridership
Performance facts

Reliability
Almost 2/3 of the commuter rail lines operated at 92% on-time performance or greater over the last 12 months.

Coverage Area
More than 60% (86) of all commuter rail stations are greater than a 30 minute travel time from North or South Station.

Train Frequency
Each weekday, commuter rail operates over 500 trains, of one-way distances between 10 and 63 miles.
## Assets
### Systemwide Summary

<table>
<thead>
<tr>
<th>ASSET CATEGORY</th>
<th>NORTH SIDE</th>
<th>SOUTH SIDE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Track Miles</td>
<td>327.82</td>
<td>410.12</td>
<td>737.44</td>
</tr>
<tr>
<td>Revenue Track Miles</td>
<td>297.27</td>
<td>342.90</td>
<td>640.17</td>
</tr>
<tr>
<td>Layover Track Miles</td>
<td>11.87</td>
<td>12.79</td>
<td>24.66</td>
</tr>
<tr>
<td>Non-Revenue Track Miles</td>
<td>18.18</td>
<td>54.43</td>
<td>72.61</td>
</tr>
<tr>
<td>Single Track Miles</td>
<td>45.07</td>
<td>133.69</td>
<td>178.76</td>
</tr>
<tr>
<td>Grade Crossings</td>
<td>169</td>
<td>187</td>
<td>356</td>
</tr>
<tr>
<td>Culverts</td>
<td>176</td>
<td>129</td>
<td>305</td>
</tr>
<tr>
<td>Undergrade Bridges</td>
<td>139</td>
<td>216</td>
<td>355</td>
</tr>
<tr>
<td>Interlockings</td>
<td>61</td>
<td>84</td>
<td>145</td>
</tr>
<tr>
<td>Switches</td>
<td>386</td>
<td>431</td>
<td>817</td>
</tr>
<tr>
<td>Hand Throw Switches</td>
<td>165</td>
<td>197</td>
<td>362</td>
</tr>
<tr>
<td>Power Switches</td>
<td>221</td>
<td>234</td>
<td>455</td>
</tr>
</tbody>
</table>

Source: MBTA 2016 Engineering Track Charts
On-Time Performance
Systemwide Actual On-Time Performance

- OTP improves as more locomotives are available and service reliability increases
- Currently working on program to provide additional spare locomotives on a daily basis
### Systemwide Challenges (Continued)
#### Drawbridges

<table>
<thead>
<tr>
<th>Drawbridge</th>
<th>Condition</th>
<th>Replacement Cost</th>
<th>Year Built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloucester</td>
<td>Structurally Deficient – to be replaced</td>
<td>$60M</td>
<td>1911</td>
</tr>
<tr>
<td>Beverly</td>
<td>Structurally Deficient – to be replaced</td>
<td>$56M</td>
<td>1885</td>
</tr>
<tr>
<td>Saugus</td>
<td>Structurally Deficient – to be replaced</td>
<td>$60M</td>
<td>1911</td>
</tr>
<tr>
<td>Manchester</td>
<td>Structurally Adequate</td>
<td>N/A</td>
<td>1944</td>
</tr>
<tr>
<td>Tower A</td>
<td>Structurally Deficient – to be replaced</td>
<td>$121M</td>
<td>1931</td>
</tr>
</tbody>
</table>
Commuter Rail at a Glance

Fun Facts

The total length of commuter rail platforms is greater than the Boston Marathon route.

If lined end to end, the total MBTA commuter rail track miles would extend from Boston to Bermuda.

There are as many grade crossings on the north as on the south side, though there are less than half as many lines.

The Fitchburg Line is the longest and has the most assets of all the commuter rail lines. It also had the best on-time performance (97%) in January 2016.

Commuter rail has 818 active, operating switches on its system – that’s a switch a mile!

The commuter rail network has 178 miles of single track. That’s the equivalent of walking the length of the Blue Line 30 times.