

MBTA

State of the Service:

Orange Line Heavy Rail

June 6th, 2016

Key Facts: Orange Line

- Carries 17% of the system wide ridership with over 211,933 (FY15) average weekday trips
- Direct connections to
 - 125 bus routes
 - All other subway lines & Silver Line
- Over 2,700 vehicle and 900 bike parking spaces
- 120 vehicles - 96 for peak service



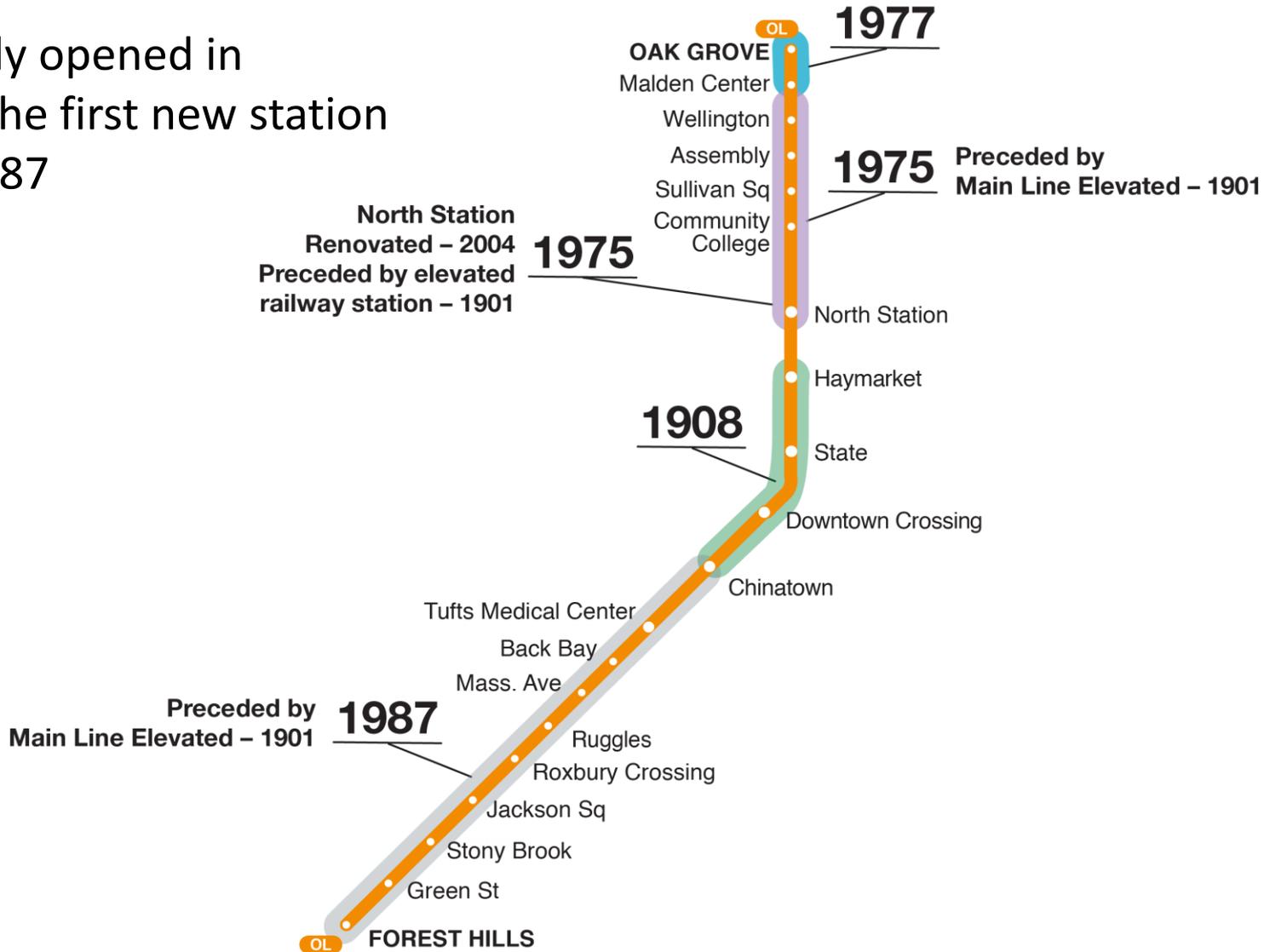
Key Issues: Orange Line

- Fleet Programs
- Infrastructure Condition and Age
- Service Management
- Moving Forward

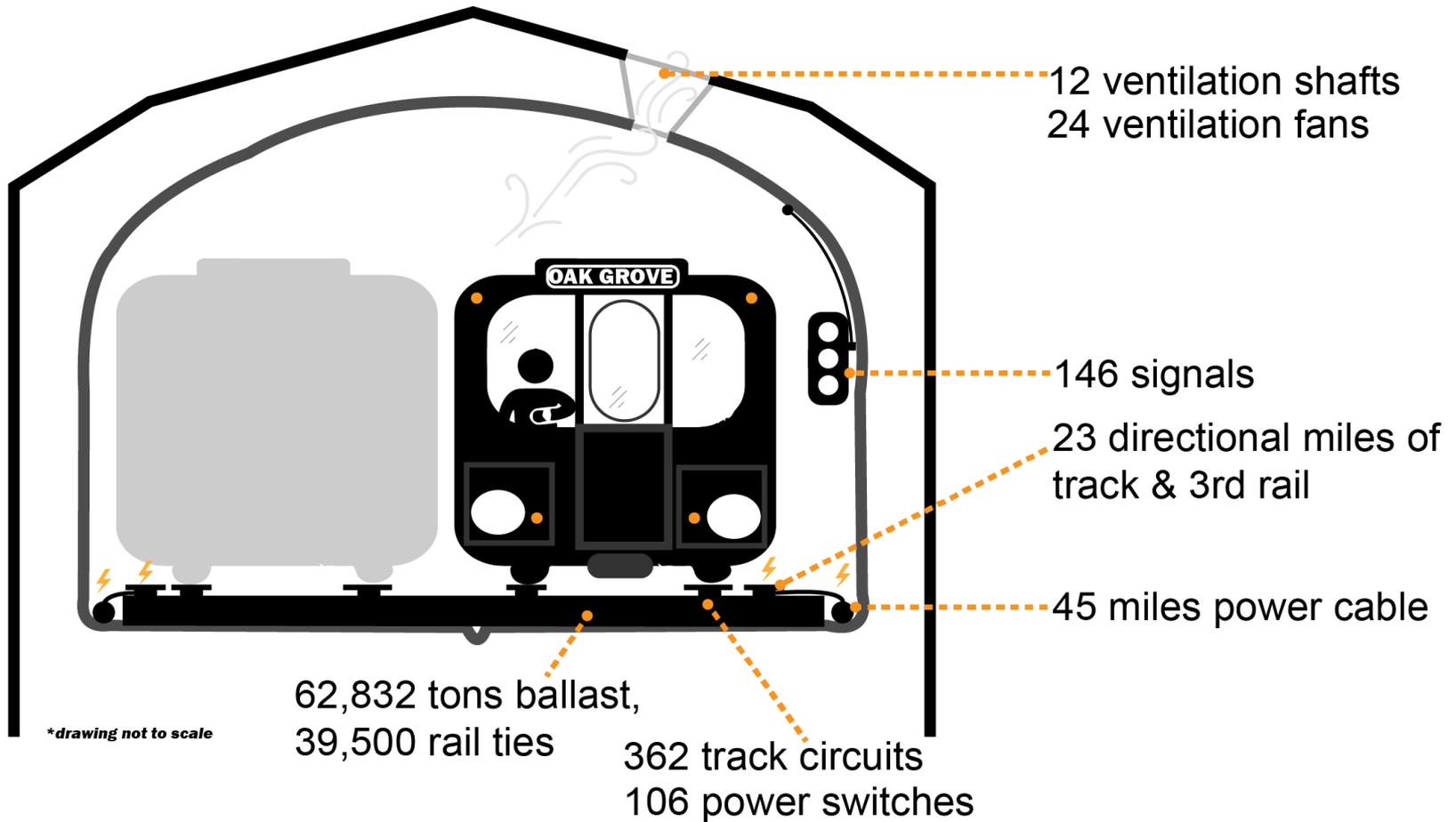


Build Dates: Orange Line

Assembly opened in
2014—the first new station
since 1987



Assets Overview: Orange Line



- 20 stations
- 7 miles of tunnel section
- Fleet Facilities located in Wellington

Recent Investments: Orange Line



Oak Grove Station Platform resurfacing



Winter resiliency
upgrading the 3rd rail
heaters and controls



Assembly Station



Malden culvert collapse



Fleet: Orange Line

- In 1979-1980, 120 vehicles went into service.
 - Design life reached in 2004-2005
- Historically 102 peak hour vehicles were used to provide approx. 5 minute headways
- In 2011, reduction to 96 peak hour vehicles for maintenance led to loss of frequency
- Growing ridership, and lengthened scheduled travel times have further reduced frequency—now at 6 minutes in peak periods



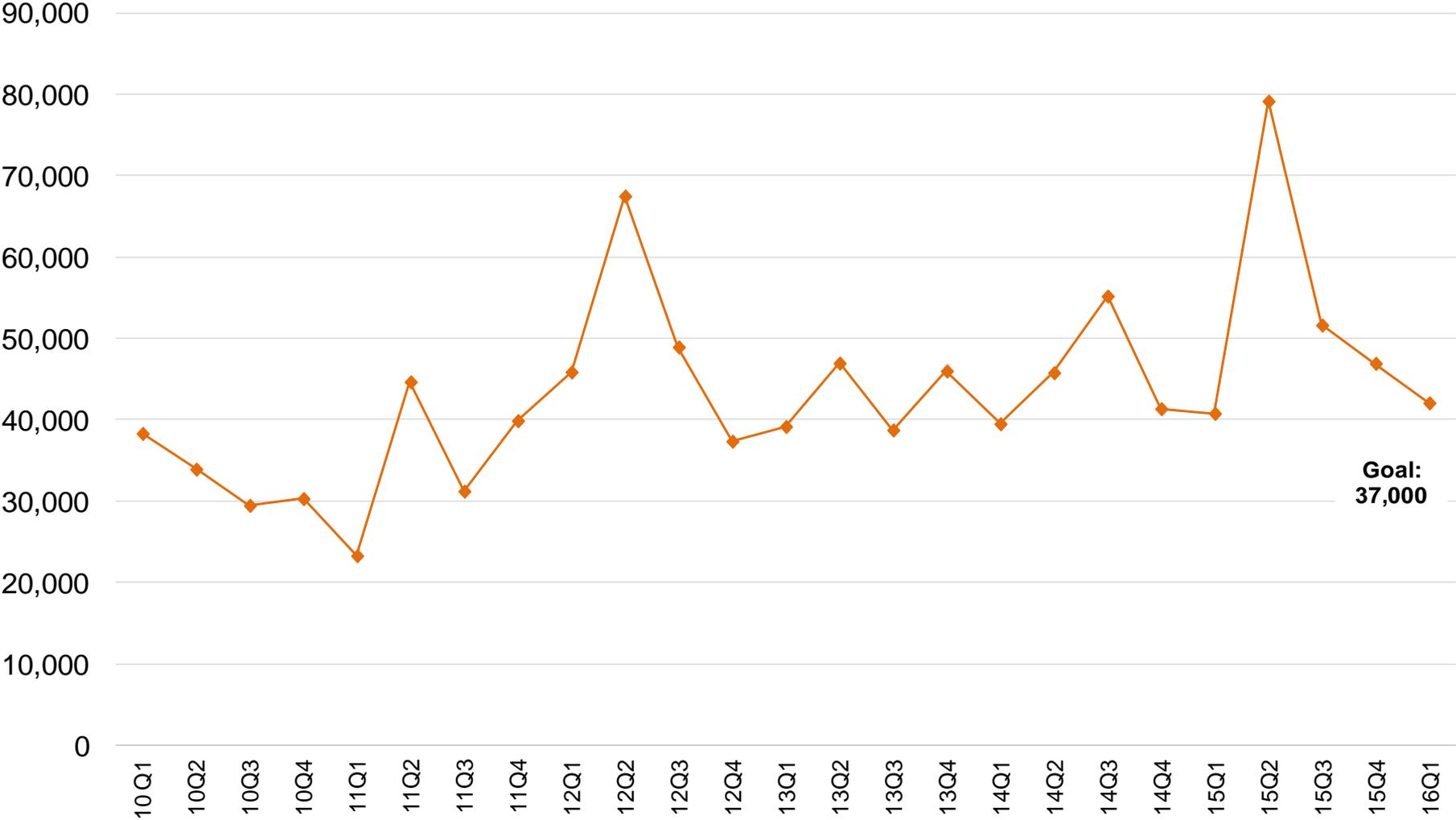
Fleet: Orange Line

- Funded maintenance programs need to be protected to ensure current peak hour vehicle levels and frequencies are maintained
- Service, Maintenance, and Reliability (SMR) program began in late 2013; still underway
 - Consists of structural work on car bodies, couplers, doors, and trucks
 - Includes all 120 cars in the fleet
- \$20 million budget; ~50% spent



Fleet Performance: Orange Line

Orange Line: Mean Miles Between Failures (MMBF)



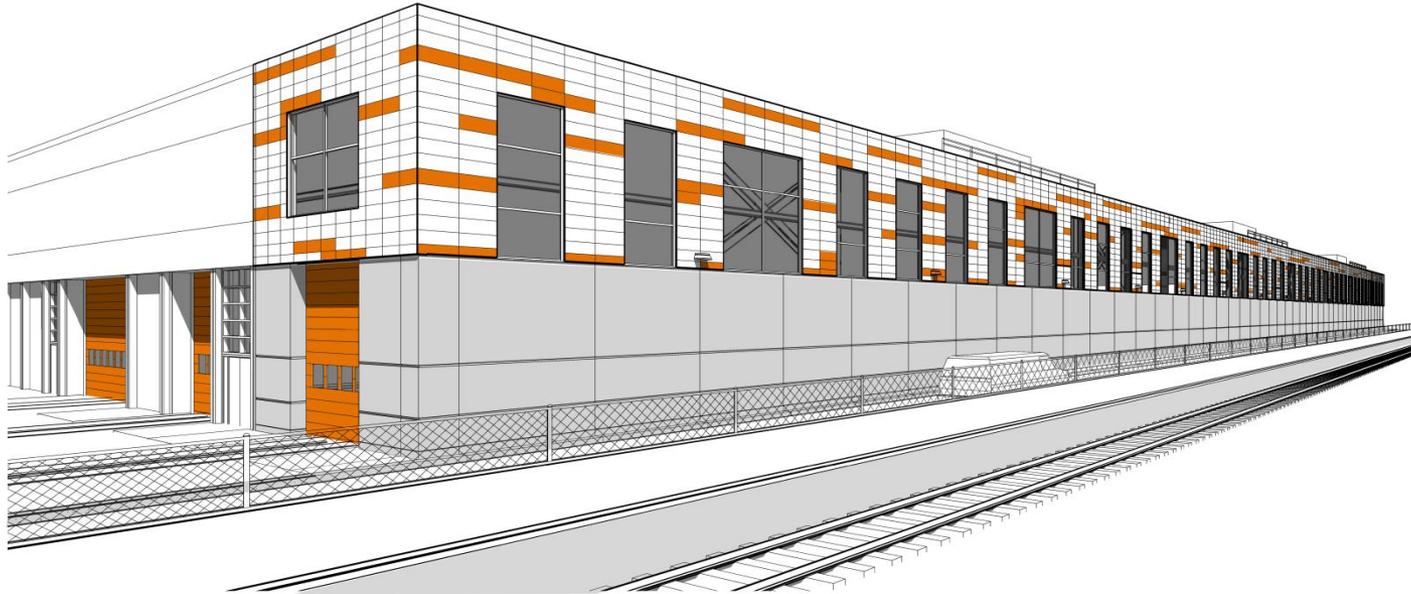
**Goal:
37,000**

Fleet: Orange Line

- Procuring 152 new vehicles
 - Will allow service in the peak period to increase from every 6 minutes to every 4-5 minutes (an increase of 30-35%)
 - Delivery of the first pilot cars is expected to begin in 2018, and the full fleet will be available by 2022



Wellington Car House Expansion Project



- Necessary for receipt and operation of new larger fleet
- Fully funded in FY17 CIP
- At 90% design, on schedule
- Addition of a new bay on the east (station side) of facility
- Tooling and shop improvements

Programs: Orange Line

- Ruggles Station
 - New elevator at lower busway and accessible paths
 - Fire alarm upgrade
- Tufts Station
 - Elevator replacements
 - Electrical, mechanical, life safety improvements
- Forest Hills Station
 - New upper busway
 - New station signage and wayfinding
- Downtown Crossing
 - \$13m construction of redundant elevators between Orange Line and Red Line northbound platforms
 - Planning under way for up to three additional elevator locations



Forest Hills
Upper Busway

Future Investment Needs: Orange Line

Power

- Power Distribution duct bank replacements
- Complete Phase 1 Cable Program
 - Replace all cables along central subway (Back Bay to North Station)
- Station Unit Substations – Southwest corridor station power

Transit Facilities

- Station egress (doors, stairs, walkways)
- Elevator upgrades
- Tunnel leaks

Maintenance of Way (Track)

- Southwest Corridor concrete track structure
- Rail fasteners at Tufts Portal
- Tie renewal

Signals

- Southwest Corridor uses obsolete equipment
 - Draft Capital Plan includes funding to make upgrades to entire signal system



Power
distribution
duct bank
replacements



Rail fasteners
at Tufts Portal

Back Bay: Orange Line

- January 2015 Master Lease Agreement with Boston Properties
- \$37m dedicated to station refurbishment
- Boston Properties will manage concourse, cleaning, tenant management
- Development of air rights over the station granted to Boston Properties
- Simultaneous agreement with MassDOT for development of air rights over adjacent property



Project overview:

- 220,000 SF residential tower with 240 units
 - **Located on MBTA Property**
- 575,000 SF office space with 30,000 SF retail space
 - **Located on MassDOT property**
- 380,000 SF residential tower with 360 units and 8,500 SF retail space
 - **Located on MassDOT property**

Assembly Station: Orange Line



Project Overview

- February 2011 Memorandum of Understanding between Federal Realty Trust and the MBTA to construct a new infill station.
 - Cost of the station was shared between developer and MBTA
- Station opened September 2014

Development Overview

- 500,000+ SF of retail space
- 2,100 residential housing units
- 1.75 million SF of office space
 - Partners Health scheduled to relocate 4,500 jobs to newly constructed HQ open mid 2016

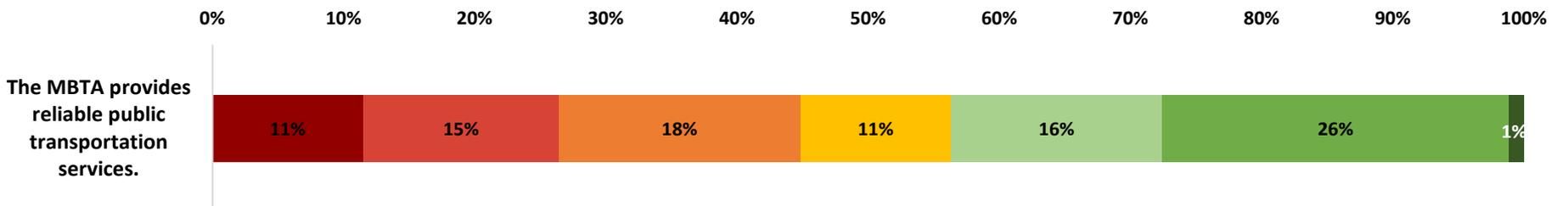
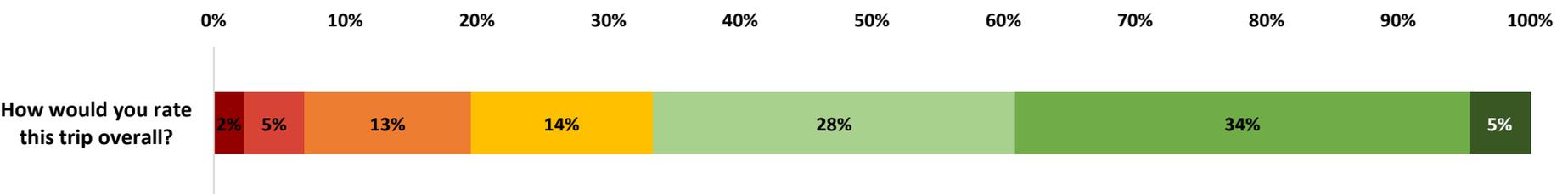
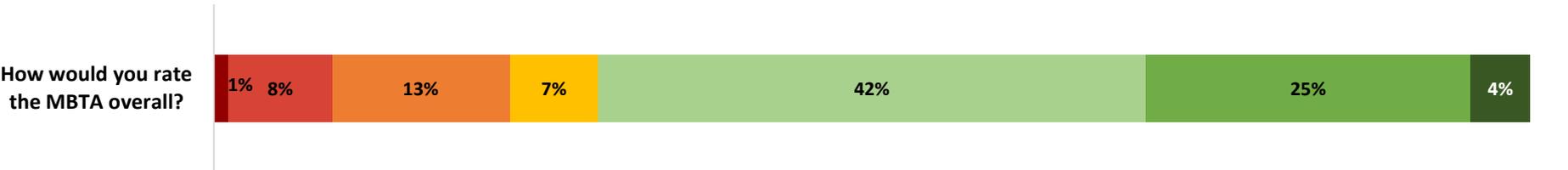
Service management

- Performance
- Crowding
- Capacity
- Dwell times



Customer Survey: Orange Line

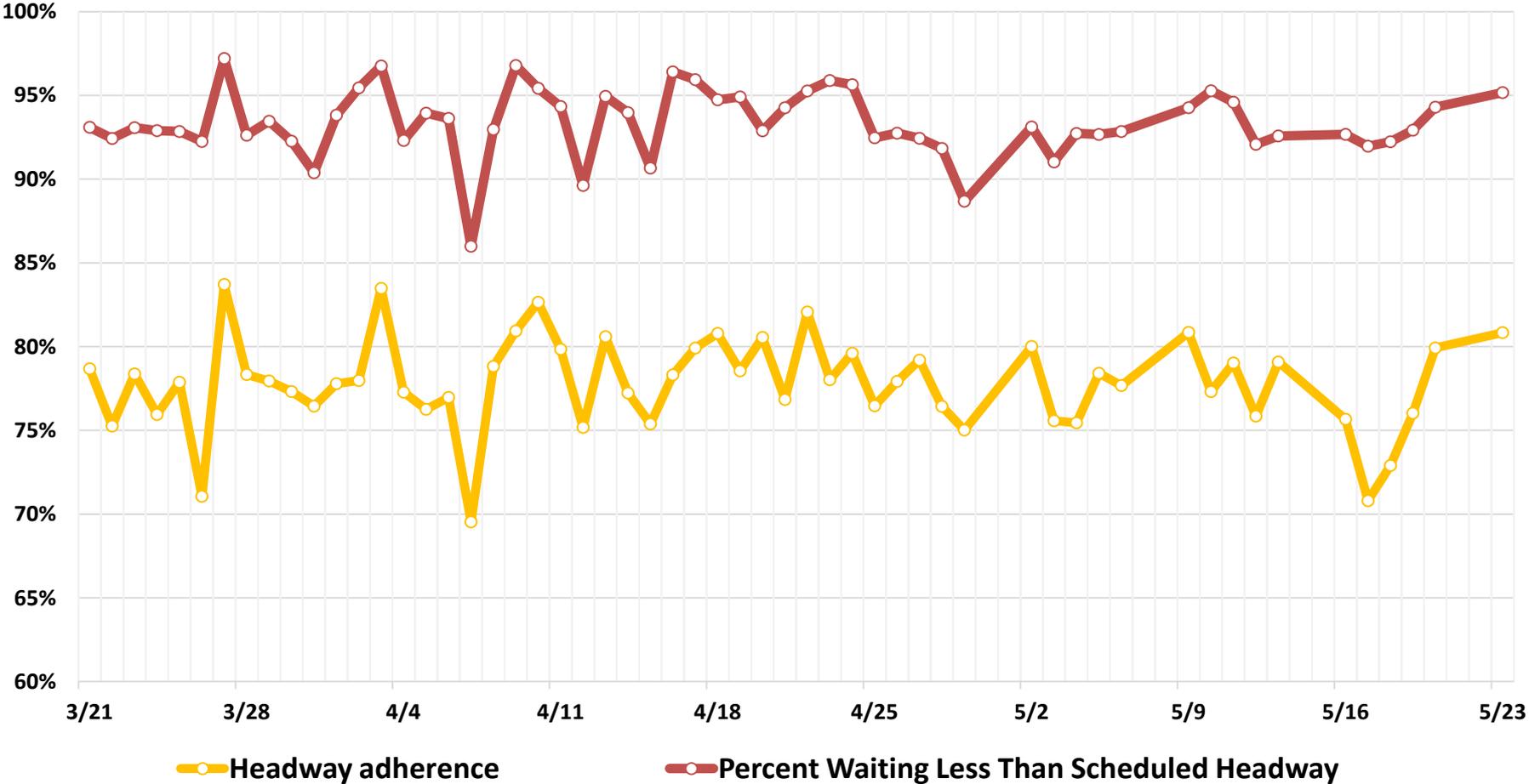
■ Extremely Dissatisfied
 ■ Very Dissatisfied
 ■ Somewhat Dissatisfied
 ■ Neutral
 ■ Somewhat Satisfied
 ■ Very Satisfied
 ■ Extremely Satisfied



Source: April 2016 Customer Opinion Panel (N=89)

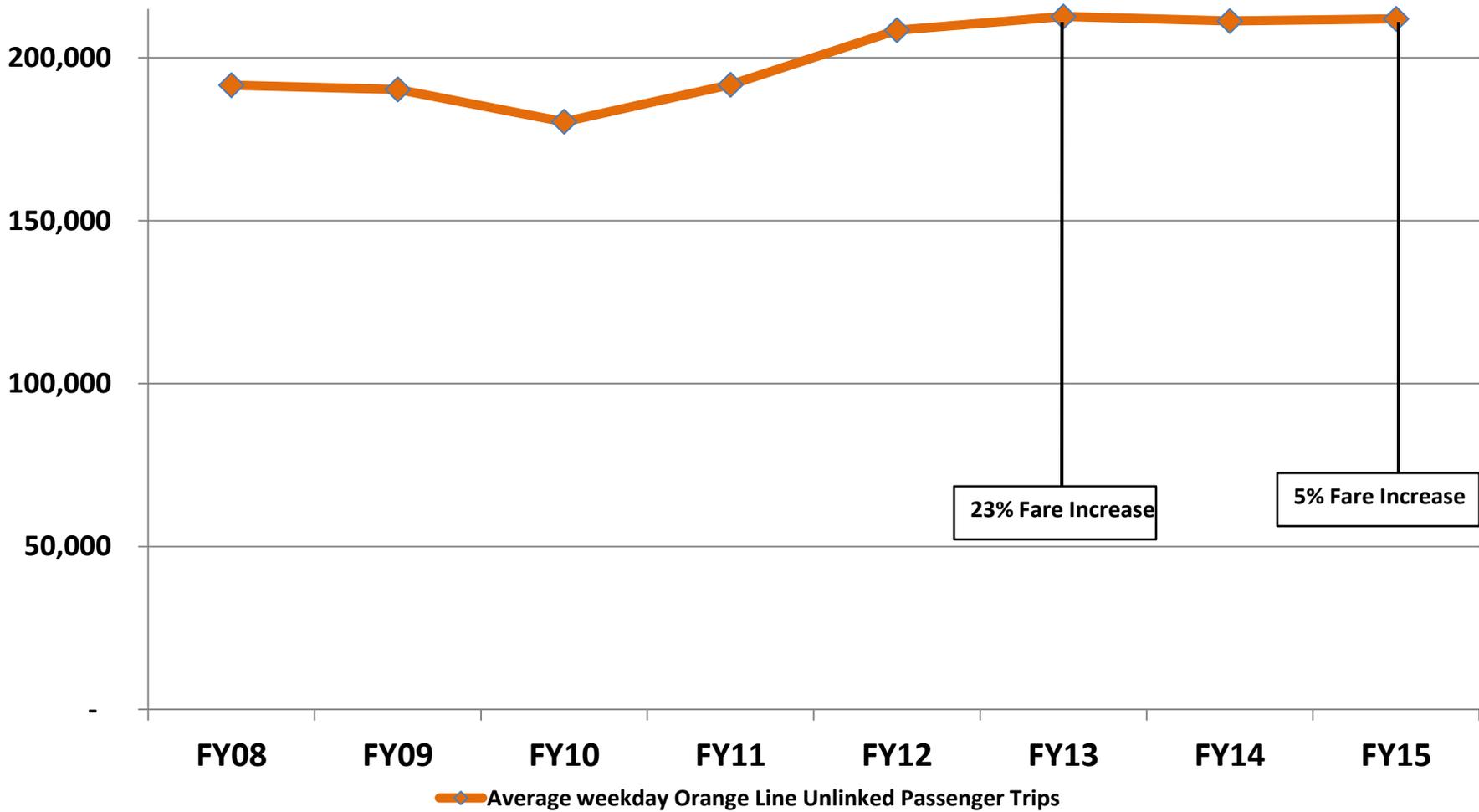
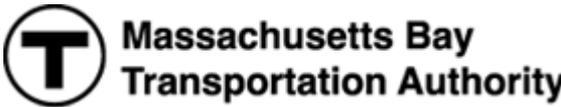
Performance: Orange Line

Orange Line Reliability Performance March 21st - May 23rd, 2016



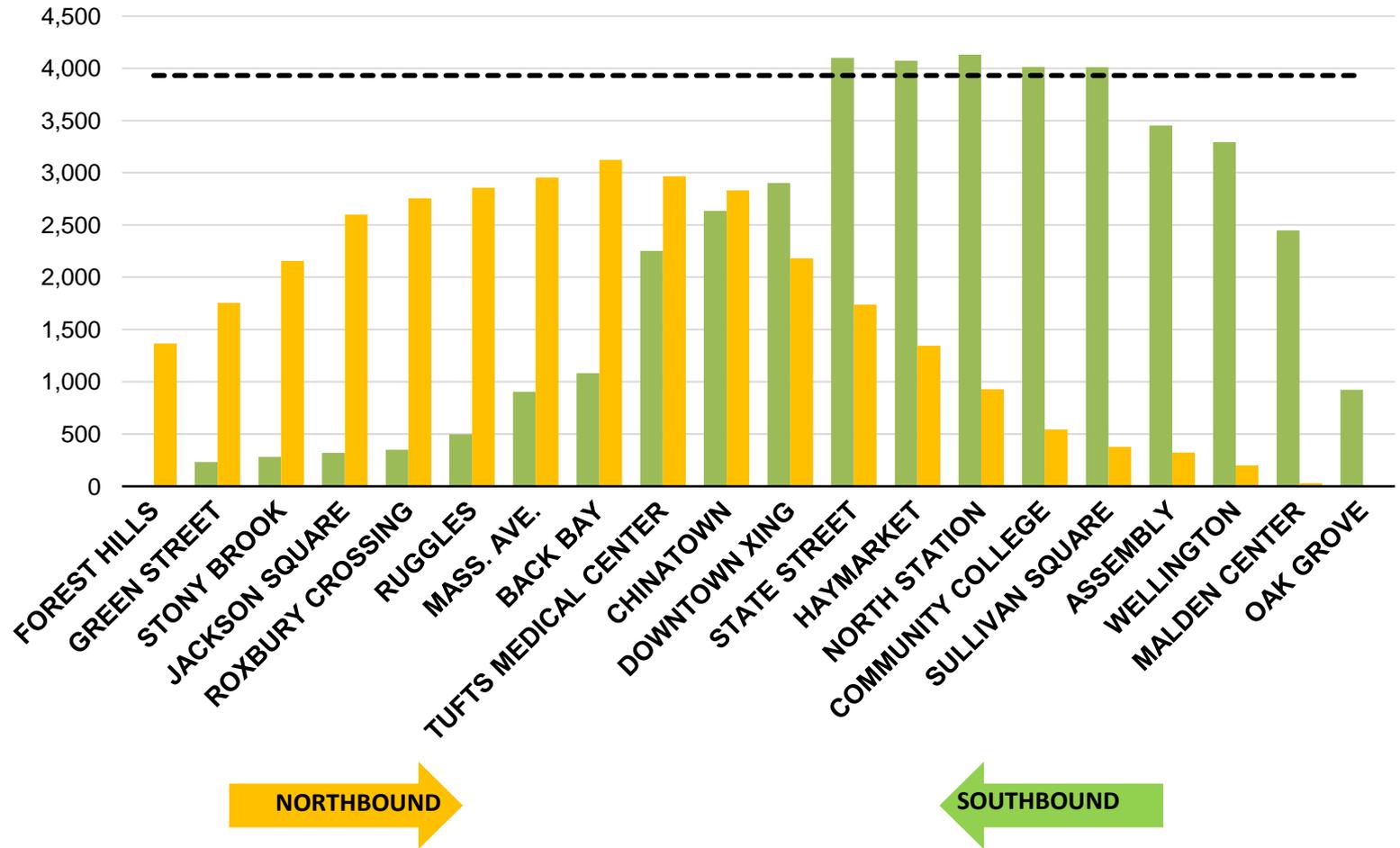
Orange Line Average Weekday Unlinked Trips

As reported to National Transit Database



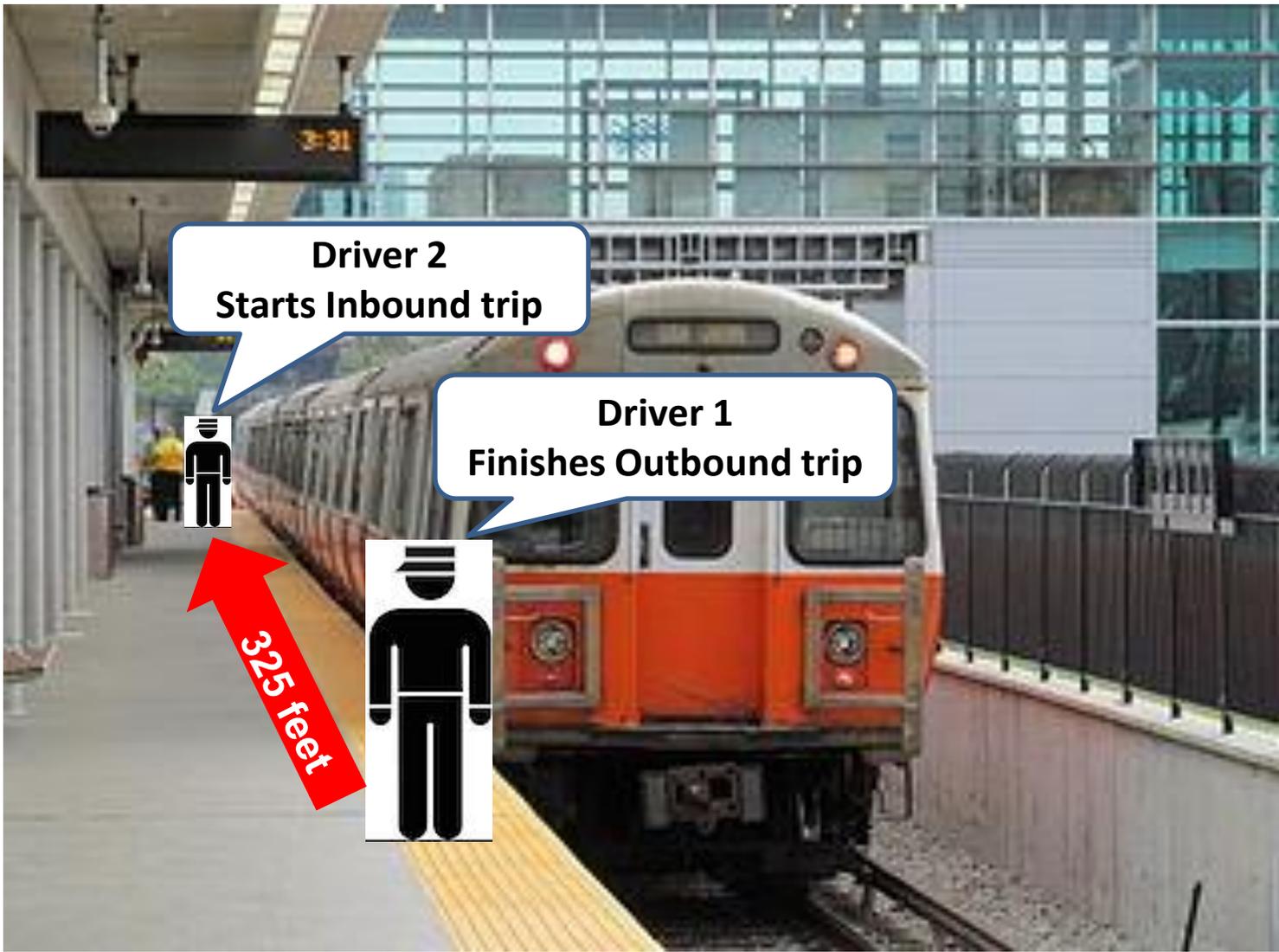
Ridership vs. Planned Capacity

ORANGE LINE PASSENGER VOLUME & POLICY CAPACITY
 8-8:30 AM, WEEKDAYS - OCTOBER 2015



The dashed line shows policy capacity, assuming 5 trains per half hour, ideal distribution of passengers and even headways.

Drop backs to improve reliability



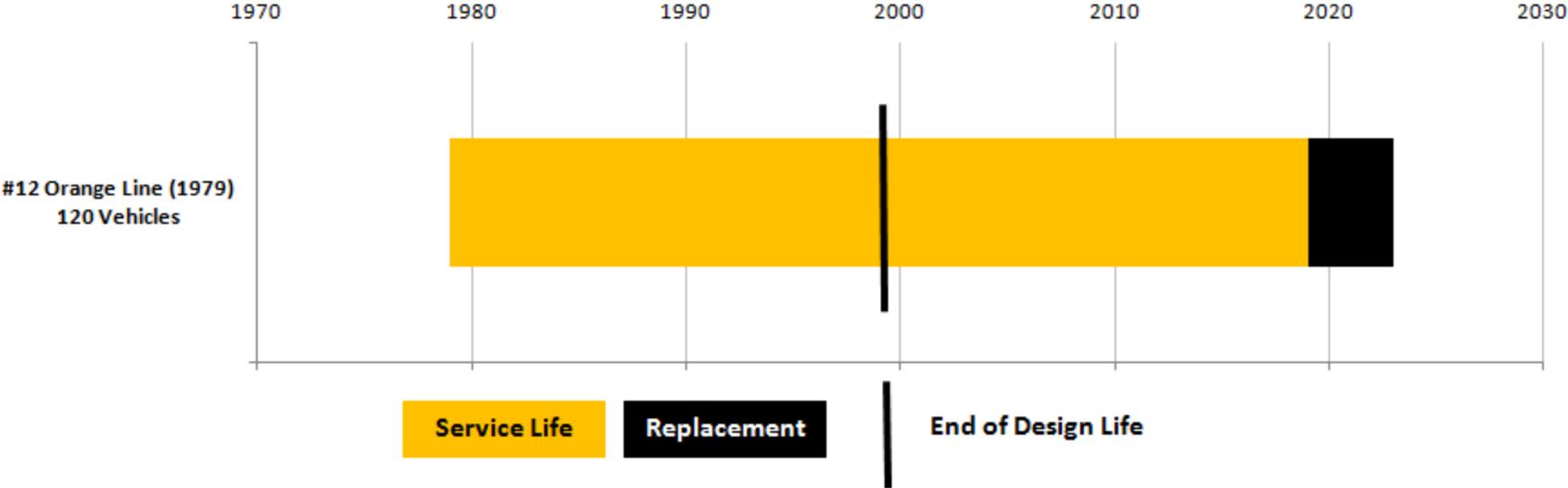
Testing “Wait Here” Markings



- Sustain existing fleet through 2022
- Complete Wellington shop expansion and related infrastructure
- Accept and integrate new fleet
- Capacity strategy for Orange and Red Line

Appendix

Fleet History



Ridership By Station: Orange Line

Heavy and Light Rail

Station	Station Entries (FY15)	Line	System Rank
Downtown Crossing	21,875	Orange/Red	3
State Street	16,714	Orange/Blue	5
Back Bay	16,663	Orange	6
North Station	16,262	Orange/Green	7
Forest Hills	14,248	Orange	10
Haymarket	12,904	Orange/Green	11
Malden Center	11,335	Orange	14
Ruggles	10,295	Orange	17
Sullivan Square	9,417	Orange	19
Wellington	7,521	Orange	26
Mass. Ave	6,300	Orange	31
Oak Grove	6,190	Orange	33
Chinatown	6,087	Orange/Silver	34
Tufts Medical Center	6,056	Orange/Silver	35
Jackson Square	5,780	Orange	38
Community College	4,698	Orange	43
Roxbury Crossing	4,656	Orange	44
Stony Brook	3,452	Orange	48
Green Street	3,367	Orange	49
Assembly	1,864	Orange	58



Crowding: Orange Line

- **Crowding/frequency:** passenger loads are heavy, and passengers can be left behind due to crowding
 - Fall 2010 peak hour headway was 4-5 minutes
 - In 2011, peak hour headways were stretched to 5-6 minutes due to lack of vehicles
 - In 2015, headways were further stretched to 6 minutes—25% peak capacity reduction

Point checks at State Street in July 2015 showed heavy loads, 350 people passed by full trains in PM peak

Time	Passengers left on platform (approximate)
16:34	0
16:45	63
16:50	6
16:54	0
16:57	0
17:00	0
17:08	57
17:11	17
17:17	3
17:25	34
17:30	8
17:37	22
17:44	14
17:52	35
17:58	2
18:02	0
18:10	4
18:22	87
Total	350