



Massachusetts Transportation Overview

Presented to the Commission on the Future of Transportation
in the Commonwealth
March 7, 2018



Transportation is not important for what it *is*

Roads and bridges, trains and tracks

Transportation is important for what it *does*

Gets people where they need to go and
connects them to opportunity

Shapes and supports the economy of
communities and regions



Massachusetts Transportation 101



MassDOT Structure

- MassDOT has a Board of Directors
 - MassDOT has four primary divisions
 - Highway Division
 - Registry of Motor Vehicles (RMV)
 - Aeronautics Division
 - Rail & Transit Division
- MassDOT has “**enterprise services**” that support both MassDOT and the MBTA
 - Office of Transportation Planning
 - Office of Performance Management and Innovation



MassDOT's and MBTA's Mission

- Provide safe and excellent service to our customers
- Maintain and modernize our transportation system assets
- Make transportation infrastructure investments to meet the needs of the Commonwealth, its cities and towns and its residents
- Plan and prioritize for the future in a way that ensures alignment of transportation policy and investment with the Commonwealth's economic, quality of life and environmental aspirations



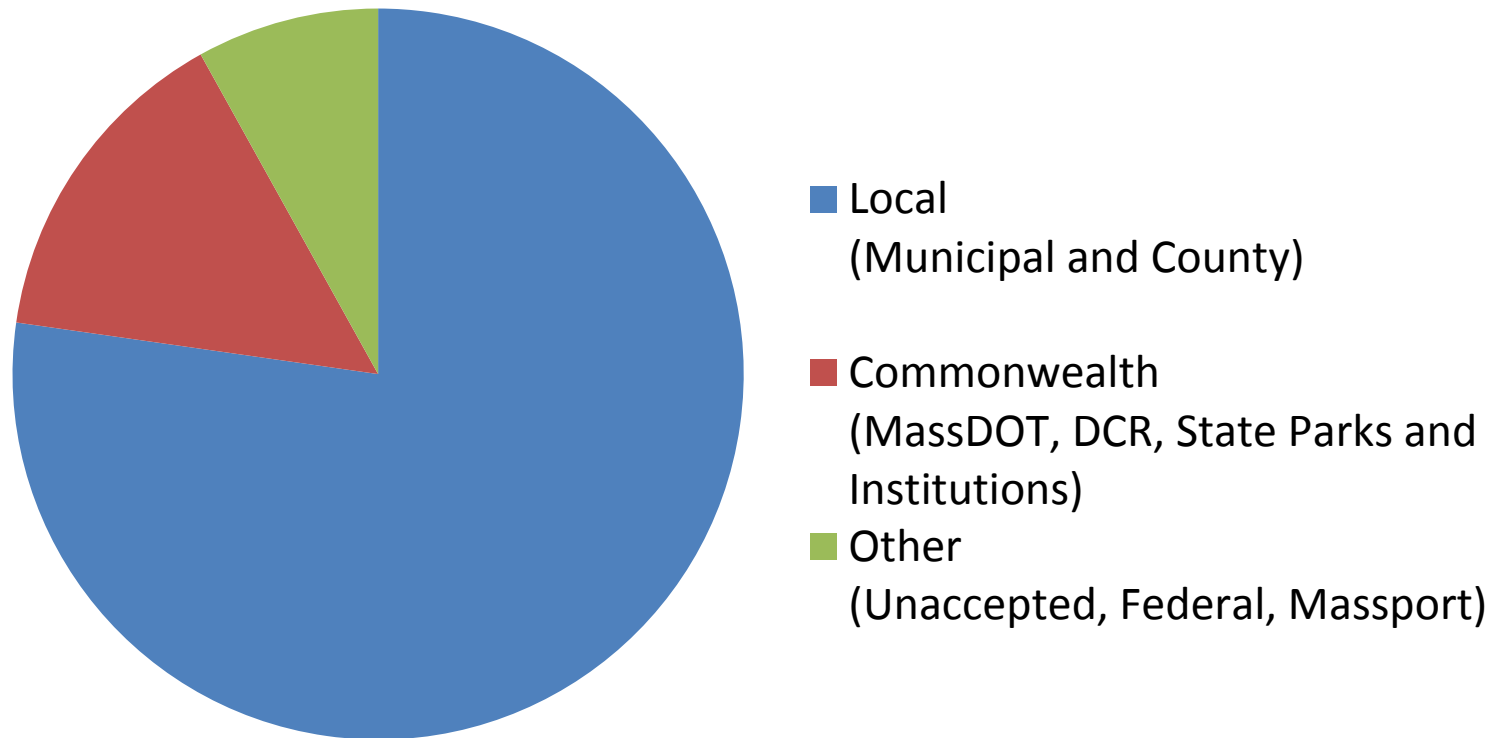
MassDOT Transportation Assets



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But MassDOT Does Not Own Most Transportation Assets

Ownership of Roadway Lane Miles in Massachusetts



Source: MassDOT Planning Division



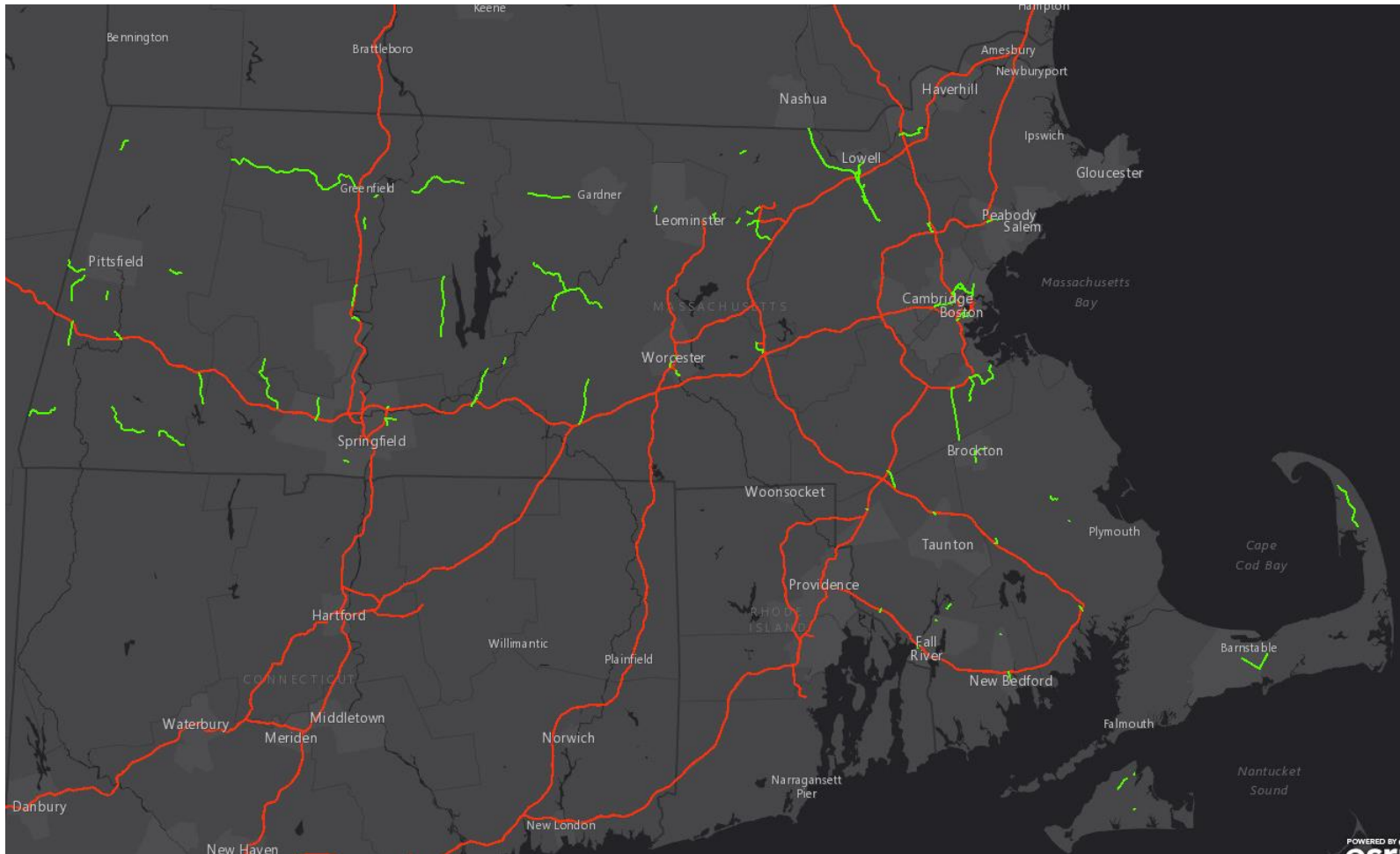
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92%

of sidewalks in Massachusetts are under
municipal jurisdiction



Freight – Critical Urban and Rural Corridors



- Primary Freight Network
- Draft Additions to Network, Urban (75 miles) and Rural (150 miles)

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MBTA Transit System



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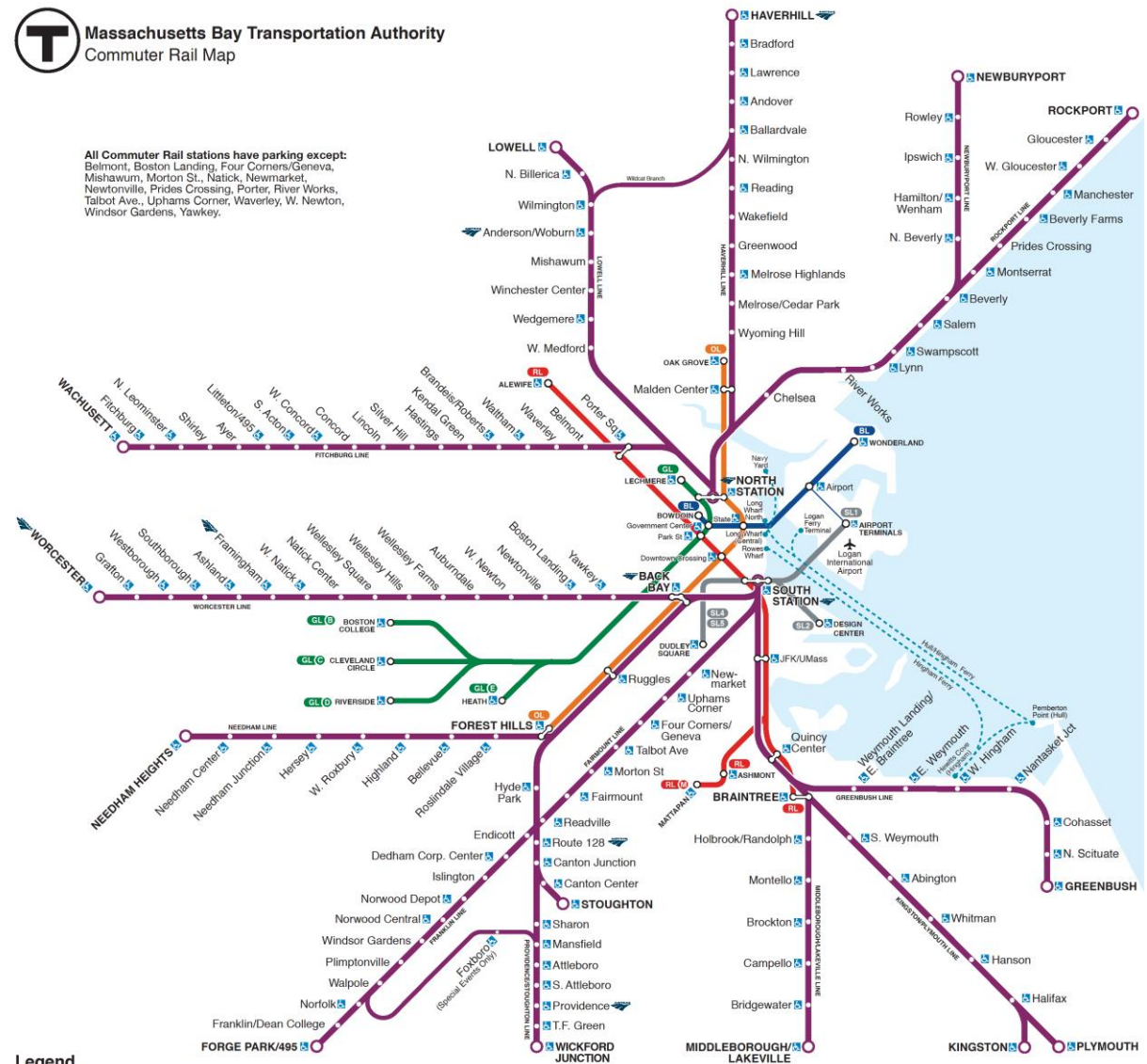


MBTA Commuter Rail Network



Massachusetts Bay Transportation Authority
Commuter Rail Map

All Commuter Rail stations have parking except:
Belmont, Boston Landing, Four Corners/Geneva,
Mishawum, Morton St., Natick, Newmarket,
Newtonville, Prides Crossing, Porter, River Works,
Talbot Ave., Uphams Corner, Waverley, W. Newton,
Windsor Gardens, Yawkey.



Legend

- COMMUTER RAIL LINES
- RED LINE
- SILVER LINE and branches
- GREEN LINE and branches
- ORANGE LINE
- BLUE LINE
- MATTAPAN LINE
- FERRY
- Accessible station
All MBTA and Massport bus and ferry services are accessible
- Free Logan Airport shuttle bus
- Amtrak service
- Customer Communications & Travel Info
617-222-3200, 1-800-392-6100,
TTY 617-222-5146, www.mbta.com
- MBTA Transit Police: 911
TTY 617-222-1200
- Elevator/escalator/lift updates: 800-392-6100

©May 2017 v.30 Not to scale



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Massachusetts Passenger Rail Network

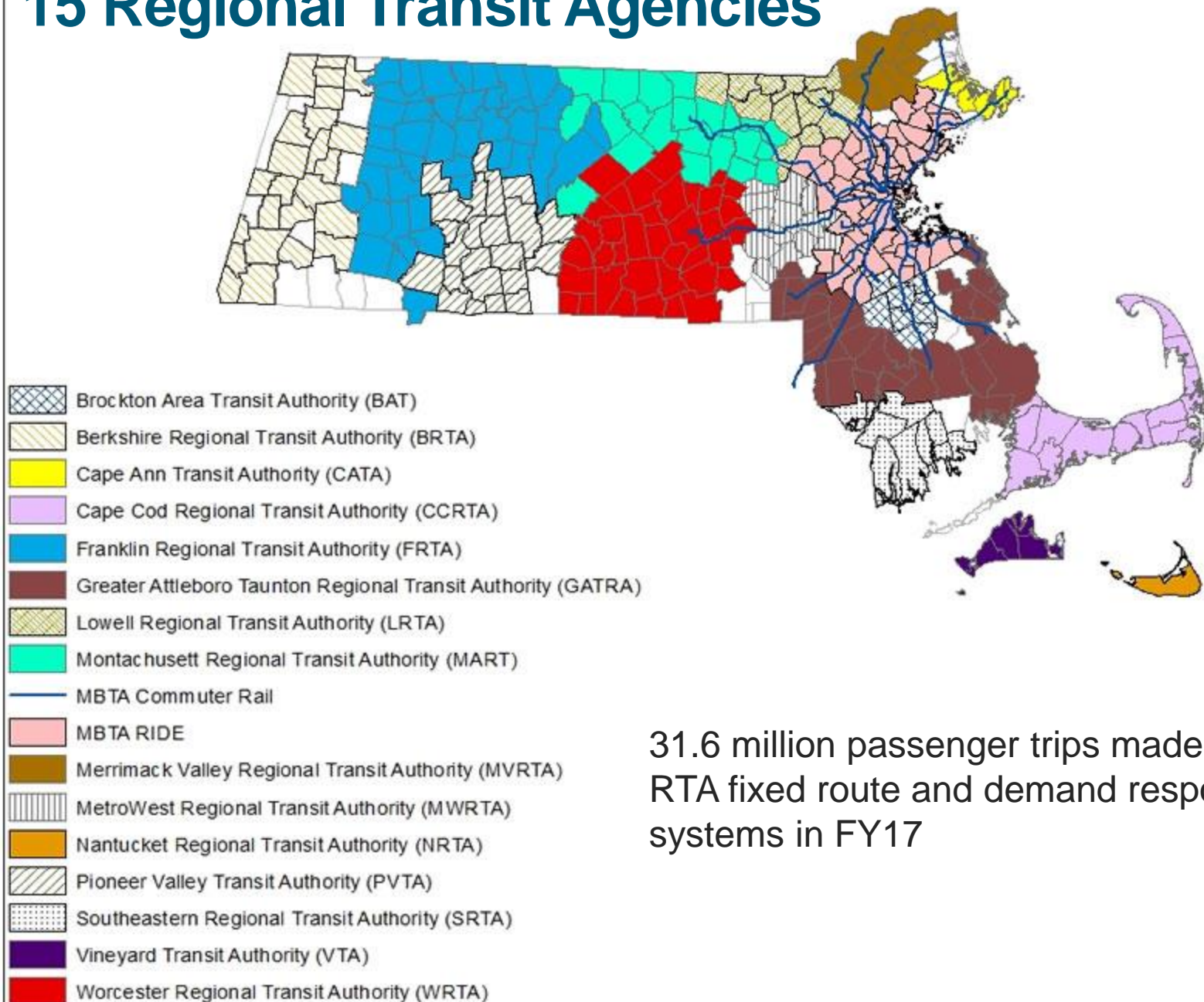
Figure ES-1: Passenger Rail Operations in Massachusetts



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15 Regional Transit Agencies



Transportation Planning



Transportation POLICY is really transportation ↳ OPERATIONS



Transportation agencies primarily do two things:

1. Capital projects to maintain and modernize infrastructure
2. Operate service

So the plans that drive change are:

1. Capital Plans
2. Service Plans



Reinventing capital planning

1 *Reliability*

Maintain and improve the overall condition and reliability of the transportation system

- ▶ Necessary routine and capital maintenance
- ▶ State of Good Repair projects designed primarily to bring asset condition up to an acceptable level
- ▶ Asset management and system preservation projects

2 *Modernization*

Modernize the transportation system to make it safer and more accessible and to accommodate growth

- ▶ Compliance with federal mandates or other statutory requirements for safety and/or accessibility improvements
- ▶ Projects that go beyond State of Good Repair and substantially modernize existing assets
- ▶ Projects that provide expanded capacity to accommodate current or anticipated demand on existing transportation systems

3 *Expansion*

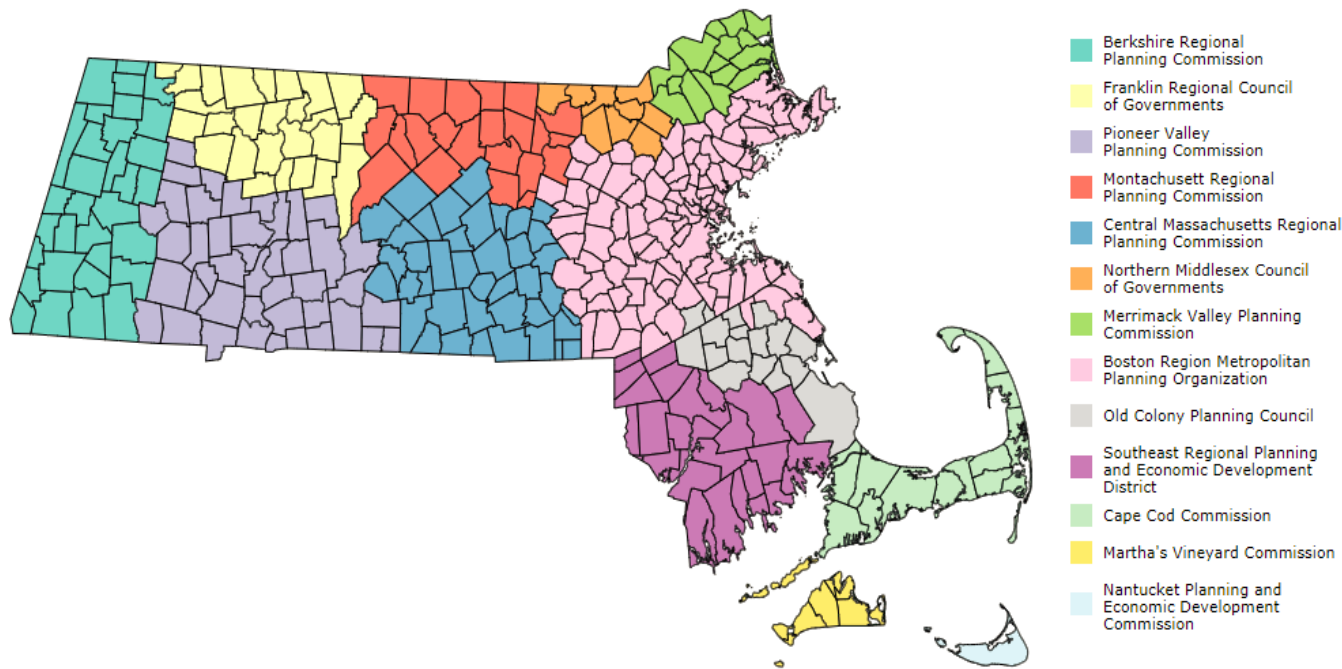
Expand diverse transportation options for communities throughout the Commonwealth

- ▶ Projects that expand highway, transit and rail networks and/or services
- ▶ Projects that expand bicycle and pedestrian networks to provide more transportation options and address health and sustainability objectives



Capital Planning Overview - MPOs

- Massachusetts has 10 Metropolitan Planning Organizations (MPOs) and 3 rural Transportation Planning Organizations
- An MPO is a federally required regional transportation policy-making organization made of representatives from local government, regional transit operators, and state transportation agencies
- MPOs create a fair and impartial setting for effective regional decision making in the metropolitan area with inclusionary approaches to effectively engage communities and stakeholders.



Long Range Transportation Plans

- A roadmap to maintain the transportation network to meet existing needs, adapt and modernize it for future demand, while simultaneously working within the reality of constrained fiscal resources
- The Boston Region MPO completed a Long Range Transportation Plan in July 2015
 - [Charting Progress to 2040](#) was developed in compliance with federal highway legislation, Moving Ahead for Progress in the 21st Century (MAP-21), which governs MPO activities.
- The Boston Region MPO is developing an updated LRTP, anticipated to be complete in summer of 2019
 - Needs Assessment
 - Goals and Performance Measures
 - Future Demographics and Land Use
 - Scenario Planning
 - Policies, Programs, and Projects
 - Transportation Equity



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Capital Planning Overview – STIP AND CIP

- The State Transportation Improvement Plan (STIP) identifies all future, federally supported highway and transit projects across the Commonwealth
- The Capital Planning Group in the Office of Transportation Planning coordinates the production of the MassDOT and MBTA annual Capital Investment Plan (CIP) update.
- The Capital Investment Program (CIP) is the 5-year portfolio of strategic investments for MassDOT and the MBTA

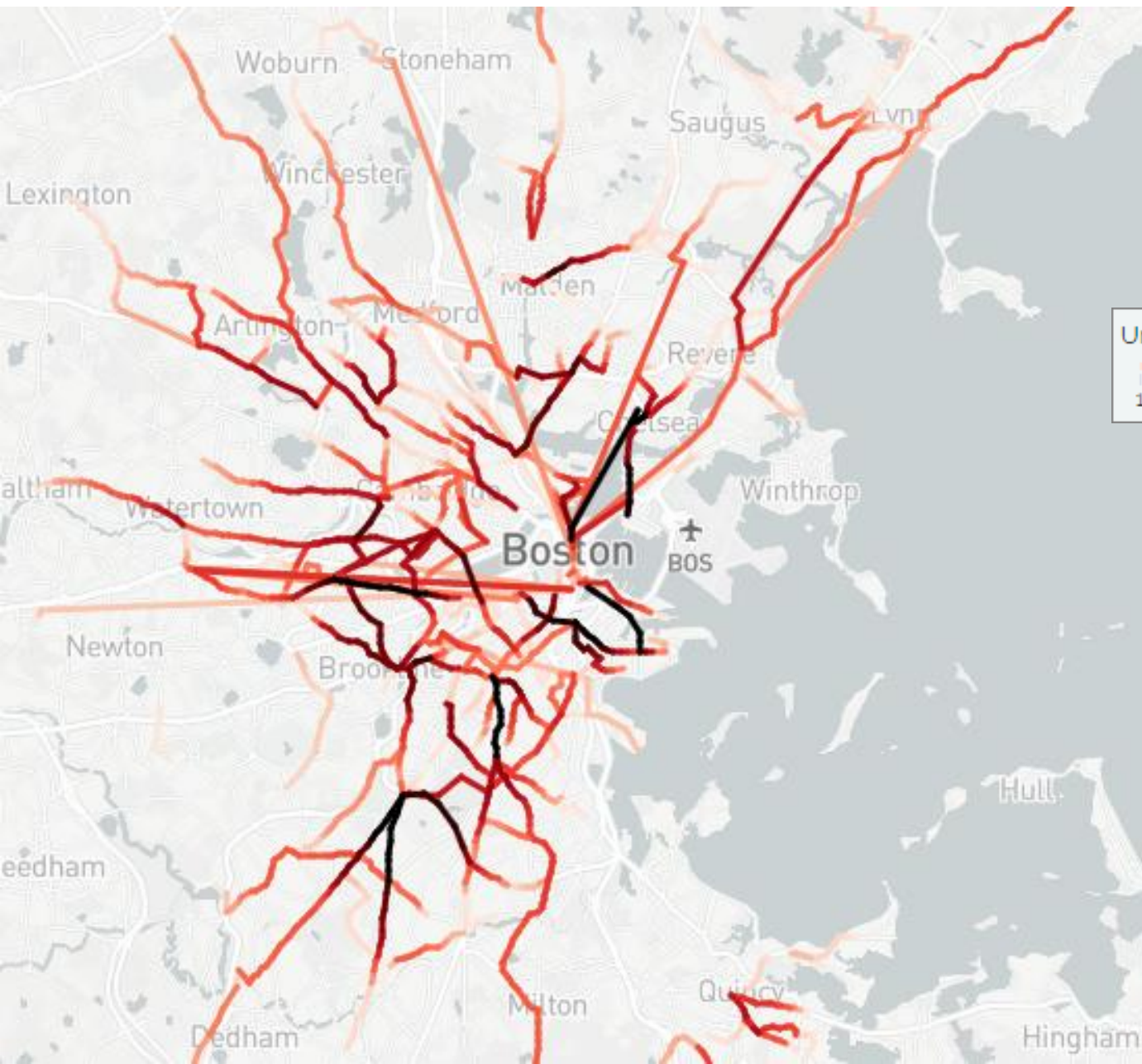


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Reinventing service planning: MBTA buses



This map shows how many passengers experience crowding on inbound trips, totaled across all bus routes that use each street.



Long straight lines represent express buses that use highways without stopping.

Data reflects an average weekday in Fall 2015. Routes SL1, SL2, SLW, 71, and some Limited Service routes are excluded due to insufficient data.

Reinventing service planning: Water transportation study

Existing
Conditions
Report

National
Best Practices
Report

30
site profiles

12 sites
selected for
modeling

3 water
transportation
stakeholder
workshops

3,689
responses
to the stated
preference survey

150
participants
at day-long open
house



Water Transportation Study Process Next Steps

12 sites

with models for
estimated
ridership demand

3 routes

with detailed
market and
feasibility analysis

Model congestion
mitigation and
reduced
emissions

**Financial Model
+ Business
Plans** for up to 3
new routes based
on these findings

responses
to the stated
preference survey



+ estimates of
ridership, time
savings, operating
costs, deficits/
subsidies,
seasonality

Public Event
to release study
and business
plans



Sites in the Analysis: Improved Service (North)

Salem Ferry Terminal

support improvements to existing service + pilot limited weekend service to Harbor Islands

Blossom St Pier (Lynn)

implement business plan, support expanded service + pilot limited weekend service to Harbor Islands

Winthrop Ferry Dock

support improvements to existing service



Sites in the Analysis: New + Expanded Service (South)

Fallon Pier at
Columbia Point
(Dorchester)

study new service

Marina Bay /
Squantum Point
(Quincy)

study permanent regular service + study potential as
Harbor Island Gateway site

Hewitt's Cove
(Hingham)

Pemberton Point
(Hull)

study additional destinations + study
potential improvements to Harbor
Island service



Sites in the Analysis: New Service (Inner Harbor)

study as part of
potential Inner
Harbor circulator

Logan Airport
Ferry Terminal
(East Boston)

Lewis Mall
(East Boston)

Navy Yard Pier 4
(Charlestown)

Lovejoy Wharf
(North Station)

Long Wharf
North and South
+ Central Wharf

Rowes Wharf
(Downtown)

Fan Pier / ICA
(Seaport)

World Trade
Center East
(Seaport)



Planning by Mode:

Six plans are underway, each with “owners”



Highway Division



MBTA



Rail & Transit Division



Municipal partners





Massachusetts' integrated and multi-modal transportation system will provide a safe and well-connected pedestrian network that will increase access for both transportation and recreational purposes



Freight Plan

- FAST Act requires an updated Freight Plan to access new freight funding program
- Focused on providing multi-modal and intermodal strategies to improve the freight system
- Freight Advisory Committee was formed to provide industry and government input and shape recommendations
- Proposed freight investments will be identified along established freight network corridors
- **Vision and Goals:**
 - The Massachusetts multimodal freight system will:
 - Be safe, secure, and resilient
 - Maintain a state-of-good-repair for key freight assets
 - Improve the economic competitiveness of Massachusetts
 - Provide efficient and reliable mobility within Massachusetts and to/from neighboring states
 - Support healthy and sustainable communities
 - Our guiding principles in implementing this vision:
 - Consider the experience of all customers
 - Provide reliable, efficient service within budget constraints
 - Take advantage of innovations and technology
 - Support a well-trained workforce with good-paying jobs



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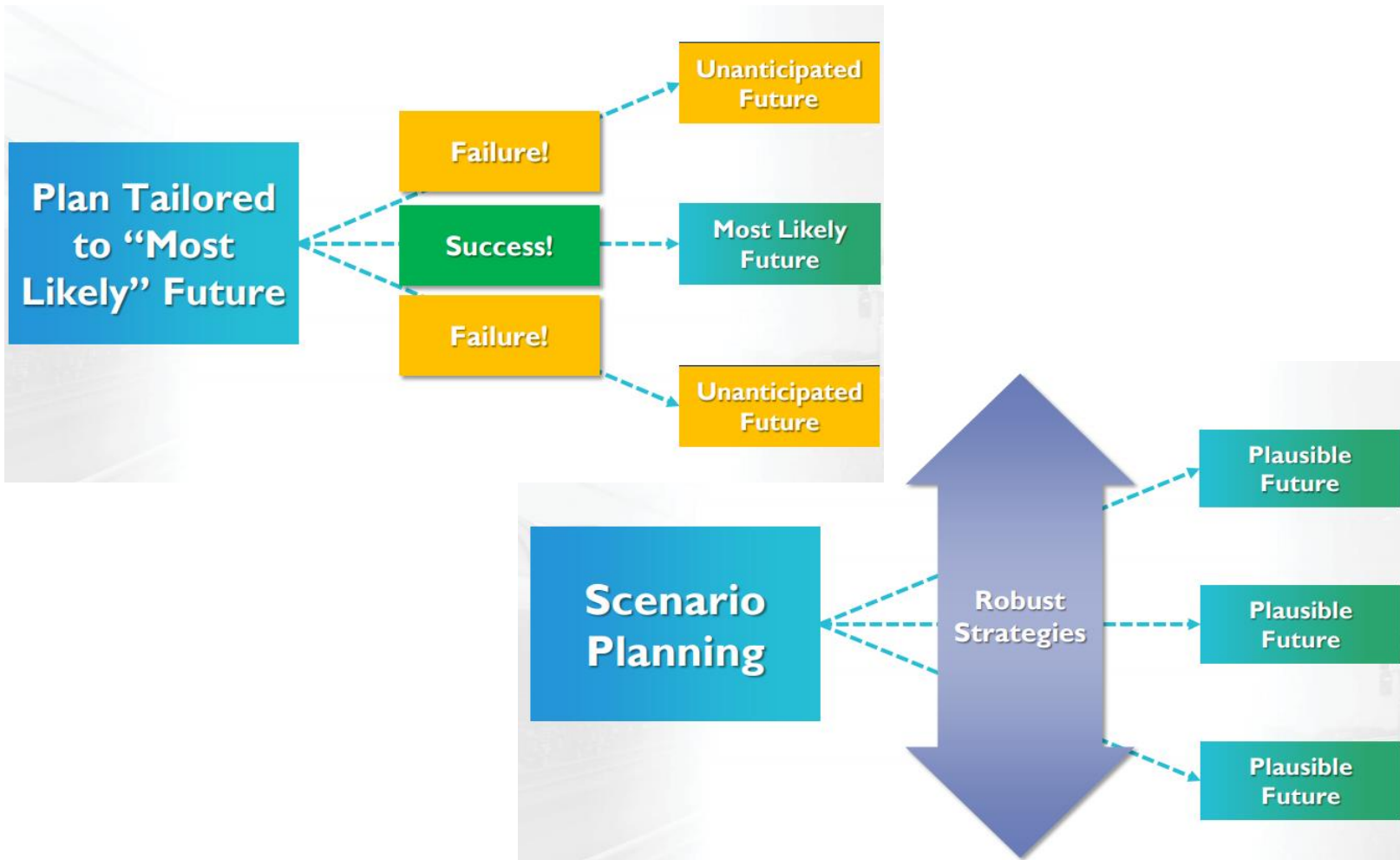
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Using Scenario Planning



Defining plausible futureS, not a single most likely future



First step is to identify drivers of the future: Drivers used in the Freight Plan



Climate



PLAUSIBLE FUTURE

DRIVING TRENDS

Urbanization

Affordability

Technology

Climate Action



MetroFuture
Formally adopted scenario of Boston MPO



Business as Usual
Low and moderate income households are living in increasingly auto-oriented suburbs



Innovation Acceleration
Technology changes are adopted quickly and radically change the transportation landscape



Climate Responsive
Strong commitment by the Commonwealth to invest in GHG reduction and resiliency measures

Suburbanization



Urbanization

Low Affordability Near Transit



High Affordability Near Transit

Gradual Evolution



Disruptive Change

Low Collective Action



High Collective Action

Suburbanization



Urbanization

Low Affordability Near Transit



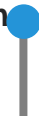
High Affordability Near Transit

Gradual Evolution



Disruptive Change

Low Collective Action



High Collective Action

Suburbanization



Urbanization

Low Affordability Near Transit



High Affordability Near Transit

Gradual Evolution



Disruptive Change

Low Collective Action



High Collective Action

Suburbanization



Urbanization

Low Affordability Near Transit



High Affordability Near Transit

Gradual Evolution



Disruptive Change

Low Collective Action



High Collective Action



Plausible Futures: Potential MBTA Strategies

These futures still require the same core reliability and modernization improvements to the system, but certain types of investments become more important:



MetroFuture

- New or improved crosstown connections
- Improve access to/from Commuter Rail
- Core capacity increases



Business as Usual

- Improve access to Commuter Rail network
- Increase speed and frequency of Commuter Rail
- More modest core capacity increases



Innovation Acceleration

- Embrace Mobility as a Service model
- Provide dedicated ROW for autonomous buses or shuttles
- Rethink parking structures
- Increase core system speeds and frequency to remain relevant



Climate Responsive

- Accelerate transition to no emission vehicles
- Partial or full electrification of Commuter Rail
- Large scale resiliency investments
- Significant core capacity increases

Applying scenario planning to capital investment decisions

	Lower Risk	Higher Risk
All Futures	Immediate Current or near-term need	
	Robust No-brainers	
Some Futures	Deferred No regret	Hedging Potential regret
		Shaping Influence the future
No futures	Dropped	

Think Big!



Autonomous Vehicles



Executive Order No. 572: To Promote the Testing and Deployment of Highly Automated Driving Technologies

Signed on October 20, 2016 by Governor Baker

1. Created an Autonomous Vehicles Working Group to provide input on potential policies, regulations, and legislation
2. Established a process to develop Guidance for testing highly automated vehicles and their safe deployment in the Commonwealth



AV Working Group

Convened 7 AV Working Group meetings since December 2016

About 75+ attendees on average, including companies, lobbyists, academic institutions, regional planning agencies, and news media

Discuss topics including a general overview of AVs, the current Massachusetts testing program, a review of existing statutes and regulations impacting AVs, cybersecurity considerations, and draft testing guidance and regulations

Included a stakeholder session in September 2017 (materials provided on the [Working Group webpage](#))

Next Meeting: March 15, 2018 @ 10-11:30 am
Topics including regional testing initiative



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Current Testing in Massachusetts

nuTonomy (recently acquired by Aptiv) in January 2017 and has logged all Conducted a passenger pilot with Lyft. The company has 4 vehicles in Massachusetts.



Optimus Ride began testing Polaris vehicle in Boston's Seaport District in June 2017. The company has entered into a partnership with Union Point in South Weymouth to test autonomous shuttle services within the development. Optimus Ride has 15 vehicles permitted in Massachusetts.



Traditional auto manufacturers, tech companies, academic institutions, and other startups have expressed interest in testing AVs on Massachusetts roads.

To review the quarterly reports and additional information submitted to Boston:
www.boston.gov/departments/new-urban-mechanics/autonomous-vehicles-bostons-approach



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Draft for Discussion & Policy Purposes Only

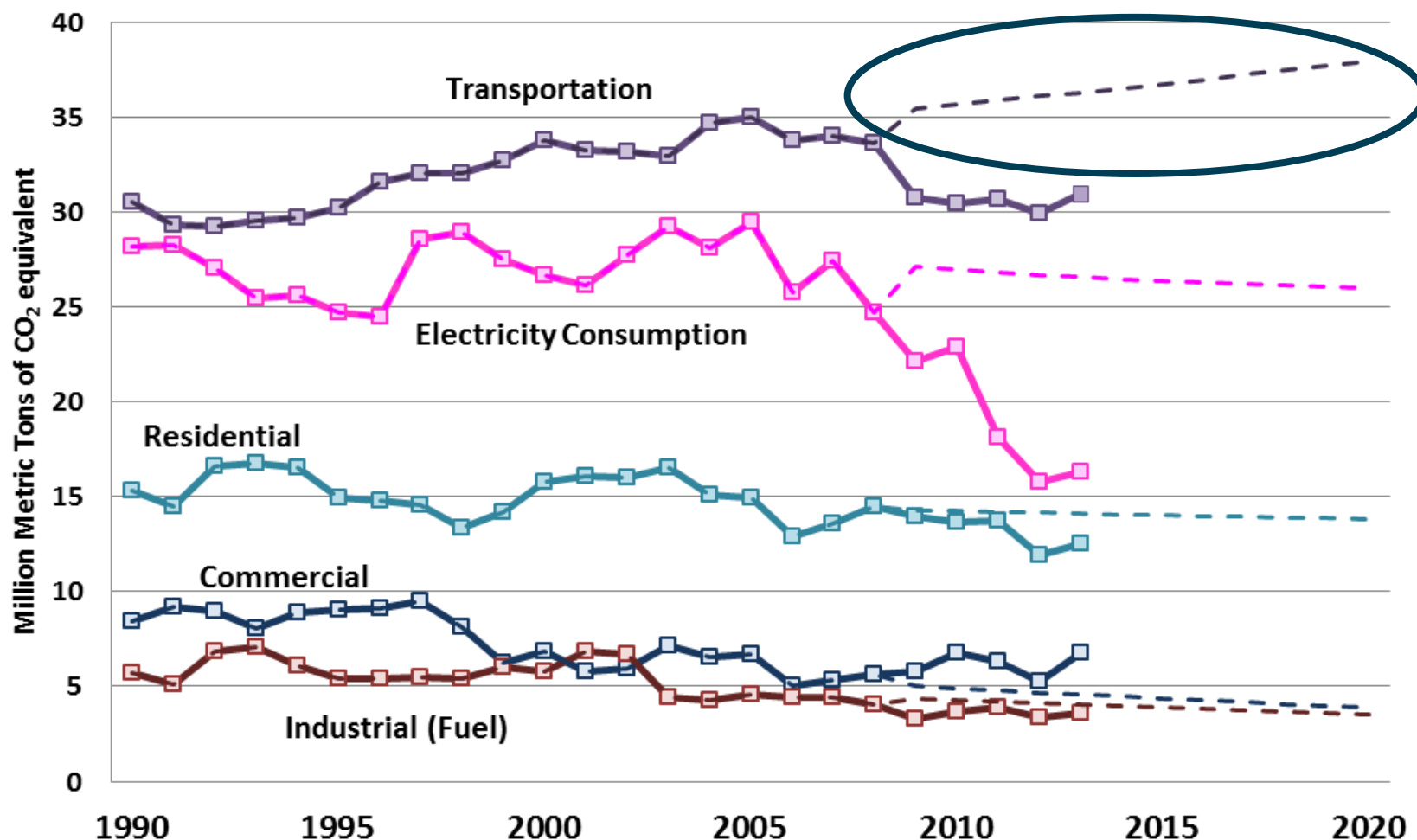
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Reducing Transportation Sector Greenhouse Gas Emissions



Our job is to bend this curve



Source: MassDEP's Statewide GHG Emissions Baseline and Projection



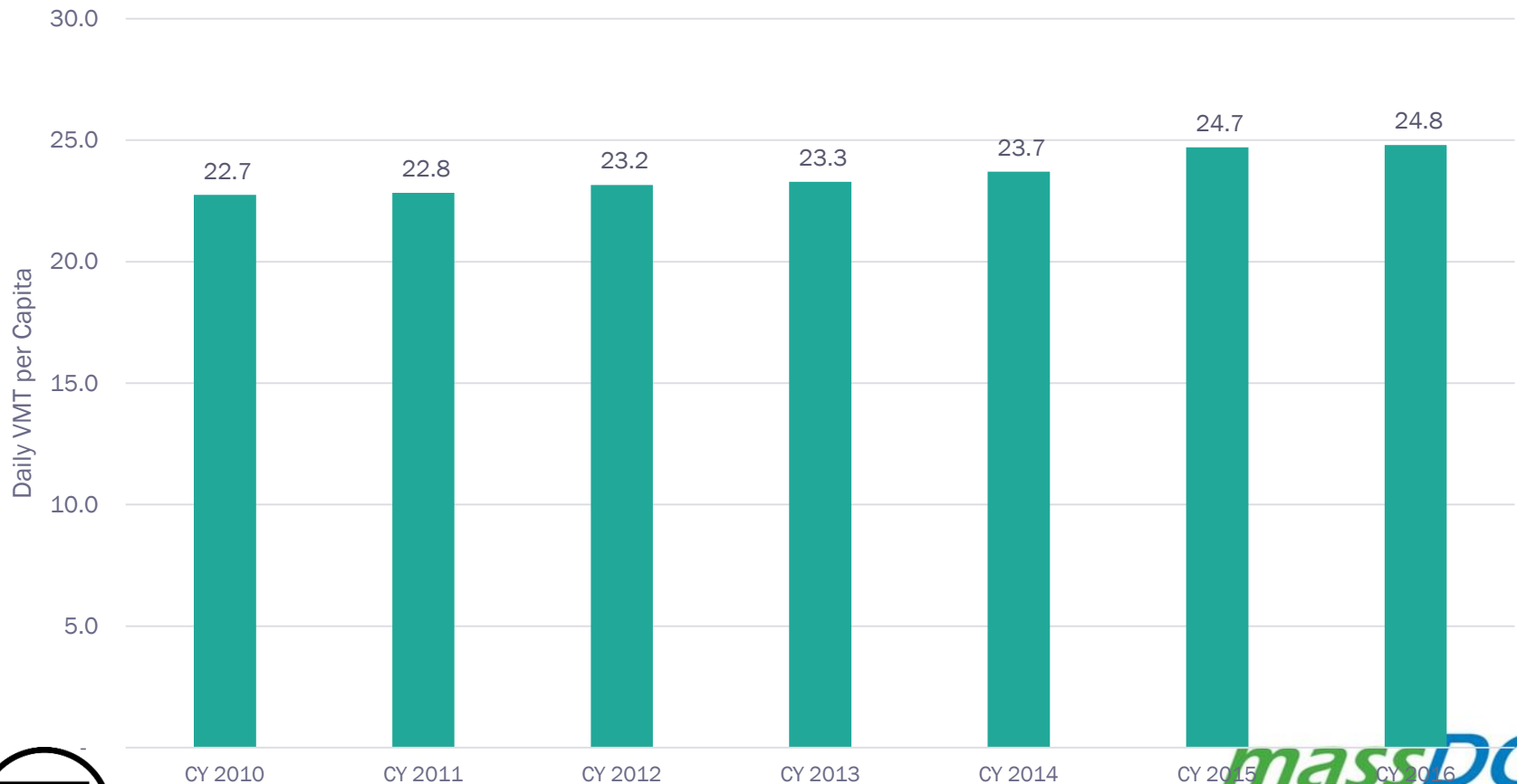
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CO2 Emissions are Proportional to Vehicles Miles Traveled – And VMT is not declining

Massachusetts Daily VMT per Capita



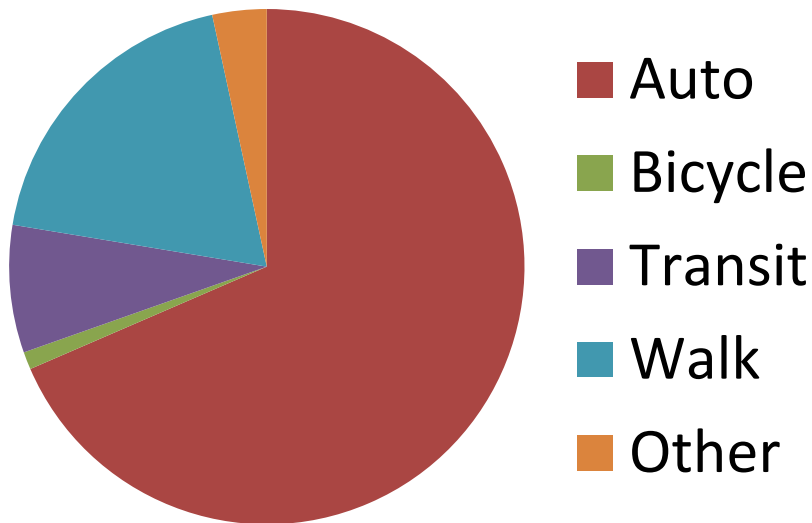
MassDOT Office of Transportation Planning



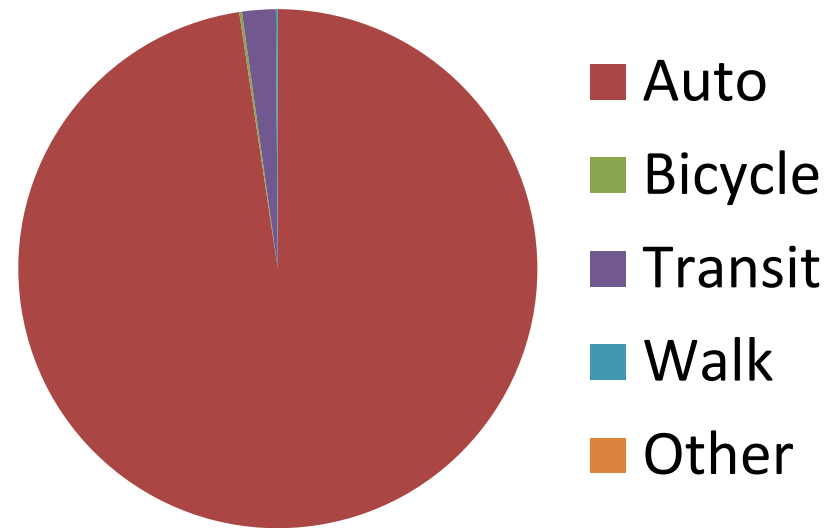
Low carbon transportation is a small proportion of travel in Massachusetts

Scale of Walking/Biking/Transit

% of All Trips



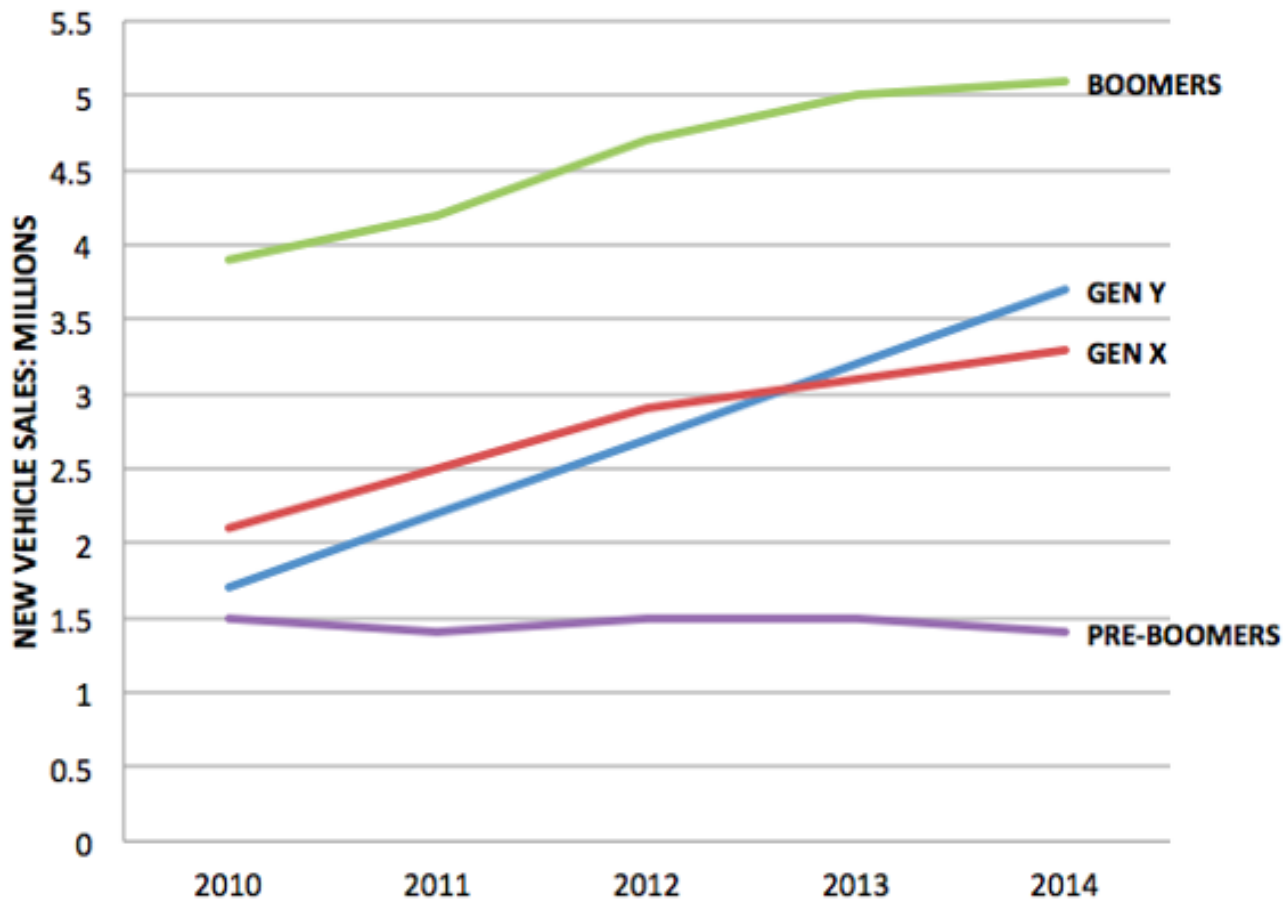
% of Total Miles Traveled



Source: 2011 Massachusetts Household Travel Survey



Demographics may or may not help: The curve does not bend itself



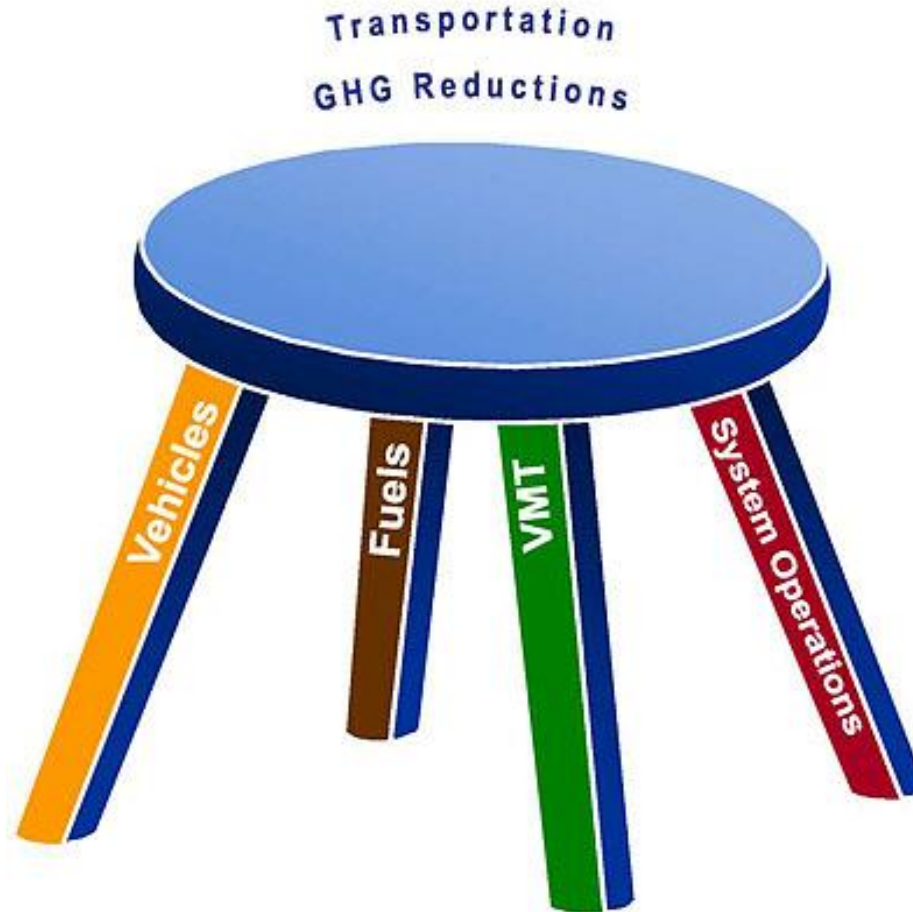
“[W]e failed to anticipate the fierce undertow of the status quo. Young people are still buying cars, they're still moving out to the suburbs, and they're still looking to buy houses in the sunny swoosh that extends from the Carolinas, through Texas, and up into the northwest.”

Derek Thompson
The Atlantic

April 21, 2015



Actions for reducing transportation GHG

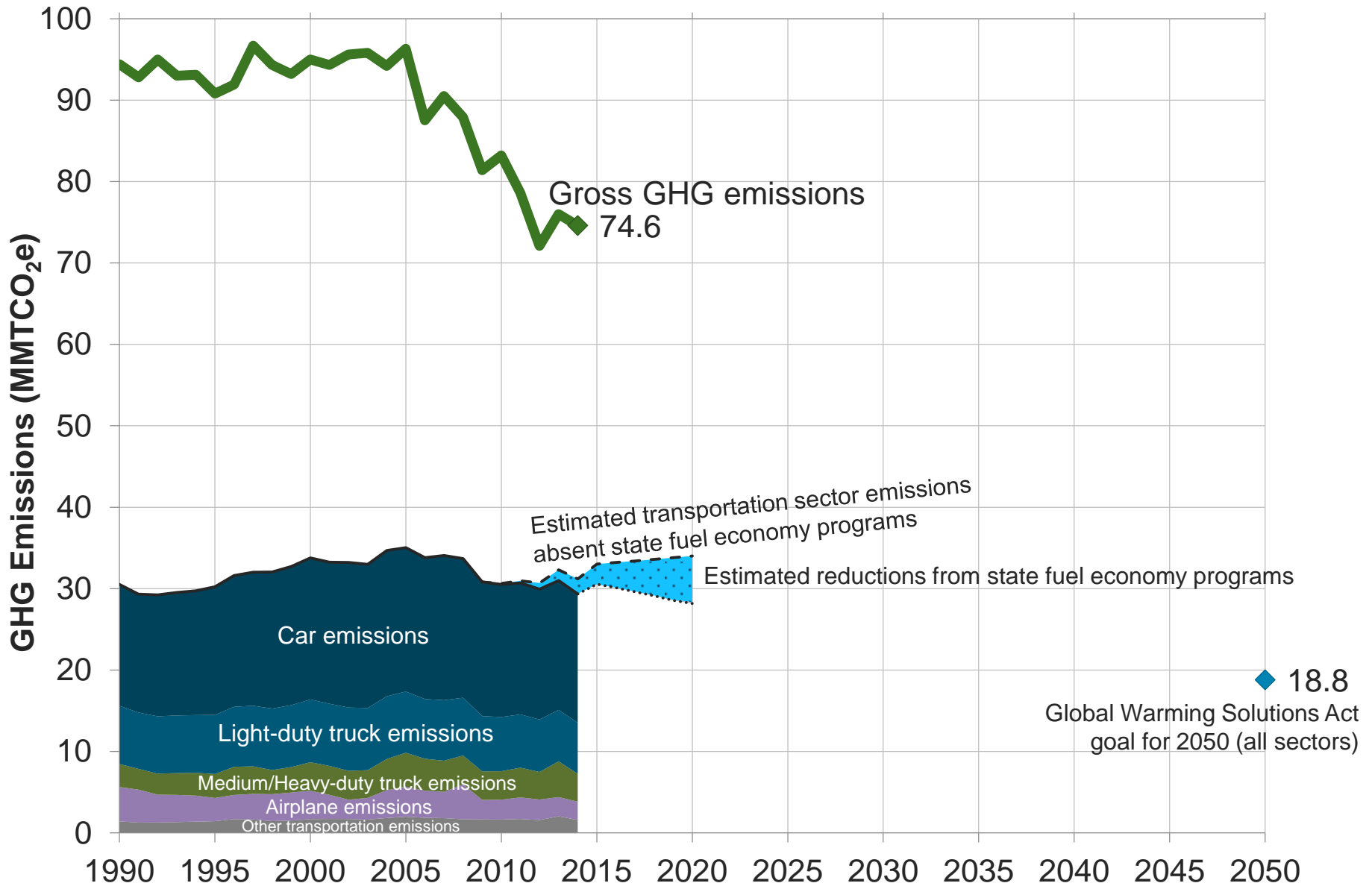


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Fuels:

Projected Emissions and Reductions from Existing Policies



Expanding Zero Emissions Vehicle Infrastructure to Encourage Adoption

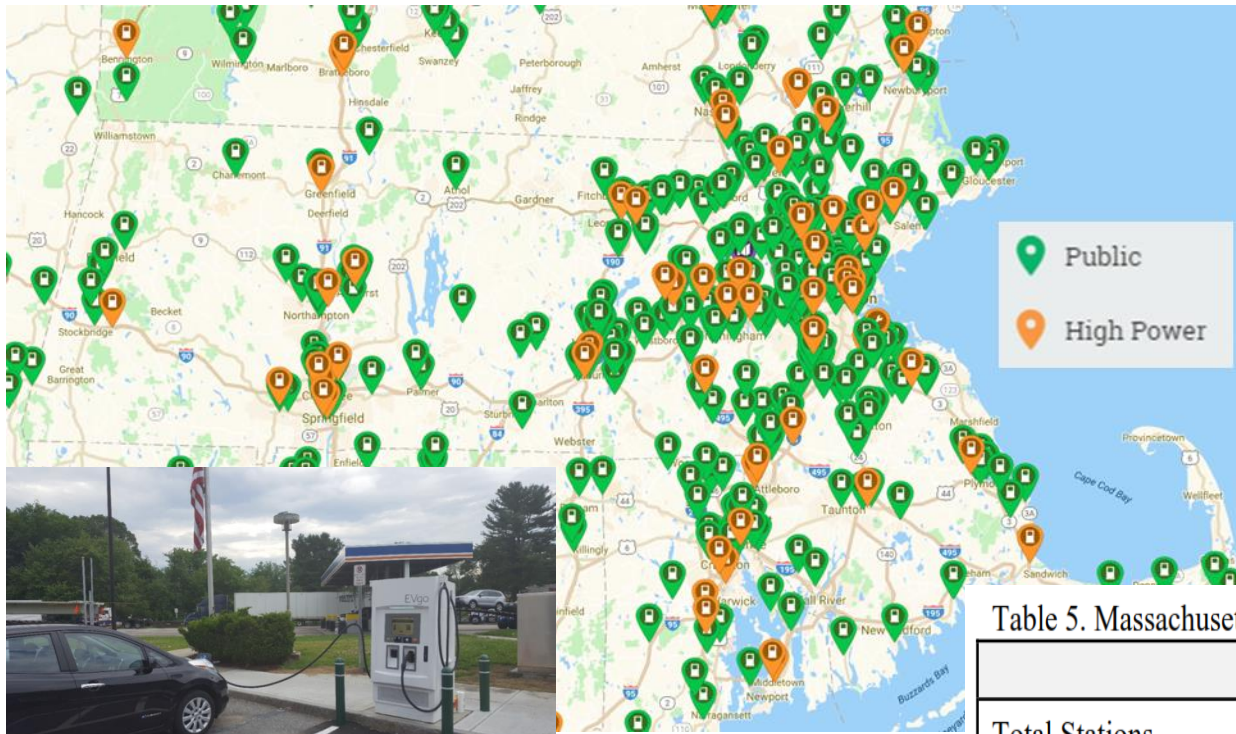


Table 5. Massachusetts public access EVSE statistics.^h

	Level 1	Level 2	DCFC	Total
Total Stations	52	586	55	693
Total Plugs	56	1,036	83	1,175
Average Plugs/Station	1.08	1.77	1.51	1.45

Source: [Wagner, F., Francfort, J., & White, S. \(2016\).](#)



I-95 Fast-Charge ARC:
 Connecting Boston and Washington D.C.
 9 fast-charge sites
 50 total charging stations
 2 fast-charge plugs per station



Creating better transportation options to promote lower carbon transportation

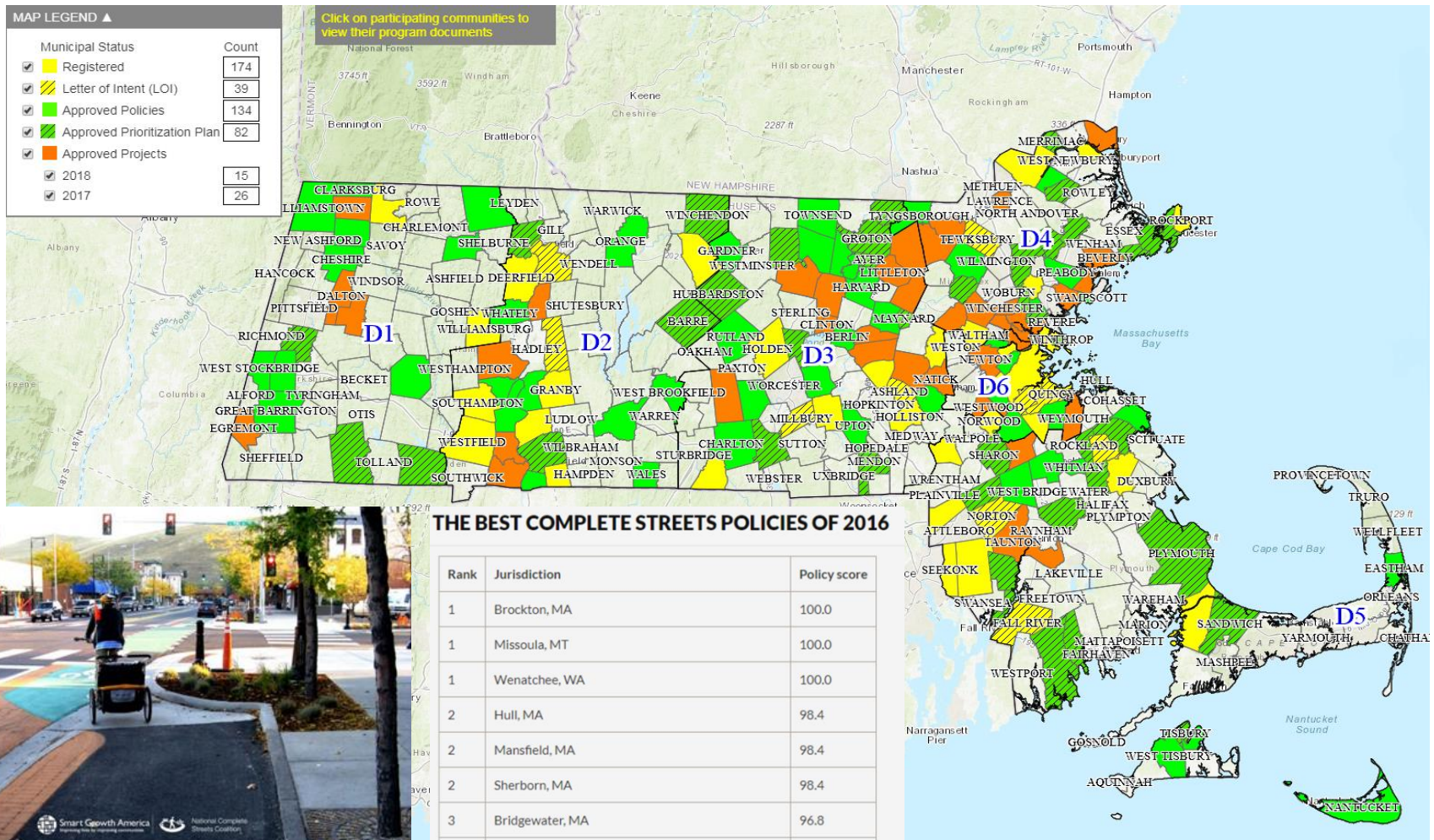
- Bicycle and Pedestrian Planning and Investments
- MassRides
- Safe Routes to School
- Operating and Capital support for Regional Transit Authorities
- Operating support for Transportation Management Associations
- Complete Streets program for cities and towns



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Complete Streets Program



Climate Resiliency



MassDOT Actions on Climate Resiliency

- Designated a Climate Coordinator (Assistant Secretary Kate Fichter)
- Collaborating and supporting EEA's state-wide resiliency initiatives
 - State hazard mitigation and climate adaptation plan
- Carried out pilot studies in selected coastal and inland areas
- Already in the process of assessing our assets' risks to extreme weather and climate changes state-wide
- Engaging external stakeholders and sharing our modeling results
- Climate impacts are already considered in recent long-term transportation plans (e.g. the Freight plan and Focus 40) and project-level environmental studies and conceptual designs when appropriate



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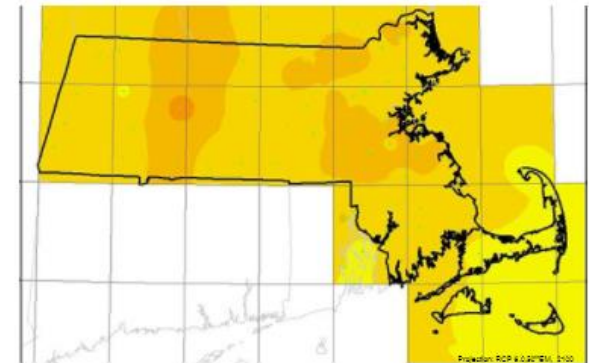
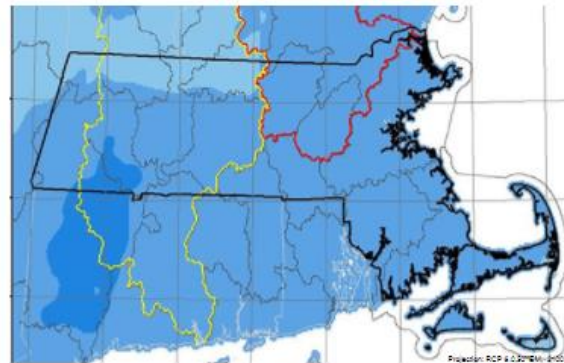


MassDOT State-wide Climate Vulnerability Assessment

- Climate risks: inland flooding and extreme heat
- Critical assets across all modes: roadways, bridges, railways, and airports
- Outputs to date:
 - Compiled down-scaled climate projections maps for the whole state
 - Completed a high-level assessment of heat impacts on transportation
 - Developed and pilot tested a prototype methodology for mapping future inland flooding



Flood damage to Rt 2 during Irene, August 2011



MassDOT climate project map viewer (<http://gis.massdot.state.ma.us/cpws>) provides three sets of climate projection maps for four future periods (2030, 2050, 2070 and 2100) and three emission scenarios .

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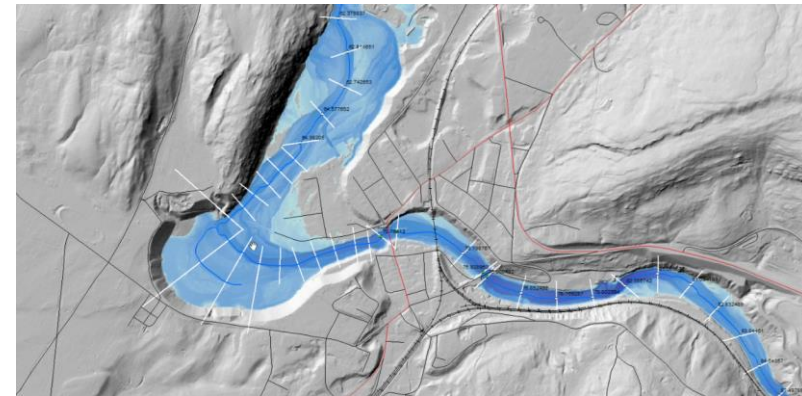
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MassDOT State-wide Climate Vulnerability Assessment (cont.)

- Current Status:
 - Prepare to map future floodplains and assess flood risks watershed by watershed
 - Expanding the current methodology to account for varied circumstances
- Expected final outputs:
 - Future 1% Annual Exceedance Probability flood maps for the inland areas of the whole state for 2030, 2050, 2070 and 2100.
 - A prioritized list of critical assets that are most vulnerable to flooding

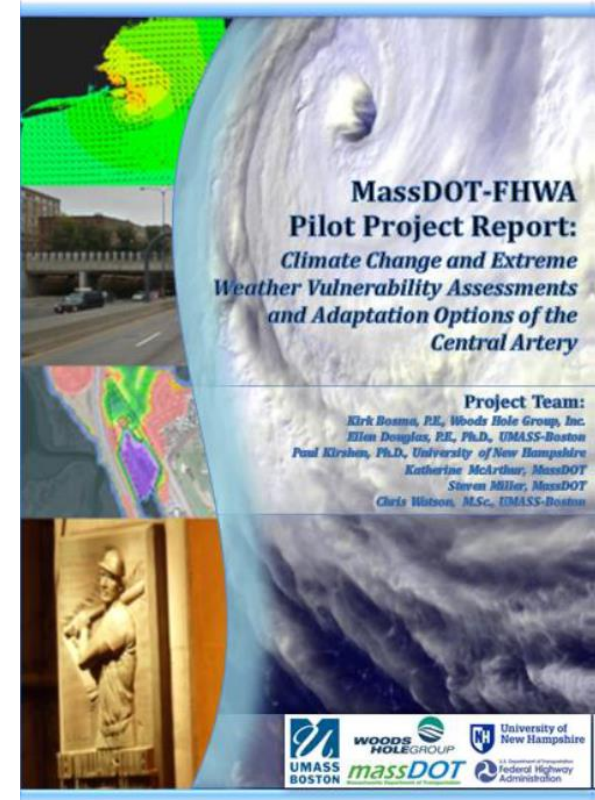
Mapping future flood plains (work in process)



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Central Artery/Tunnel Study

- Climate risk: coastal flooding caused by sea level rise and storm surge
- Asset: the Central Artery/Tunnel system
- Status: completed in June 2015
- Key results:
 - Developed the Boston Harbor Flood Risk Model (BH-FRM)
 - Created high-resolution flood exceedance probability and inundation depth maps for the study area for current year, 2030, 2050 and 2070
 - Assessed CA/T vulnerability to storm-induced coastal flooding
 - Recommended conceptual level adaptation strategies for current and future time horizons



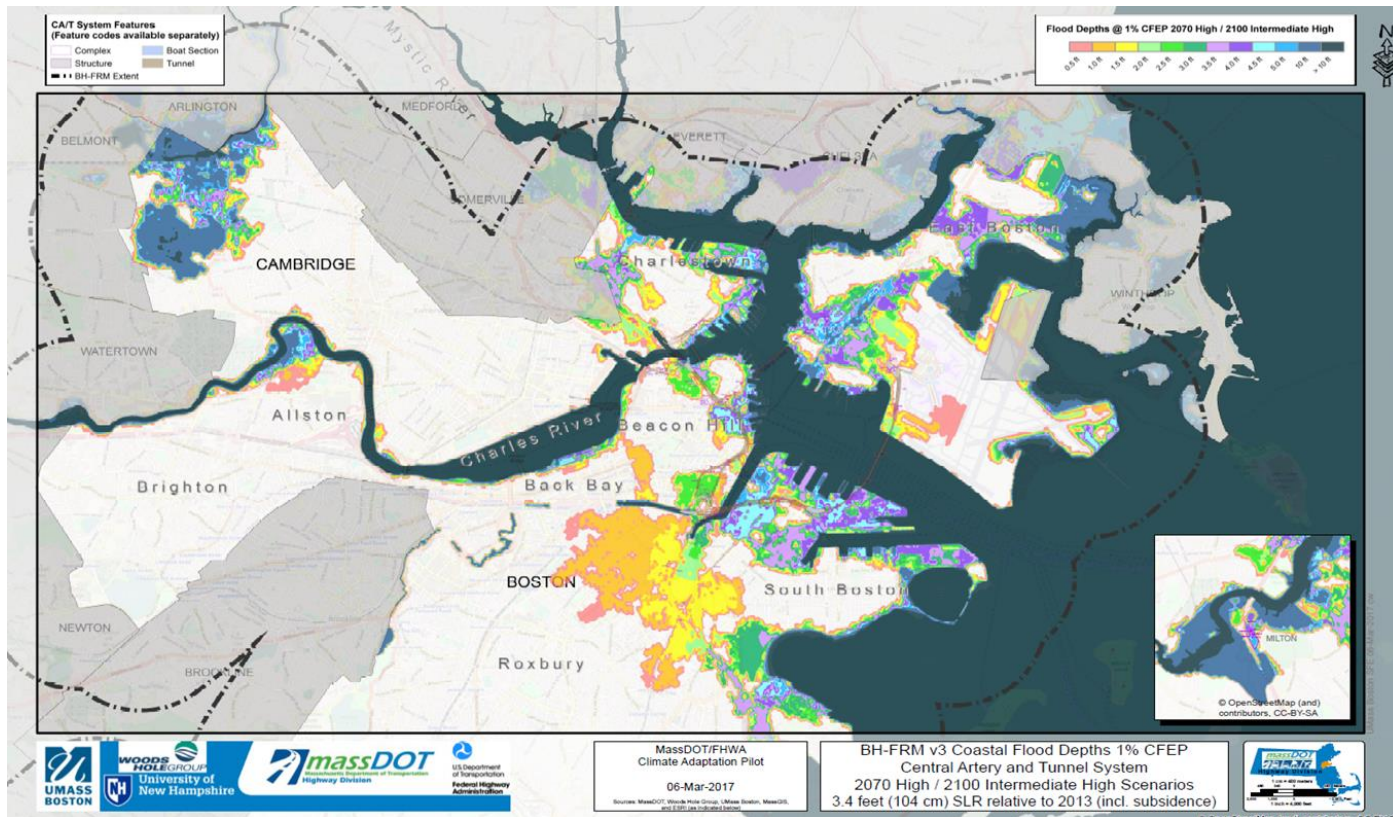
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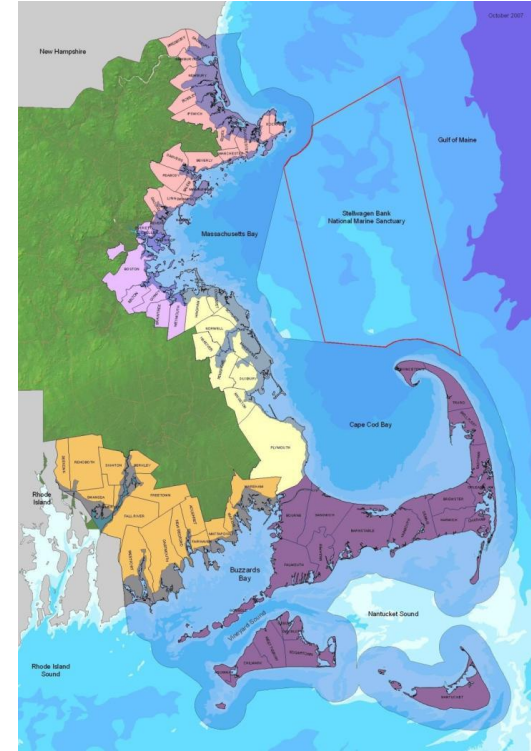
Central Artery/Tunnel Study

- MassDOT is currently considering the recommendations presented in the report as well as near-term alternatives.
- Flood modeling results have been provided to various municipalities (including Boston) and organizations to support their resiliency efforts



Coastal Transportation Vulnerability Assessment

- Extending the pilot study to the entire Massachusetts coastline
- Three objectives:
 - Examining the impacts of coastal flooding on critical assets
 - Developing conceptual protection strategies over time and by location
 - Estimating the cost of these strategies
- Three phases:
 - Phase 1: Pilot-scale analysis to develop methodologies and test modeling schemes – completed
 - Phase 2: Extension and refinement of the Boston Harbor Flood Risk Model to the full Massachusetts coastline – in process
 - Phase 3: Regional scale vulnerability analysis and conceptual adaptation strategies



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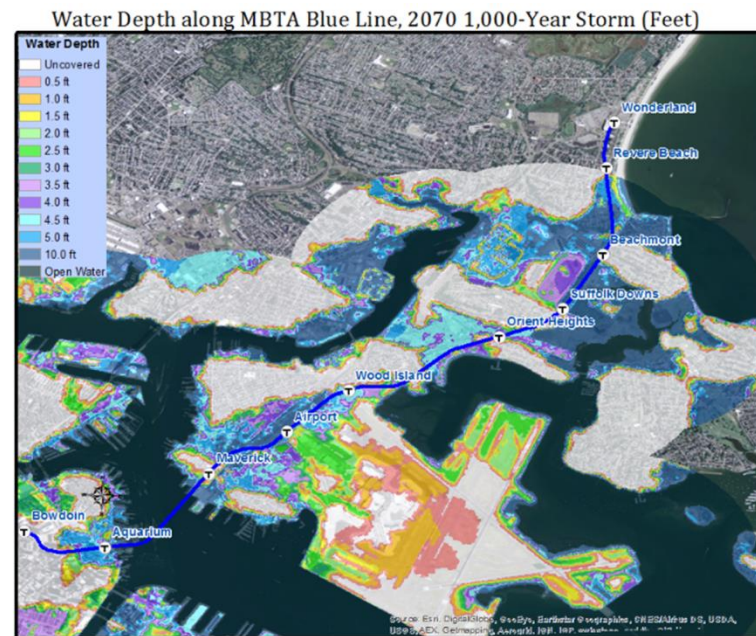


MBTA Climate Resiliency Initiatives

- Climate change resilience identified as key objective for MBTA's 2040 organizational strategy
- Current infrastructure resiliency projects:
 - Rebuild the Charlestown Seawall to protect the nearby maintenance facility
 - Enhance flood protection at the Green Line Fenway Portal
- Completed Blue Line vulnerability assessment in early 2017 (flooding risks in present day, 2030s and 2070s)



Rendering of the new Charlestown seawall

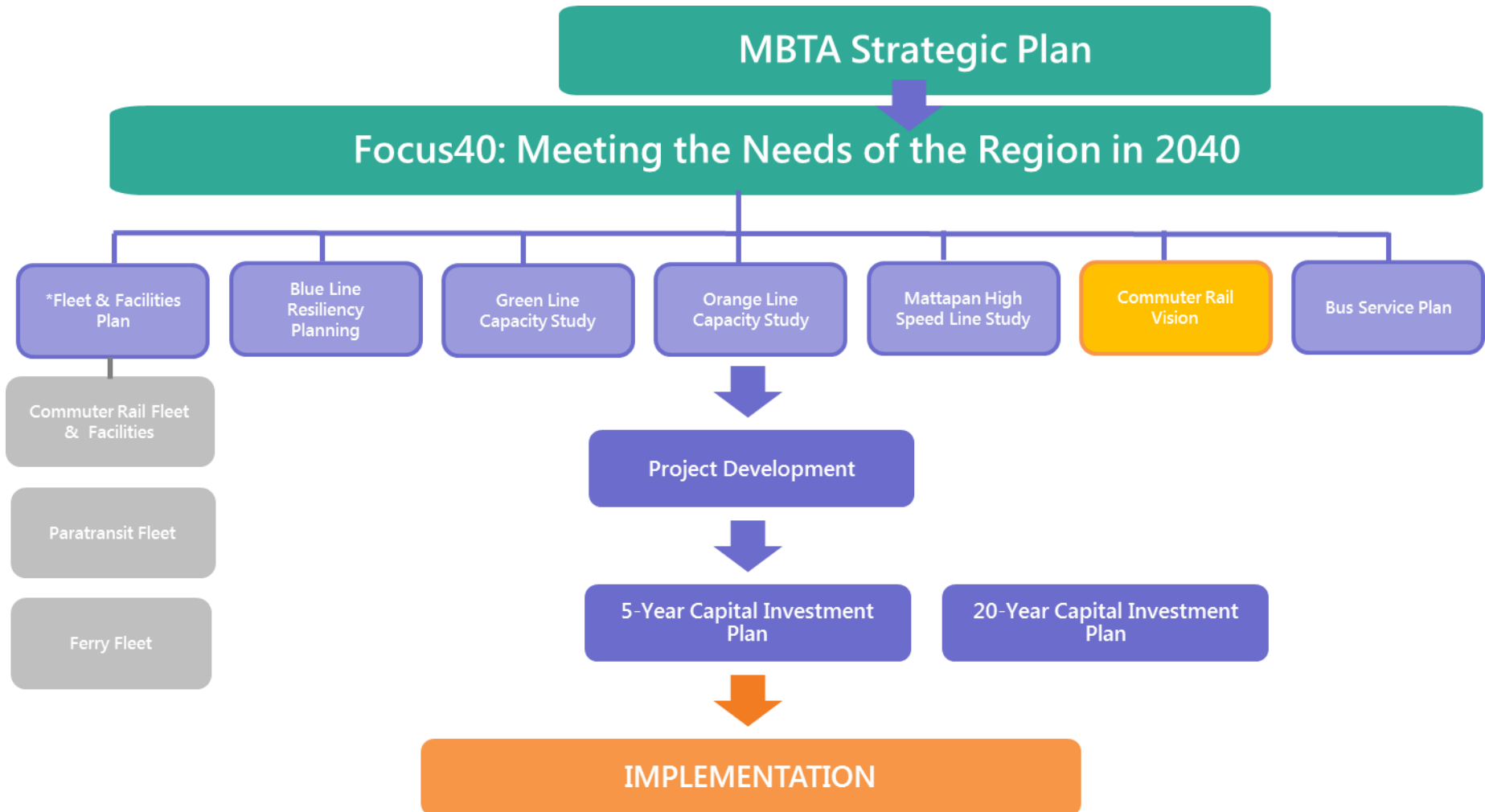


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The Future of the MBTA



MBTA Strategic, Capital and Planning Efforts

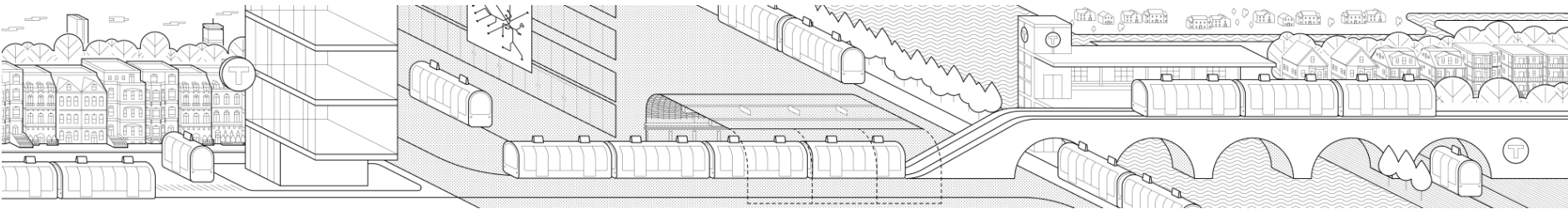


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A 25-year strategic plan for how the MBTA can **meet the needs of the region** in 2040



Focus40:

- Highlighting **long-term performance, reliability, and capacity needs**
- Strengthening **municipal partnerships** for improved transit in our region
- Conducting an extensive **public engagement** process





Team will release a draft in Spring 2018

Timeline	Task
October	Presented to FMCB on Framework and Investment Programs
November	Presented to FMCB on Priority Places and Policy Framework
December – January	Continuing MBTA engagement, finalizing programs, places, and report text, MAPC Inner Core outreach
February	Subject matter designees, Deputy GM, and GM to do final review and sign off on all Investment Programs
February – March	Continue targeted stakeholder outreach
Late March ★	Draft Release
Late March/April	Outreach on Draft Plan (30 day public comment)
May ★	Final Focus40 Release Event

 ★ = Milestones

Describe needs and opportunities, strategic investments, and implementation highlights for each Investment Program

“The Orange Line is always overcrowded, and difficult to get on and off.”

STREET TEAM / ARBOWAY COMMENTER

ADDRESSING NEEDS AND OPPORTUNITIES

Today

Future

%

STRATEGIC INVESTMENTS

Immediate

Robust

Think BIG!

Equity

Mobility

Prosperity

Climate

Stewardship

IMPLEMENTATION HIGHLIGHTS

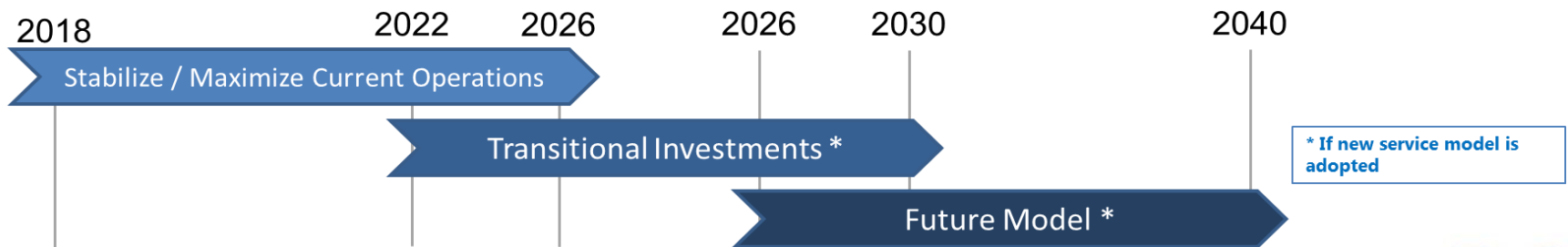
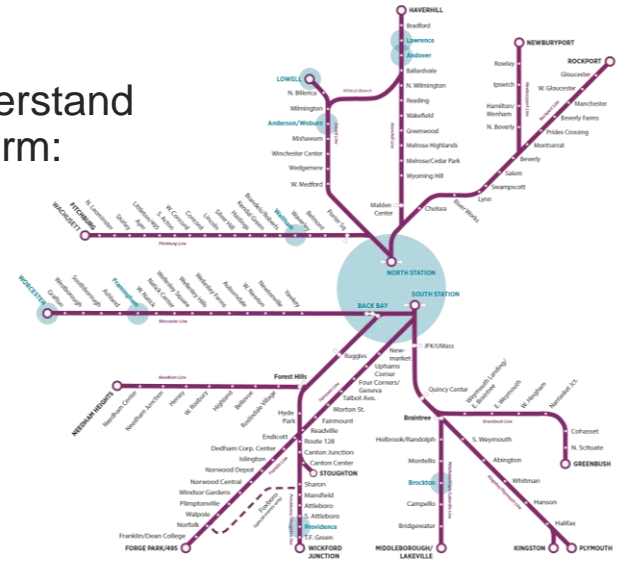
1-5 Years

5-10 Years

10+ Years

Commuter Rail Vision Study

- Purpose of the Commuter Rail Vision study is to better understand the future of commuter rail infrastructure and service to inform:
 - Capital investments (including fleet procurement)
 - Appropriate system design, schedule, and operations
 - Procurement of the next operating contract
- Key Questions:
 - What is the long-term demand/market for rail service?
 - What types of service make sense under various market conditions and different assumptions about infrastructure?
 - What infrastructure upgrades would be necessary to deliver new types of service?

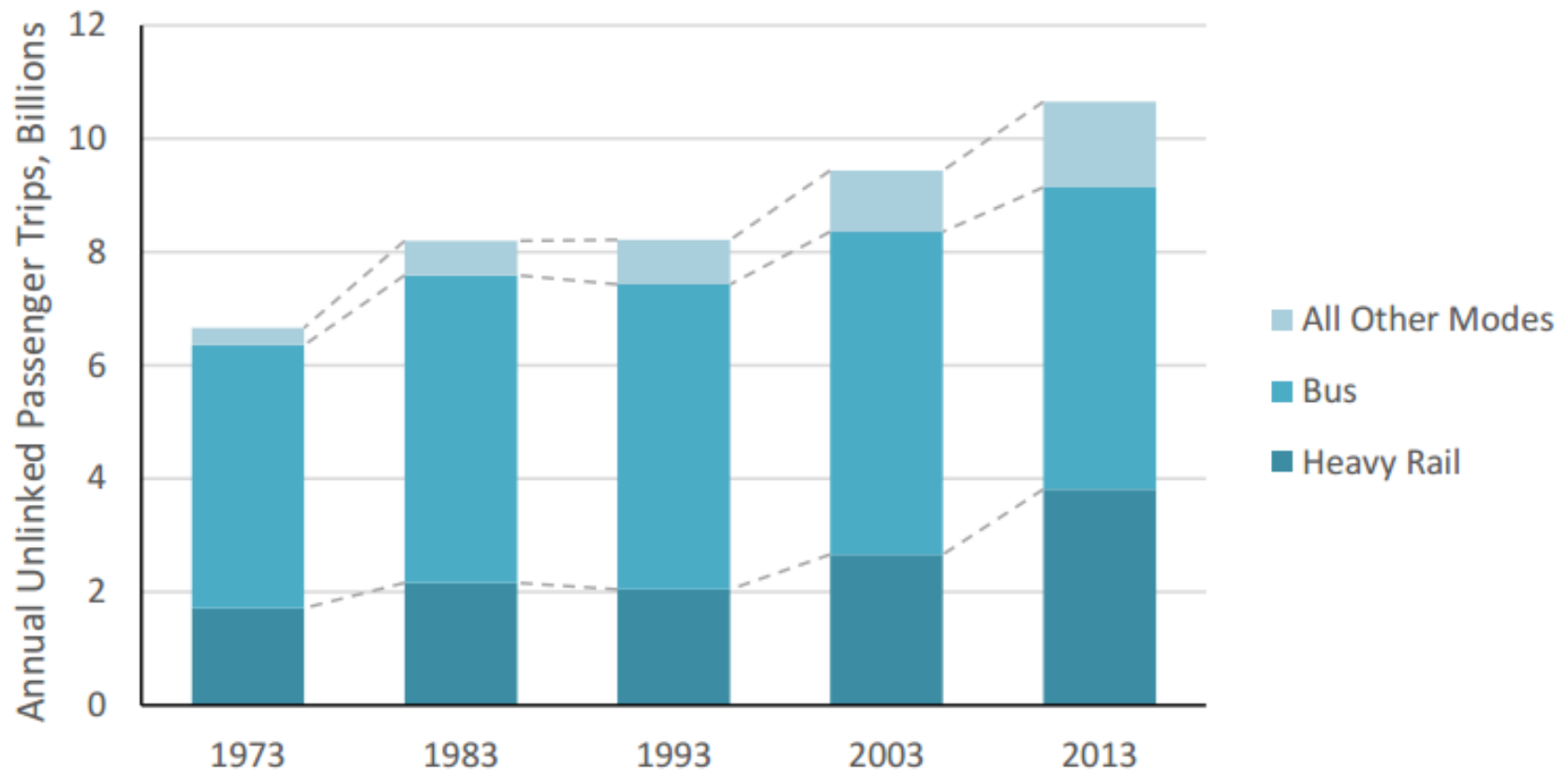


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Transit Ridership Trends



What is happening to transit ridership? Nationally, ridership has been rising . . .



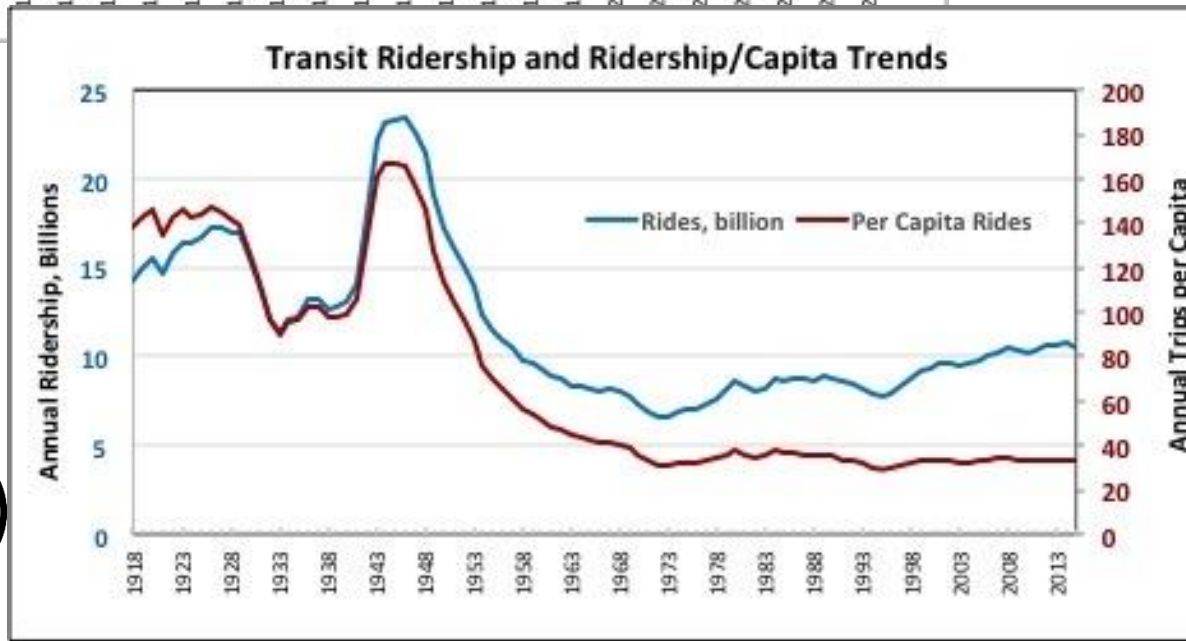
Source: APTA 2015 Public Transportation Fact Book



... But not as much as expected given capital investment and population growth



Source: APTA 2015 *Public Transportation Fact Book*
and *Public Transportation Ridership: Three Steps Forward, Two Steps Back?*, Steven Polzin

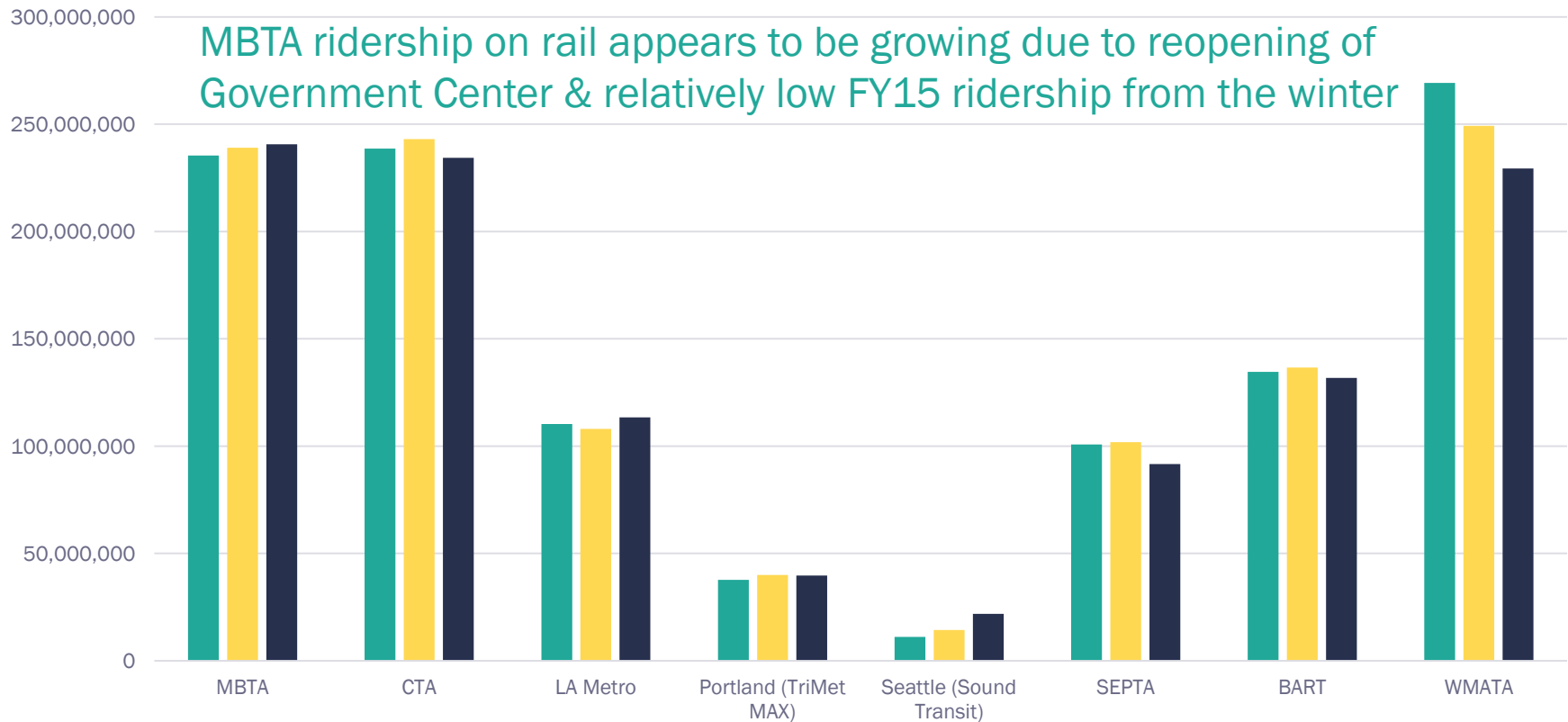


MBTA ridership analysis and projections

- In order to inform planning for future capacity, MBTA staff has been analyzing recent ridership trends and projecting future ridership
- An analysis of ridership trends at the MBTA and peer systems for fiscal years 2015-2017 found that
 - MBTA trends are in line with national trends
 - Peak ridership is not decreasing on the subway
 - Ridership declines occurred primarily during off-peak hours and on buses
 - Ridership changes not uniform by bus route
 - Reliability and proportion of riders paying reduced fare significant
- In a regular survey of a panel of MBTA riders, approximately 30% reported that use of ride-hailing services reduced their use of the MBTA



Recent heavy and light rail ridership trends



FY15-FY17 Change

FY15 FY16 FY17

2.2%

-1.8%

2.7%

5.0%

+49.1%

-9.8%

-2.2%

-17.4%

National Transit Database, with preliminary monthly FY17 data

Seattle opened new service



Recent bus ridership trends



FY15-FY17 Change

FY15 FY16 FY17

-6.8%

-8.9%

-17.46%

-4.01%

-7.7%

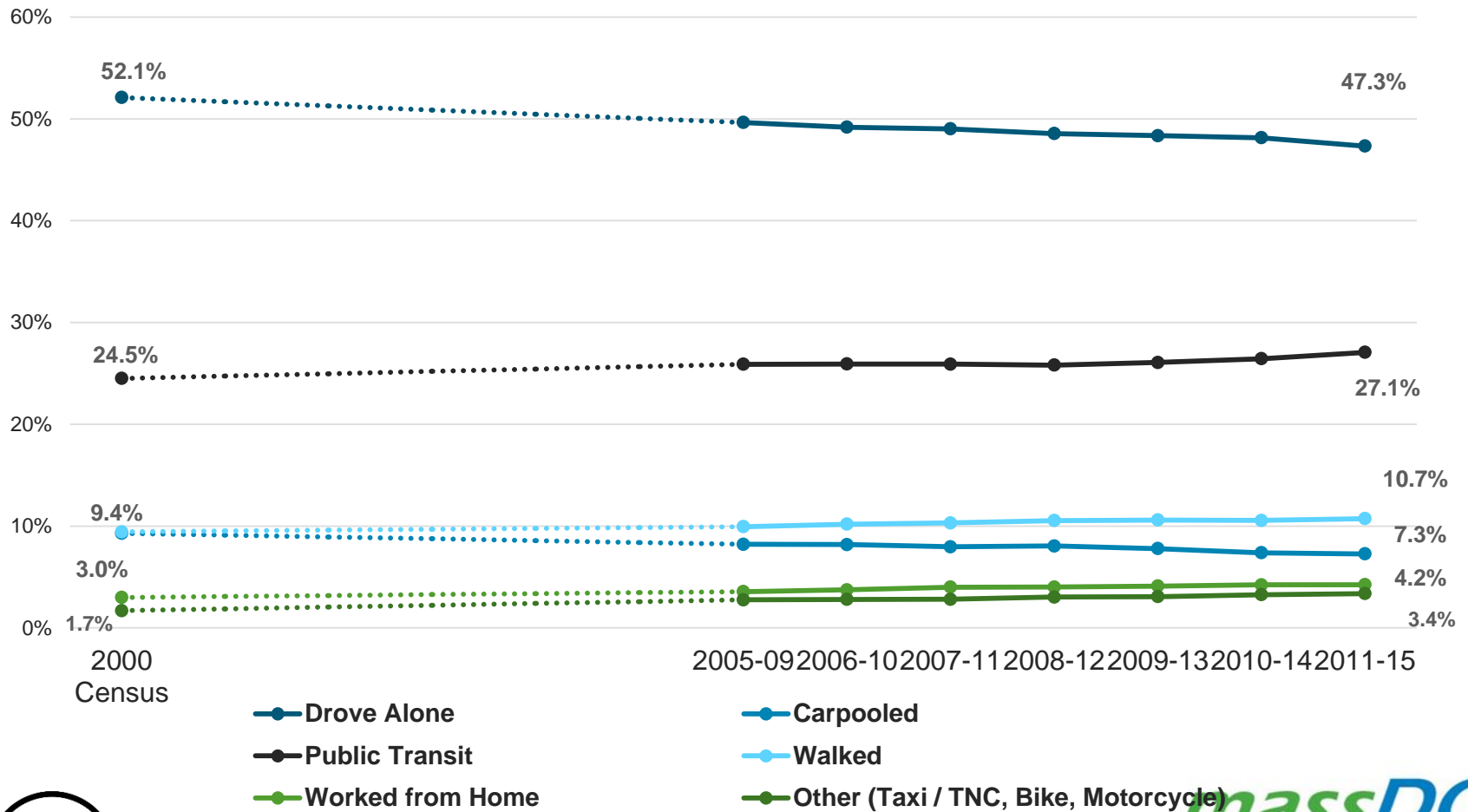
0.06%

-10.08%

National Transit Database, with preliminary monthly FY17 data



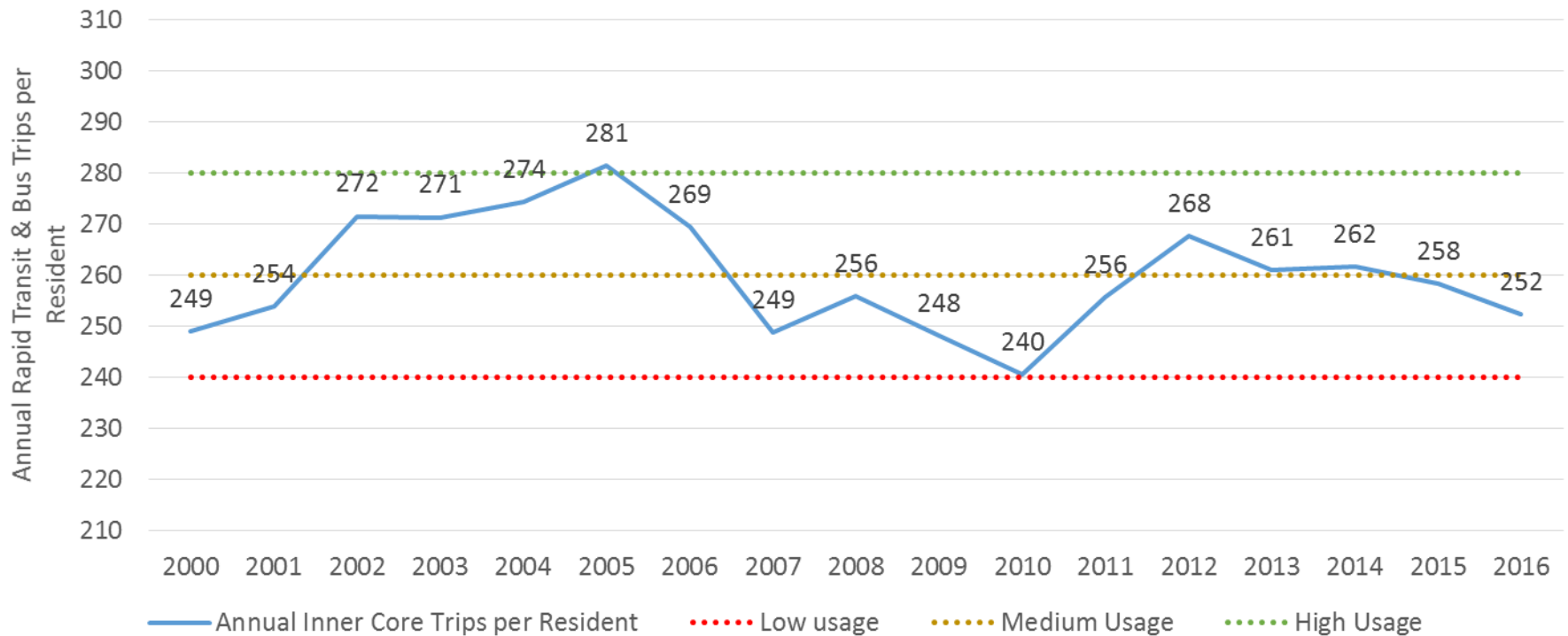
Good news: Transit's share of the commute to work is increasing in the 17 inner core communities near Boston



Source: US Census and American Community Survey, 17 inner core communities



Bad news: Trips per resident is down in Boston-area core communities

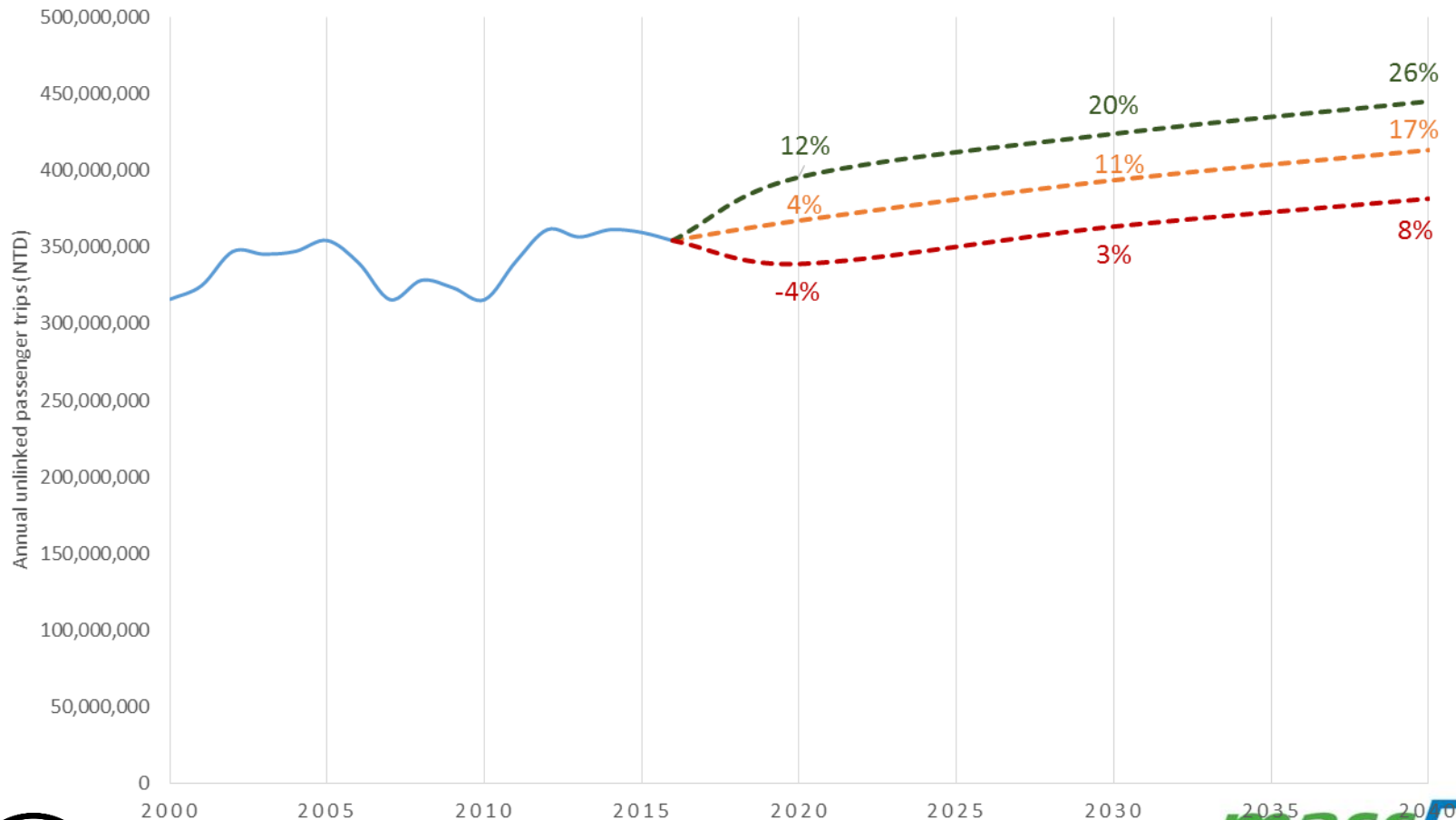


Usage rate down to recession levels while unemployment is lower

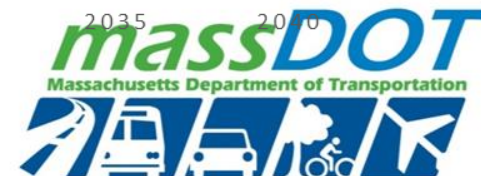


Projecting ridership based on population projections in core communities

MBTA RAPID TRANSIT & BUS RIDERSHIP PROJECTIONS

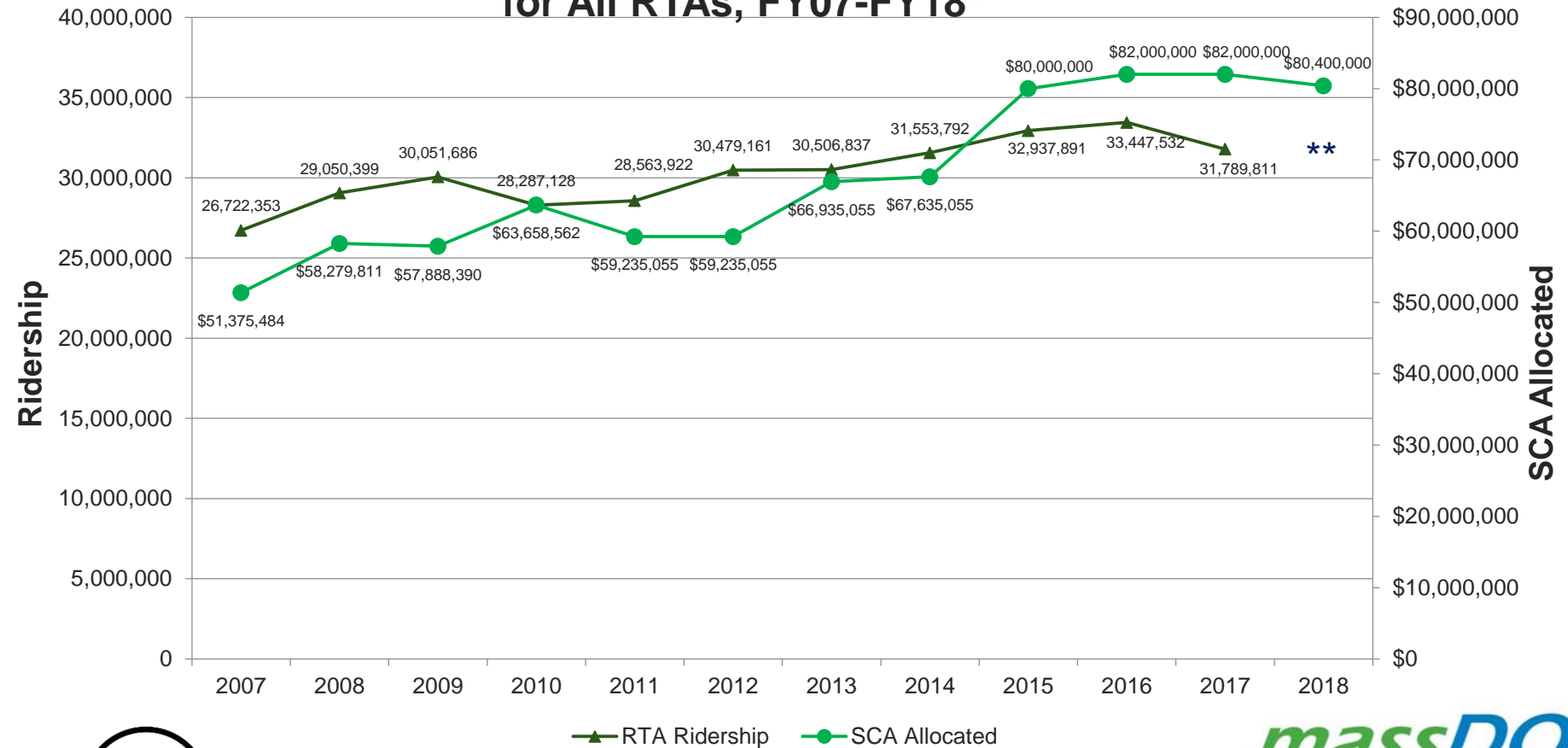


Medium usage projection was used as an input to Focus40 and Integrated Fleet and Facilities Plan. Assumes stronger population growth



RTA Ridership 2007-2018

**Total Ridership and State Contract Assistance Allocation
for All RTAs, FY07-FY18***



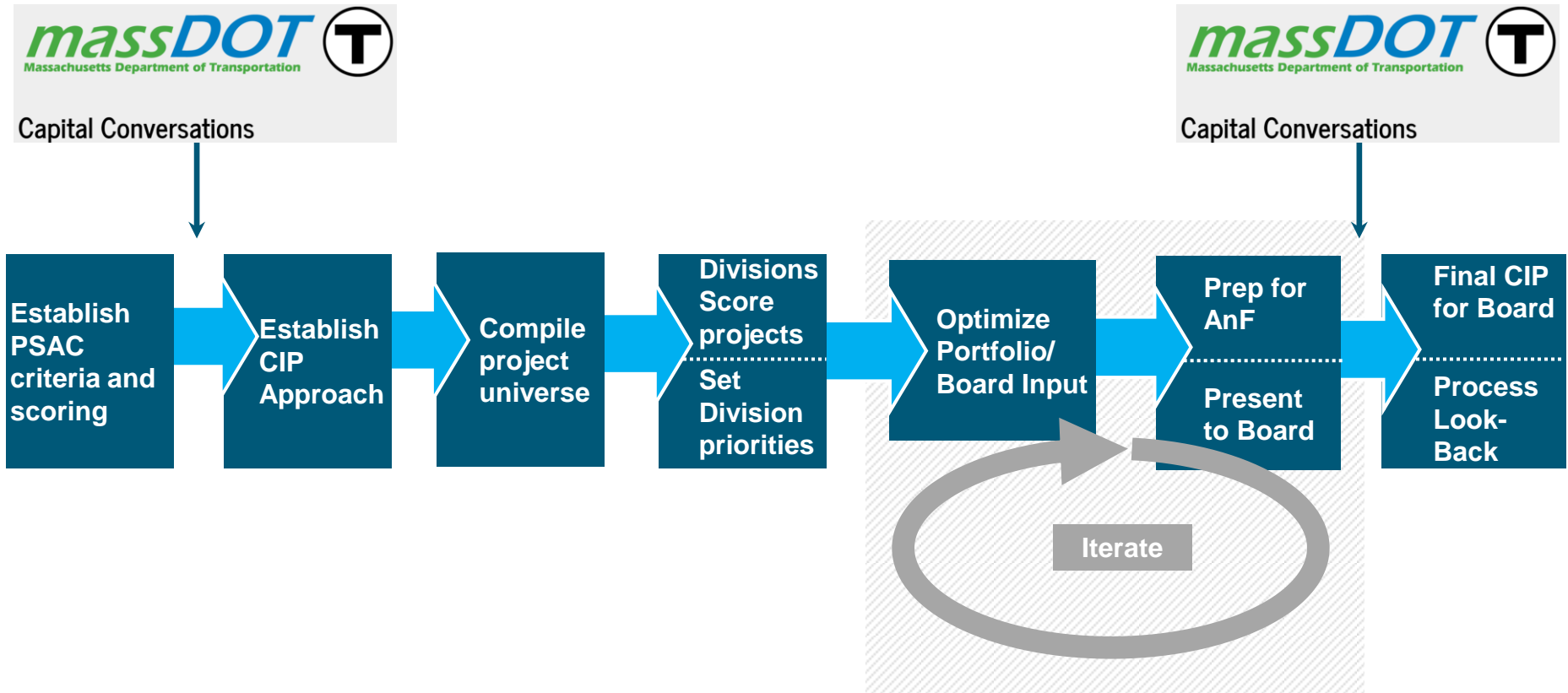
*FY14 figure does not include debt repayment bonus

**FY18 total ridership statistics not yet available

Appendix: Reinventing Capital Planning at MassDOT and the MBTA



Capital planning process



Project Selection Advisory Council

Recommendations for MassDOT Project Selection Criteria

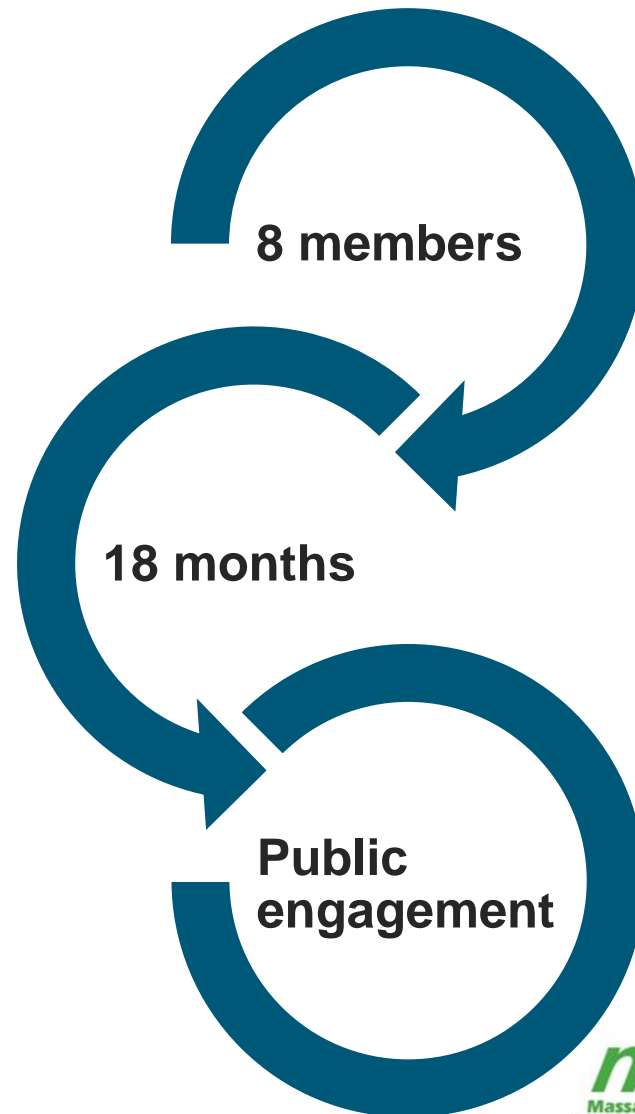
Project Selection Advisory Council Report to the Legislature

Stephanie Pollack, Chair
Frank DePaola
Linda Dunlavy
Jim Lovejoy
David Mohler
John M. Pourbaix
Jeffrey B. Mullan
Stephen Silveira

July 1, 2015



1005-5012



Engage customers and stakeholders

Capital Improvement Plan Public Comments

Map Description

The Capital Conversations resulted in over 1300 comments across the Commonwealth on a wide range of topics, ideas, concerns and customer priorities. MassDOT is thankful for the robust participation and is now analyzing the comments so that they can inform the 2017-2021 Capital Improvement Program. While completing that process, MassDOT wanted to give our customers the opportunity to explore the comments shared with us. To view this information in an accessible format, [visit the tabular data page](#).



Total Comments

1,419

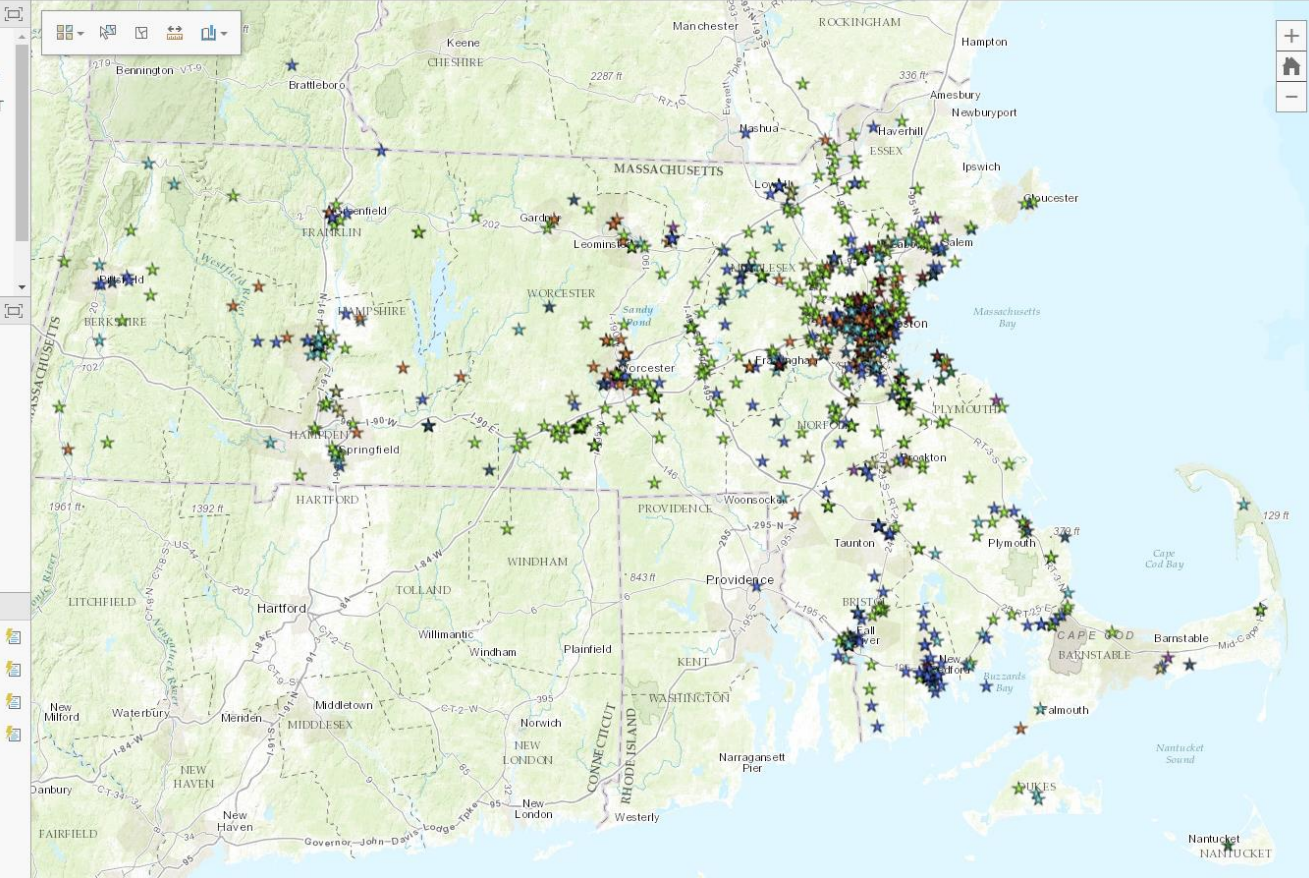
Queries

Transportation Mode

Comment Topic

Topic and Mode

Topic or Mode



Compile a universe of potential investments

Dist	Project Name	Priority	Program	Phase	Origin	Division	Project Type	Score	Total Cost	Location	Jurisdiction
HWY	SPENCER- RESURFACING & RELATED WORK ON ROUTE 31 (MAPLE ST) 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Bond Bill	Hwy Reconstr - Restr and Rehab		38	\$ 94,051.80	SPENCER	Municipality
HWY	SPENCER- RESURFACING & RELATED WORK ON ROUTE 31 (MAPLE ST) 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Bond Bill	Hwy Reconstr - Restr and Rehab		38	\$ 3,897,707.84	SPENCER	Municipality
HWY	SPENCER- RESURFACING & RELATED WORK ON ROUTE 31 (MAPLE ST) 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Bond Bill	Hwy Reconstr - Restr and Rehab		38	\$ 974,426.96	SPENCER	Municipality
HWY	STOUGHTON- RECONSTRUCTION OF TURNPIKE STREET	2: Modernization	ROADWAY RECONSTRUCTION	Design	TIP Appendi	Hwy Reconstr - Restr and Rehab		38.25	\$ 12,000,250.00	STOUGHTON	MassDOT
HWY	HADLEY- PEDESTRIAN SIGNAL INSTALLATION AT 2 LOCATIONS ALONG 2: Modernization	2: Modernization	INTERSECTION SAFETY	Design	L RTP	Traffic Signals		38.25	\$ 119,000.00	HADLEY	MassDOT
HWY	SALEM- RECONSTRUCTION BRIDGE STREET, FROM FLINT STREET TO V 3: Expansion	3: Expansion	CAPACITY	Design	TIP Appendi	Hwy Reconstr - Added Capacity		38.5	\$ 23,405,953.08	SALEM	Municipality
HWY	LAWRENCE- NORTH ANDOVER- RESURFACING & RELATED WORK ON I 1: Reliability	1: Reliability	NON INTERSTATE DOT PAVEMEN	Design	L RTP	Resurfacing DOT Owned Non-Interstate		38.5	\$ 885,500.00	LAWRENCE- NORTH ANDOVER	MassDOT
HWY	NORWOOD- INTERSECTION IMPROVEMENTS @ ROUTE 1A & UPLAND 2: Modernization	2: Modernization	INTERSECTION SAFETY	Design	TIP Appendi	Traffic Signals		38.75	\$ 3,021,241.65	NORWOOD	MassDOT
HWY	BUCKLAND- CHARLEMONT- RESURFACING & RELATED WORK ON ROU 1: Reliability	1: Reliability	NON INTERSTATE DOT PAVEMEN	CIP REC	MassDOT	Resurfacing DOT Owned Non-Interstate		38.8	\$ 148,961.55	CHARLEMONT	MassDOT
HWY	BUCKLAND- CHARLEMONT- RESURFACING & RELATED WORK ON ROU 1: Reliability	1: Reliability	NON INTERSTATE DOT PAVEMEN	CIP REC	MassDOT	Resurfacing DOT Owned Non-Interstate		38.8	\$ 7,156,410.55	CHARLEMONT	MassDOT
HWY	BUCKLAND- CHARLEMONT- RESURFACING & RELATED WORK ON ROU 1: Reliability	1: Reliability	NON INTERSTATE DOT PAVEMEN	CIP REC	MassDOT	Resurfacing DOT Owned Non-Interstate		38.8	\$ 1,789,102.64	CHARLEMONT	MassDOT
HWY	BUCKLAND- RECONSTRUCTION & MINOR WIDENING ON CONWAY ST 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	TIP Appendi	Hwy Reconstr - Minor Widening		39	\$ 4,730,000.00	BUCKLAND	Municipality
HWY	BOSTON- BROOKLINE- MULTI-USE PATH CONSTRUCTION ON N 1: Expansion	1: Expansion	MULTI USE PATH	CIP REC	Municipal	Bikeway/Bike Path Construction		39	\$ 1,609,794.17	BOSTON- BROOKLINE	Municipality
HWY	BOSTON- BROOKLINE- MULTI-USE PATH CONSTRUCTION ON N 1: Expansion	1: Expansion	MULTI USE PATH	CIP REC	Municipal	Bikeway/Bike Path Construction		39	\$ 402,448.54	BOSTON- BROOKLINE	Municipality
HWY	BEVERLY- MANCHESTER-BY-THE-SEA- RESURFACING & RELATED WORK ON ROUTE 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	MassDOT	Hwy Reconstr - Restr and Rehab		39.25	\$ 2,300,000.00	BEVERLY- MANCHESTER-BY-THE-SEA	MassDOT
HWY	SUDBURY- INTERSECTION IMPROVEMENTS @ ROUTE 20 & HIND 2: Modernization	2: Modernization	INTERSECTION SAFETY	Design	TIP Appendi	Traffic Signals		39.5	\$ 1,586,471.20	SUDBURY	MassDOT
HWY	GROVELAND- RECONSTRUCTION ON ROUTE 1 (SCHOOL STREET) 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	Municipal	Hwy Reconstr - No Added Capacity		39.5	\$ 3,300,000.00	GROVELAND	Municipality
HWY	DENNIS- CORRIDOR AND STREETSCAPE IMPROVEMENTS ON MAIN ST 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	Municipal	Hwy Reconstr - Minor Widening		39.5	\$ 4,125,000.00	DENNIS	MassDOT
HWY	DRACUT- IMPROVEMENTS ON NASHUA ROAD 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Municipal	Roadway - Reconstr - Sidwalks and Curb		39.5	\$ 4,857,600.00	DRACUT	Municipality
HWY	DRACUT- IMPROVEMENTS ON NASHUA ROAD 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Municipal	Roadway - Reconstr - Sidwalks and Curb		39.5	\$ 1,214,400.00	DRACUT	Municipality
HWY	HARDWICK- RESURFACING & RELATED WORK ON THE GILBERTVILLE ST 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	TIP Appendi	Hwy Reconstr - Restr and Rehab		39.75	\$ 3,230,800.00	HARDWICK	Municipality
HWY	PAXTON- RECLAMATION ON ROUTE 31 (OLDEN ROAD) 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Municipal	Reclamation		39.75	\$ 41,319.00	PAXTON	Municipality
HWY	PAXTON- RECLAMATION ON ROUTE 31 (OLDEN ROAD) 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Municipal	Reclamation		39.75	\$ 3,099,538.02	PAXTON	Municipality
HWY	PAXTON- RECLAMATION ON ROUTE 31 (OLDEN ROAD) 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Municipal	Reclamation		39.75	\$ 7,000,000.00	PAXTON	Municipality
HWY	LEVERETT- RESURFACING & RELATED WORK ON STATE ST 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	TIP Appendi	Hwy Reconstr - Restr and Rehab		40	\$ 575,000.00	LEVERETT	MassDOT
HWY	HAVERHILL- RESURFACING & RELATED WORK ON MAIN ST 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	L RTP	Hwy Reconstr - Restr and Rehab		40.25	\$ 2,901,800.00	HAVERHILL	Municipality
HWY	COHASSET/SCITUATE- CORRIDOR IMPROVEMENTS AND RELATED WC 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	TIP Appendi	Hwy Reconstr - Minor Widening		40	\$ 3,600,000.00	COHASSET	MassDOT
HWY	ORANGE- RECONSTRUCTION OF NORTH MAIN STREET, FROM SCHOOL 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Municipal	Hwy Reconstr - Restr and Rehab		40.5	\$ 4,000,129.15	ORANGE	Municipality
HWY	ORANGE- RECONSTRUCTION OF NORTH MAIN STREET, FROM SCHOOL 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Municipal	Hwy Reconstr - Restr and Rehab		40.5	\$ 1,004,032.29	ORANGE	Municipality
HWY	GILL- GREENFIELD- IMPROVEMENTS ON GRADES ON ROUTE 2 FROM 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	TIP Appendi	Hwy Reconstr - No Added Capacity		41	\$ 2,498,518.50	GILL- GREENFIELD	MassDOT
HWY	AMHERST- PELHAM- RESURFACING & RELATED WORK ON ROUTE 9 FROM 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	Municipal	Hwy Reconstr - Restr and Rehab		41	\$ 1,932,000.00	AMHERST- PELHAM	Municipality
HWY	ERVING- RECONSTRUCTION & IMPROVEMENTS ON ROUTE 2 (FARLEY 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	TIP Appendi	Hwy Reconstr - No Added Capacity		41	\$ 6,437,250.00	ERVING	MassDOT
HWY	BOURNE- MEDIAN INSTALLATION ON ROUTE 1A (HYWAY) 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	TIP Appendi	Hwy Reconstr - No Added Capacity		41.5	\$ 1,700,000.00	BOURNE	MassDOT
HWY	TEWKSBURY- RESURFACING AND SIDEWALK RECONSTRUCTION ON R 1: Reliability	1: Reliability	NON INTERSTATE DOT PAVEMEN	Design	MassDOT	Resurfacing		41.5	\$ 1,600,000.00	TEWKSBURY	MassDOT
HWY	PEMBROKE- REHABILITATION OF ROUTE 36 (CENTER STREET) FROM 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	TIP Appendi	Hwy Reconstr - No Added Capacity		41.75	\$ 2,000,000.00	PEMBROKE	Municipality
HWY	QUINCY- CONSTRUCTION OF NEW CONNECTION ON ROUTE 1 FROM BU 3: Expansion	3: Expansion	CAPACITY	CIP REC	Municipal	New Bridge		42	\$ 900,000.00	QUINCY	Municipality
HWY	ANDOVER- LAWRENCE- RESURFACING & RELATED WORK ON ROUTE 21: Reliability	1: Reliability	NON INTERSTATE DOT PAVEMEN	Design	MassDOT	Resurfacing DOT Owned Non-Interstate		42	\$ 1,232,616.00	ANDOVER- LAWRENCE	MassDOT
HWY	LAWRENCE- INTERSECTION IMPROVEMENTS AT MARSTON STREET & 2: Modernization	2: Modernization	INTERSECTION SAFETY	Design	MassDOT	Traffic Signals		42	\$ 660,000.00	LAWRENCE	MassDOT
HWY	DANVERS- RECONSTRUCTION ON COLLINS STREET, FROM SYLVAN ST 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	TIP Appendi	Hwy Reconstr - Restr and Rehab		42.25	\$ 5,994,002.00	DANVERS	Municipality
HWY	MARLBOROUGH- INTERSECTION & SIGNAL IMPROVEMENTS ON ROU 2: Modernization	2: Modernization	INTERSECTION SAFETY	Design	TIP Appendi	Traffic Signals		42.25	\$ 1,587,900.00	MARLBOROUGH	MassDOT
HWY	BOXFORD- RECONSTRUCTION ON ROUTE 133 (WASHINGTON STREET) 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	Municipal	Hwy Reconstr - No Added Capacity		42.25	\$ 4,648,700.70	BOXFORD	Municipality
HWY	WESTWOOD- RECONSTRUCTION OF CANTON STREET AND EVERETT S 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	Design	Municipal	Hwy Reconstr - No Added Capacity		42.25	\$ 2,640,000.00	WESTWOOD	Municipality
HWY	AMESBURY- RECONSTRUCTION OF ELM STREET	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Municipal	Hwy Reconstr - No Added Capacity		42.25	\$ 8,263,068.40	AMESBURY	Municipality/MassDC
HWY	AMESBURY- RECONSTRUCTION OF ELM STREET	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Municipal	Hwy Reconstr - No Added Capacity		42.25	\$ 2,065,767.10	AMESBURY	Municipality/MassDC
HWY	PRINCETON- RECONSTRUCTION OF ROUTE 140, FROM STERLING T.L. 2: Modernization	2: Modernization	ROADWAY RECONSTRUCTION	CIP REC	Bond Bill	Reclamation		42.25	\$ 6,062,894.94	PRINCETON	Municipality



Score projects

Evaluation Criteria Description		Modernization	Capacity
System preservation	Projects should contribute to a state of good repair on the transportation system	35	-
Mobility	Projects should provide modal options efficiently and effectively	10	25
Cost effectiveness	Projects should result in benefits commensurate with costs and should be aimed at maximizing the return on the public's investment	15	20
Economic impact	Projects should support strategic economic growth in the Commonwealth	10	15
Safety	Projects should contribute to the safety and security of people and goods in transit	10	10
Social equity & fairness	Projects should equitably distribute both benefits and burdens of investments among all communities	-	10
Environment and health impacts	Projects should maximize the potential positive health and environmental aspects of the transportation system	10	10
Policy support	Projects should get credit if they support local or regional policies or plans; or state policies not addressed through the other criteria	10	10



Set priorities

1 *Reliability*

Maintain and improve the overall condition and reliability of the transportation system

- ▶ Necessary routine and capital maintenance
- ▶ State of Good Repair projects designed primarily to bring asset condition up to an acceptable level
- ▶ Asset management and system preservation projects

2 *Modernization*

Modernize the transportation system to make it safer and more accessible and to accommodate growth

- ▶ Compliance with federal mandates or other statutory requirements for safety and/or accessibility improvements
- ▶ Projects that go beyond State of Good Repair and substantially modernize existing assets
- ▶ Projects that provide expanded capacity to accommodate current or anticipated demand on existing transportation systems

3 *Expansion*

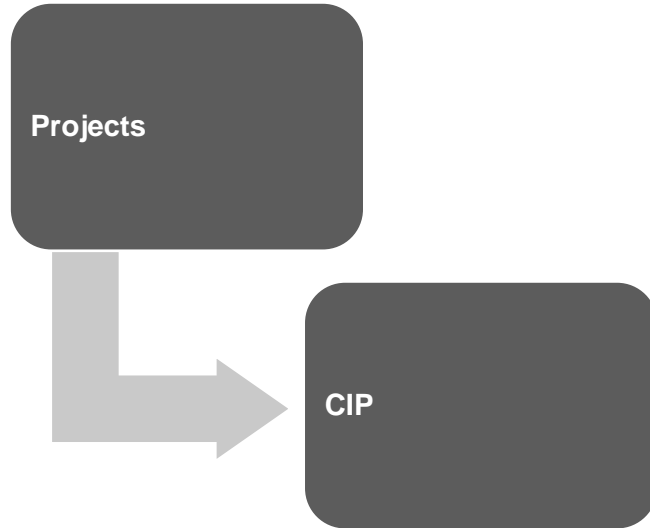
Expand diverse transportation options for communities throughout the Commonwealth

- ▶ Projects that expand highway, transit and rail networks and/or services
- ▶ Projects that expand bicycle and pedestrian networks to provide more transportation options and address health and sustainability objectives



Change capital planning approach

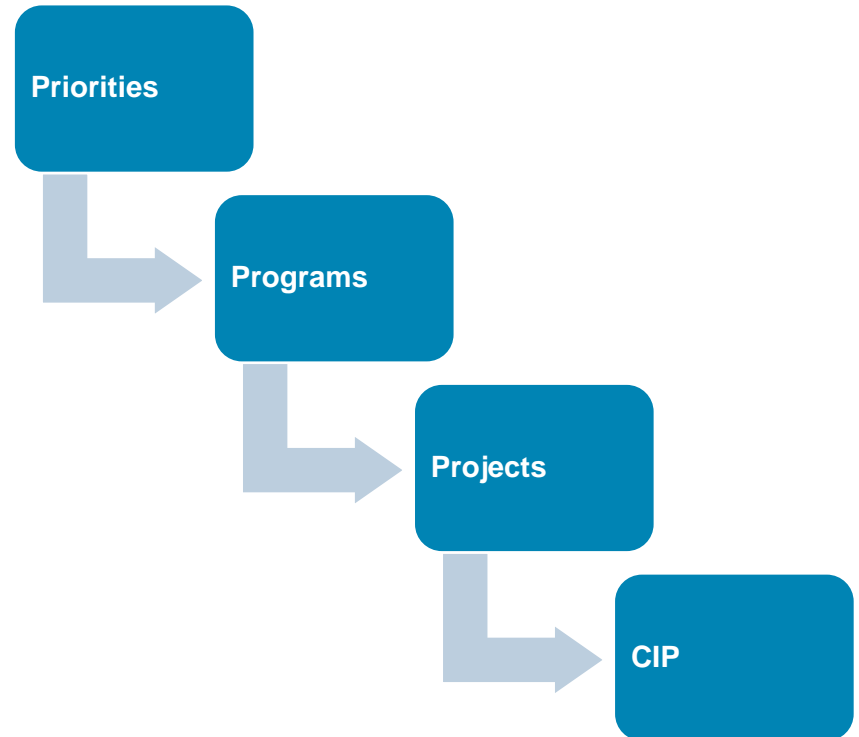
Old system



Two CIPs



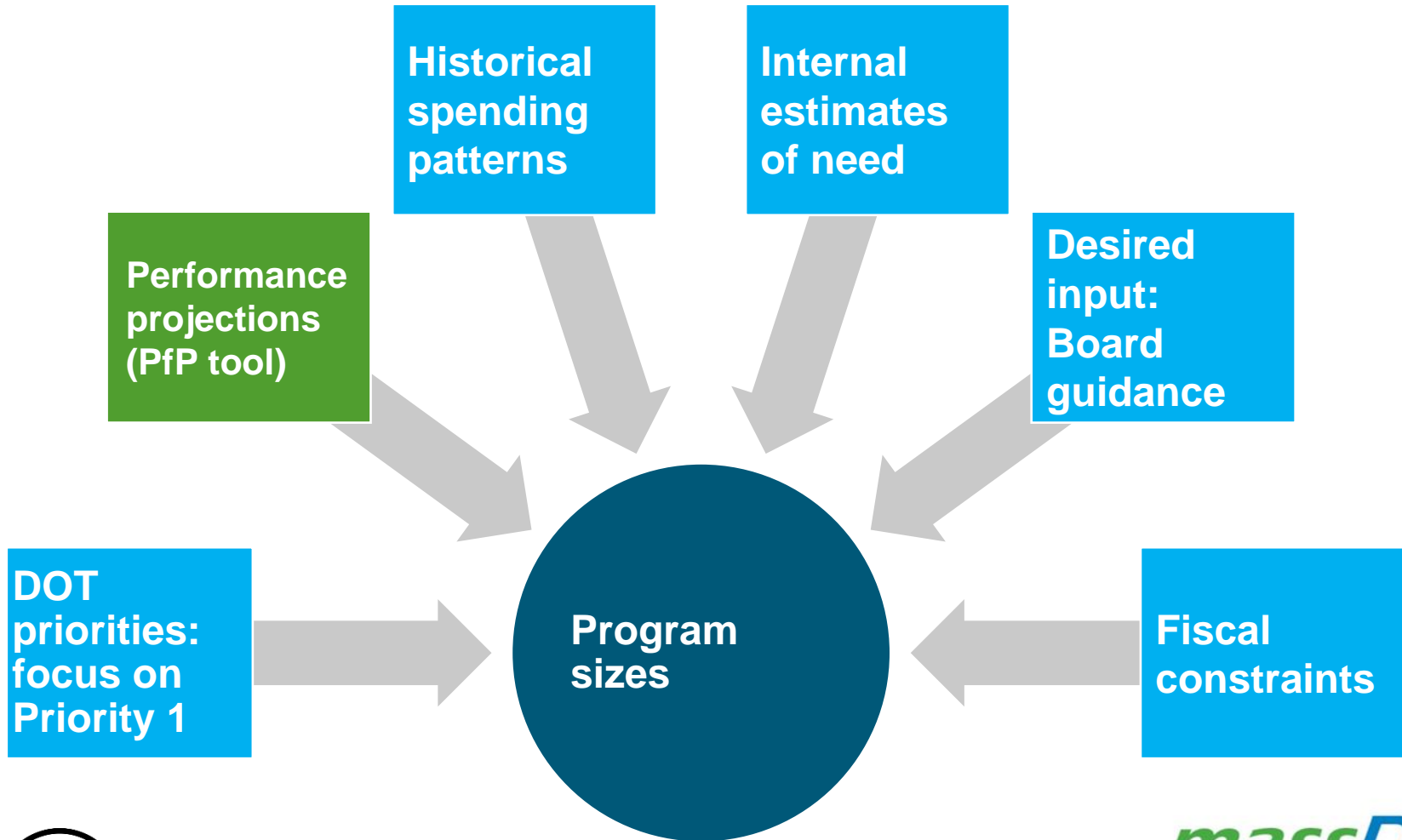
New system



Joint CIP



Establish program sizes FIRST



Planning for Performance Tool

Select a Plan Year:	2025	Current Scenario: If Average Annual Spend for FY17-21 CIP Continued for 10 Years		Baseline Scenario: If Recent Historical Avg. Annual Spend Continued for 10 years		
		FY17-FY21 Avg Annual CIP Funding	2025 Performance	Historical Funding	Today's Performance	2025 Performance
Highway Division						
NON-TOLLED INTERSTATE PAVEMENT % Good or Excellent % Poor		\$62	94% 0%	\$67	80%	94% 0%
DOT-OWNED NON-INTERSTATE PAVEMENT % Good or Excellent % Poor		\$96	32% 66%	\$52	63%	21% 78%
MULTI-USE PATH Miles of New Multi-Use Path		\$32	155	\$32	N/A	156
BRIDGE Number of Bridges SD		\$325	102	\$197	444	542
INTERSECTION SAFETY Economic-Weighted EPDO Crashes Reduced		\$25	11,935	\$22	N/A	10,553
ROADWAY RECONSTRUCTION		\$157	N/A	\$115	N/A	N/A
ADA RETROFITS Number of ADA Retrofits Completed		\$4	6,984	\$2	N/A	3,600
ITS		\$16	N/A	\$3	N/A	N/A
PEDESTRIAN Miles of New or Rebuilt Pedestrian Facilities			748		N/A	561

Iterate, draft, iterate, endorse

Ensure fiscal
constraint

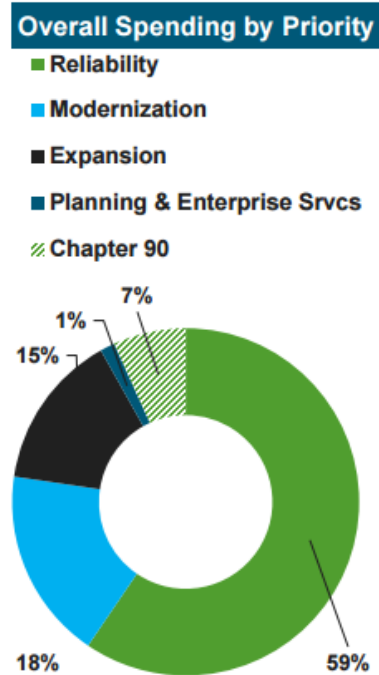
Present to
Board of Directors

Present to
Governor

Engage
customers

Refine/revise
based on
feedback

Endorse!



Overall spending by priority

Spending Priority	% of Total Spending
Reliability	59%
Modernization	18%
Expansion	15%
Planning & Enterprise Svcs	1%
Chapter 90	7%
Combined Total	N/A

