



# Transformation through Connectivity – Program Management

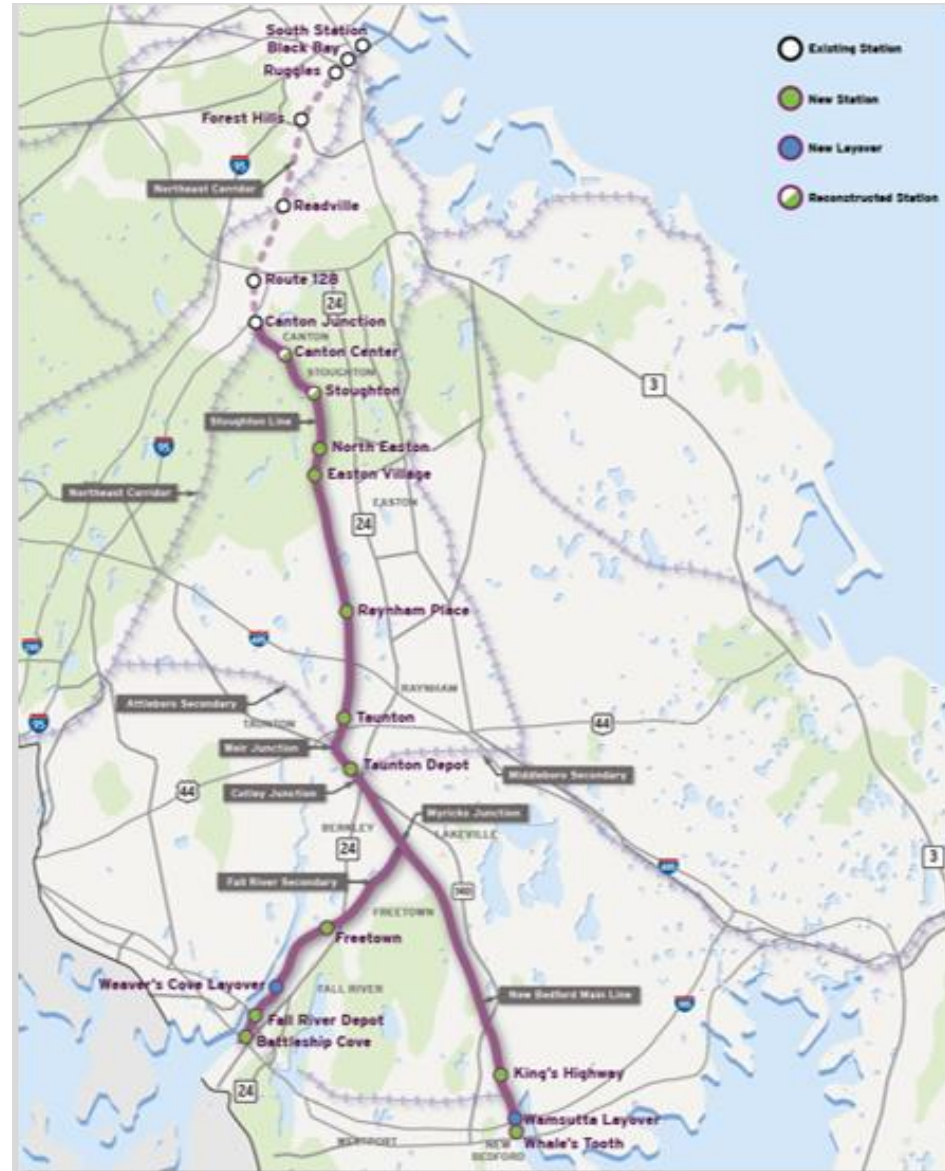
*Presented by*  
**Rick Carey, PE**

September 2018

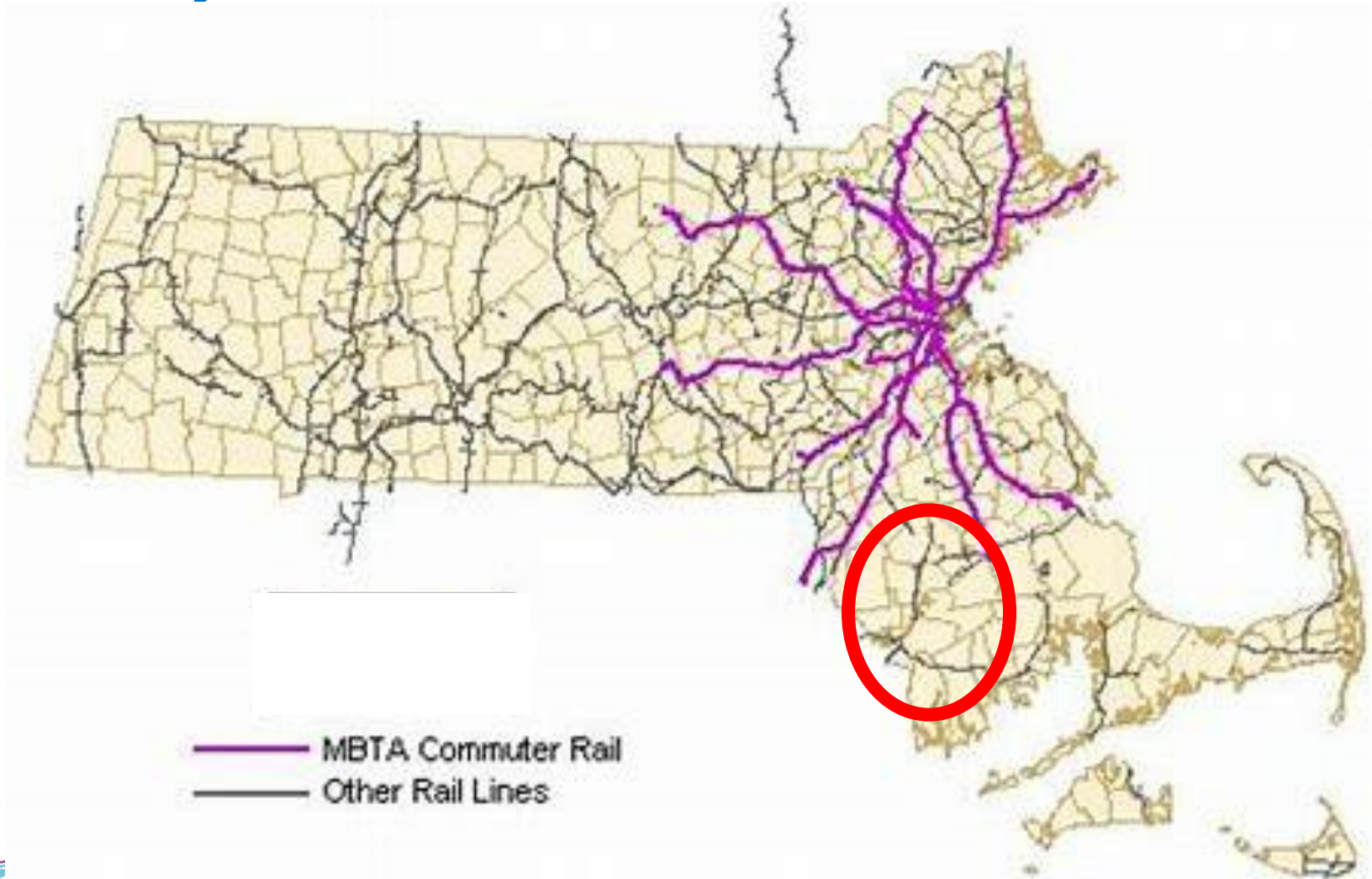


# South Coast Rail Project Overview

- Extension of existing Stoughton service
- 10 communities
- 10 new stations
- 2 reconstructed stations
- 2 layovers
- Electrified service
- 40 trips per day



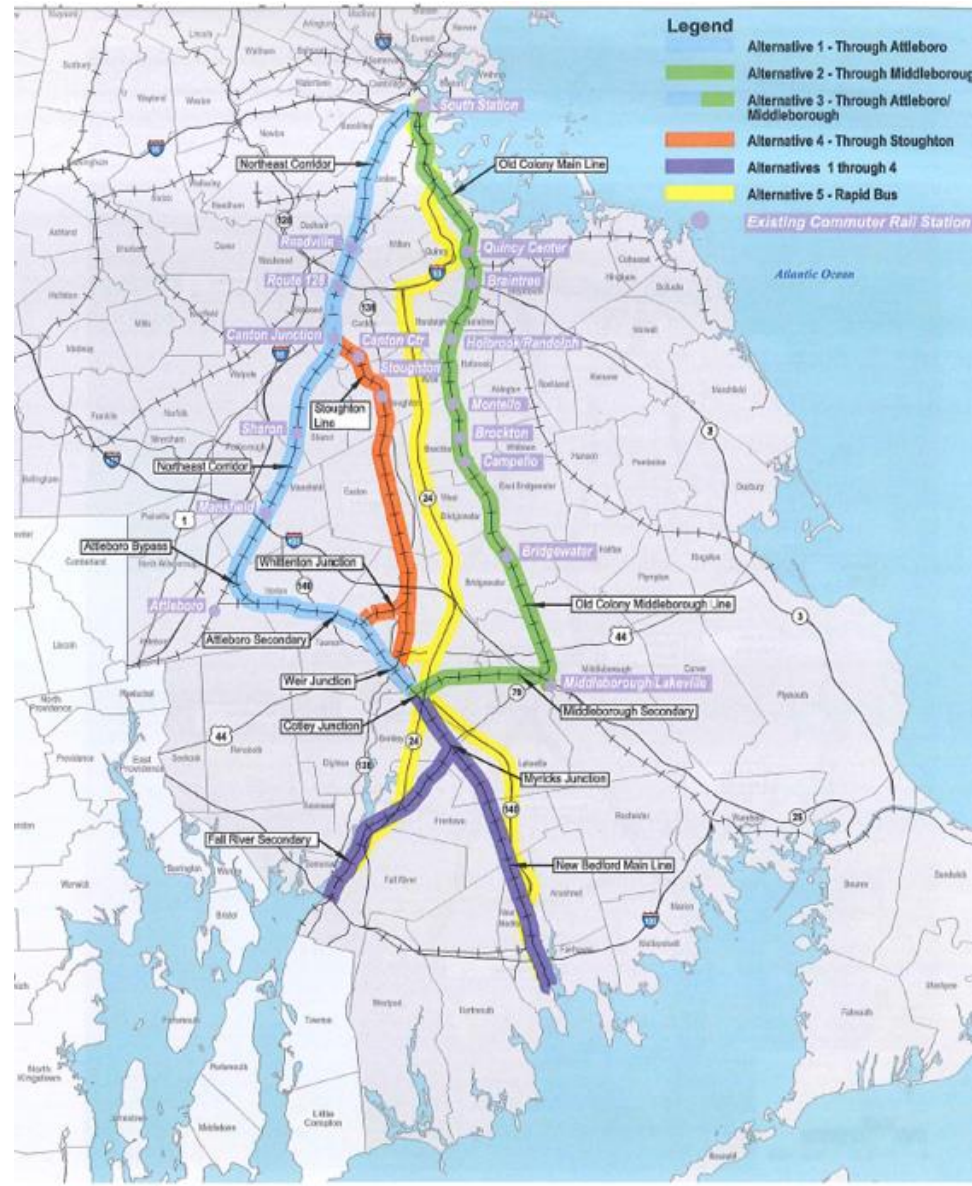
# South Coast Rail Project Overview





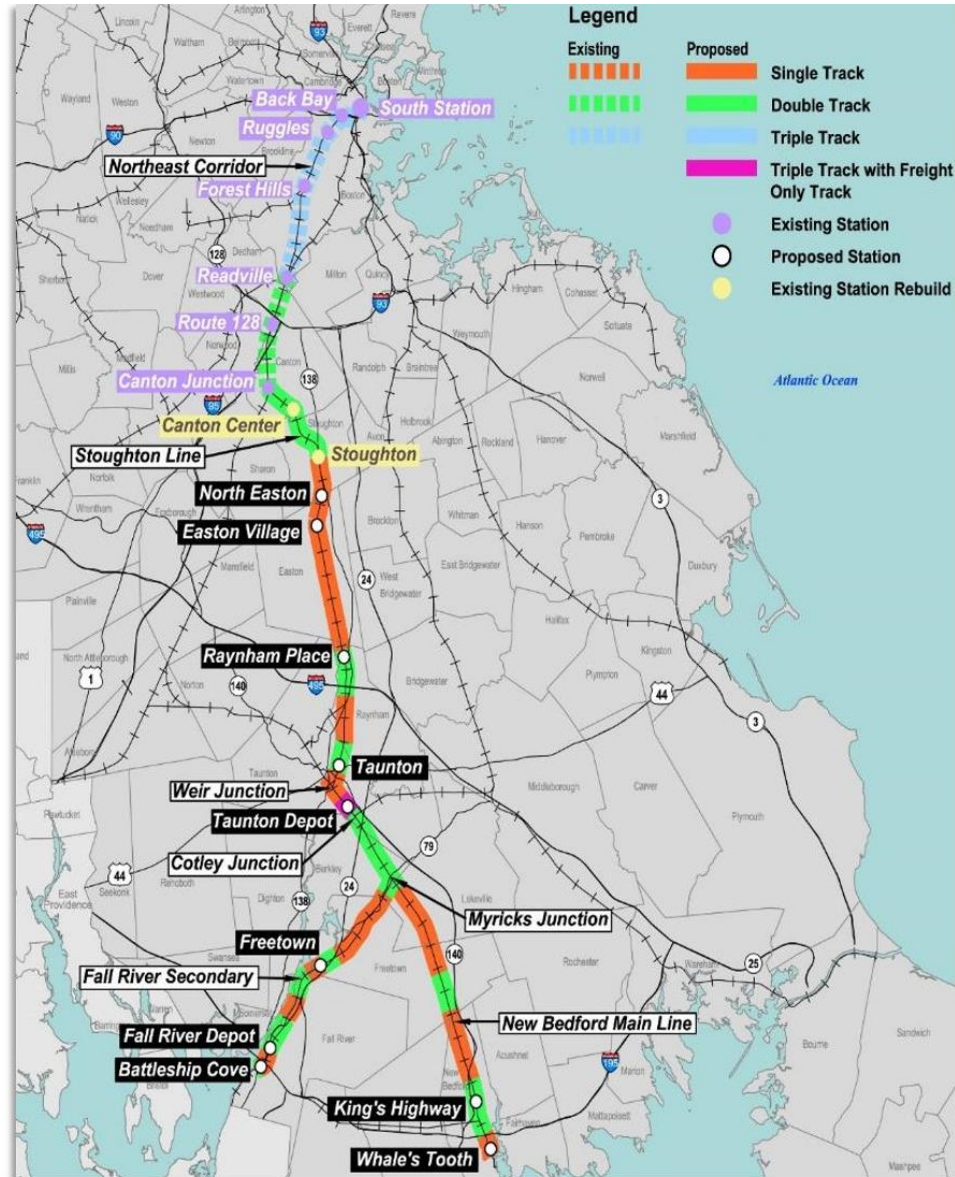
# Alternatives Analysis History

- Initial list of 65 alternatives
- 5 alternatives advanced through MEPA/NEPA process
  - Commuter rail, Stoughton straight
  - Commuter rail, Attleboro
  - Commuter rail, Middleborough
  - Commuter rail, Middleborough/Attleboro
  - Rapid bus



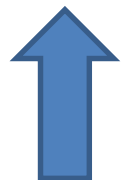
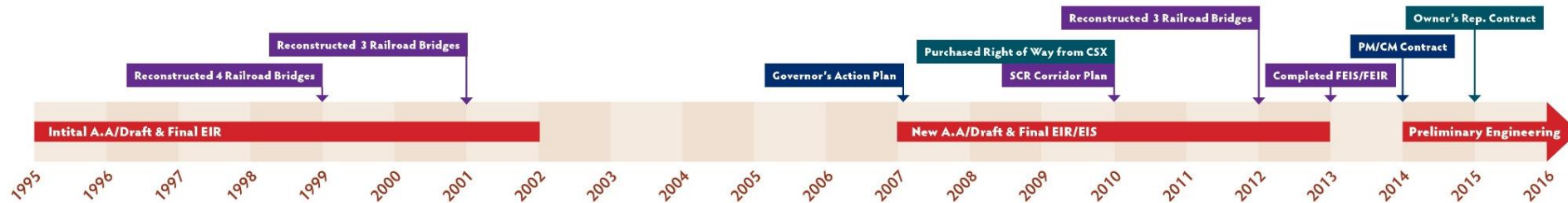
# Selected Alternative: Stoughton Straight (Electric)

- 40 Trips Total (32 currently serving Stoughton)
  - 20 trips to New Bedford
  - 20 trips to Fall River
- Trip Time
  - New Bedford to South Station - 77 minutes
  - Fall River to South Station - 75 minutes
- Projected Ridership: 4,570 daily riders



# Project History

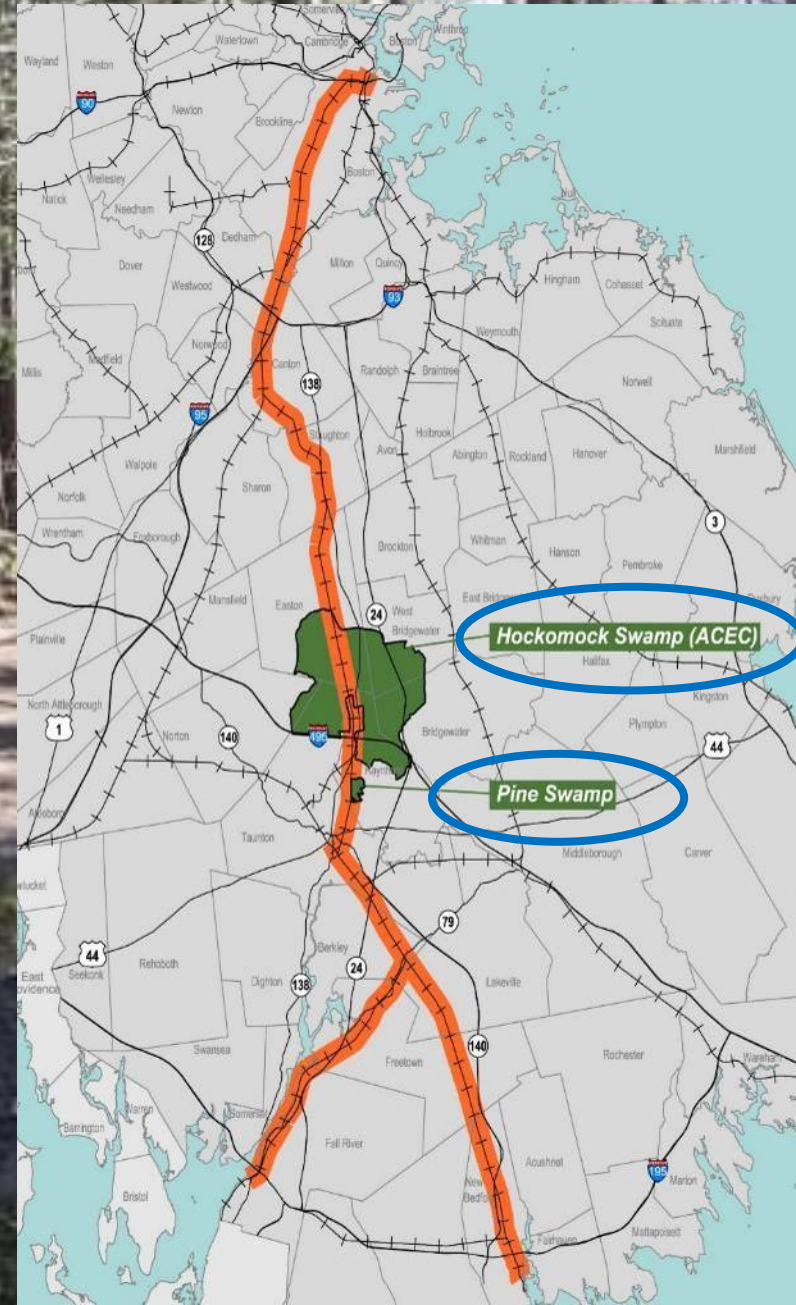
- 1994 - Start Initial AA and EIR
- 1999 - Complete construction of 4 RR Bridges
- 2001 - Complete construction of 3 RR Bridges
- 2002 - Completed Initial FEIR
- 2007 - Governor's Action Plan
- 2010 - Purchased Right of Way from CSX (Taunton South)
- 2010 - Completed SCR Corridor Plan
- 2012 - Complete construction of 3 RR Bridges
- 2013 - Completed FEIS/FEIR
- 2014 - Awarded PM/CM Contract & Initiated Preliminary Engineering Phase
- 2014 - Began construction of 4 bridges and 5 grade crossings
- 2015 - Awarded Owner's Rep. Contract





## Environmental Concerns

- Hockomock Swamp (Easton & Raynham)
  - 2.3 Miles long (Foundry Street to Raynham Park crossing)
- Pine Swamp (Raynham)



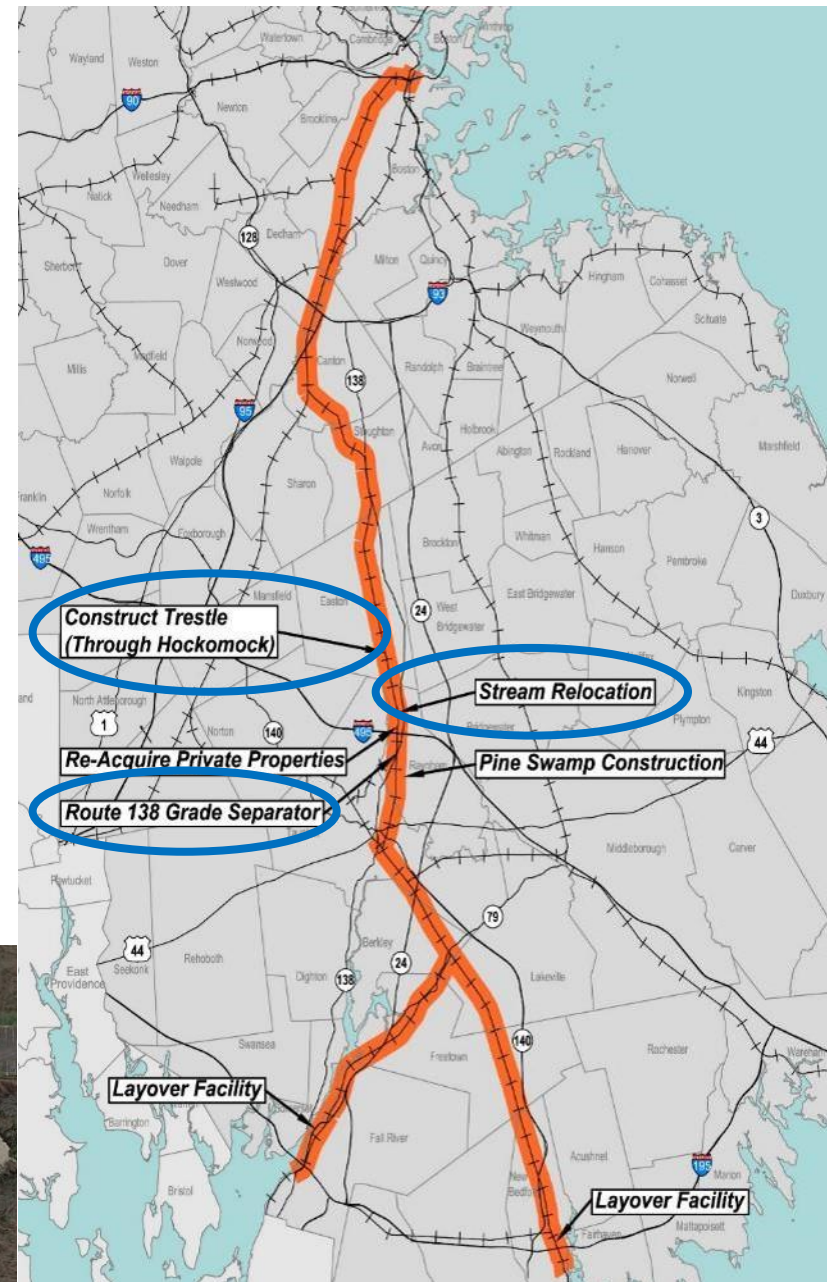


# Major Infrastructure

1.6-mi trestle through the Hockomock Swamp

Stream relocation in ROW - Raynham

Route 138 grade separation - Raynham





# Environmental Process

DEVELOP PERMIT  
STRATEGY

PRELIMINARY DESIGN

FINAL DESIGN

MESA CMP

WPA Variance

Section 404  
Permit and  
ROD

CZM  
Determination

Programmatic  
Agreement

USCG Bridge  
Permit

CH 91  
Licenses

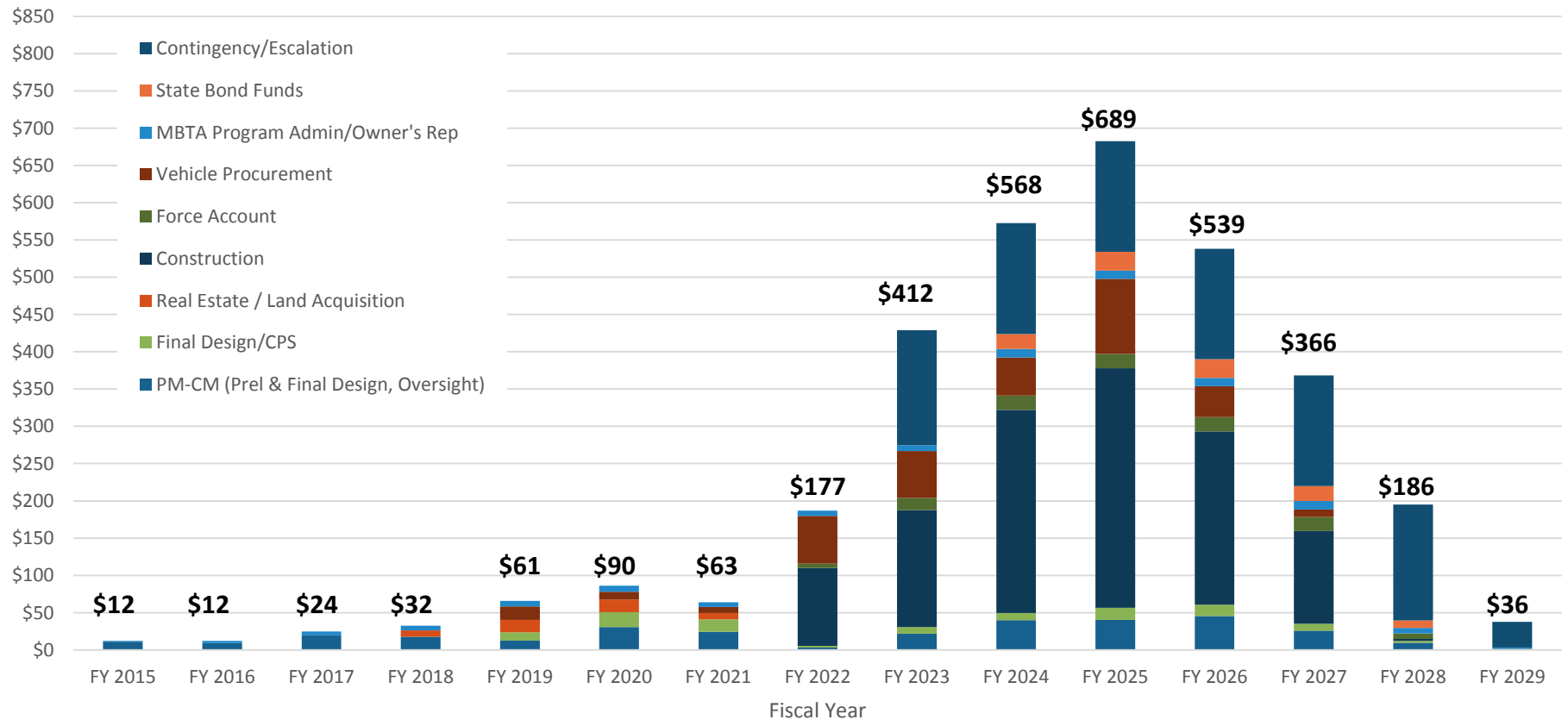
MESA CMP – MA Endangered Species Act  
WPA Variance – Wetland Protection Act Variance  
CZM – Coastal Zone Management Determination  
ROD – Army Corps Record of Decision  
USCG – Coast Guard Bridge Permit  
CH 91 License – MA Tidelands & Waterways License  
PROG. AGREEMENT – agreement between MBTA, State & Federal  
Agencies to define process for consultation, review, and compliance

# Schedule and Cost Review

|  | Schedule | Cost           |
|--|----------|----------------|
| <b>Independent Cost Estimate (ICE)</b> | 15 Years | \$3.42 Billion |
| <b>PM/CM Schedule &amp; Cost</b>       | 16 Years | \$3.40 Billion |

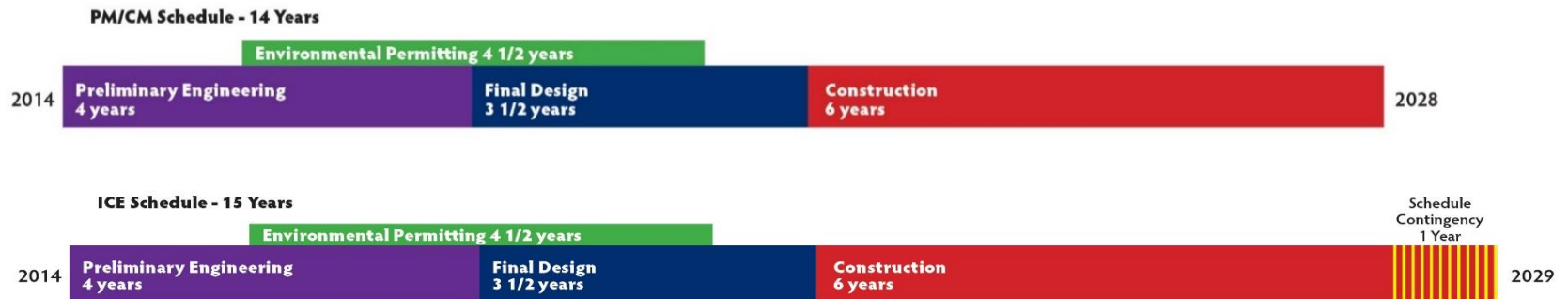


# Cash Flow: 14 yrs./\$3.4B (unconstrained)



# Program Schedule Overview

- Independent cost estimator 15-year schedule
  - Unconstrained funding
  - Similar assumptions to the PM/CM 14-year schedule
  - Longer schedule risk contingency (+1 year) for design and construction





# Schedule Risks and Impacts

- Future funding availability
  - Reduced annual cash flows extend overall schedule
- Environmental permitting schedule risk
  - Variable and uncertain timeline for regulators issuing permits
  - Uncertainty of negotiation and execution of Programmatic Agreement with Army Corps and Mass Historic
  - Longer wetland mitigation siting process
  - Likely appeals and litigation risk for both state and federal permits
- Design and construction cost escalation - \$4.1M per month
- The first electrified commuter rail in Massachusetts

# Why a Phased Approach?

Provides earlier service for the South Coast region while MassDOT advances Stoughton Electric Route

Serve Environmental Justice Communities

Uses active rail lines owned by MassDOT

Foundation for Stoughton Electric Service

Initiates air quality, economic, and smart growth benefits

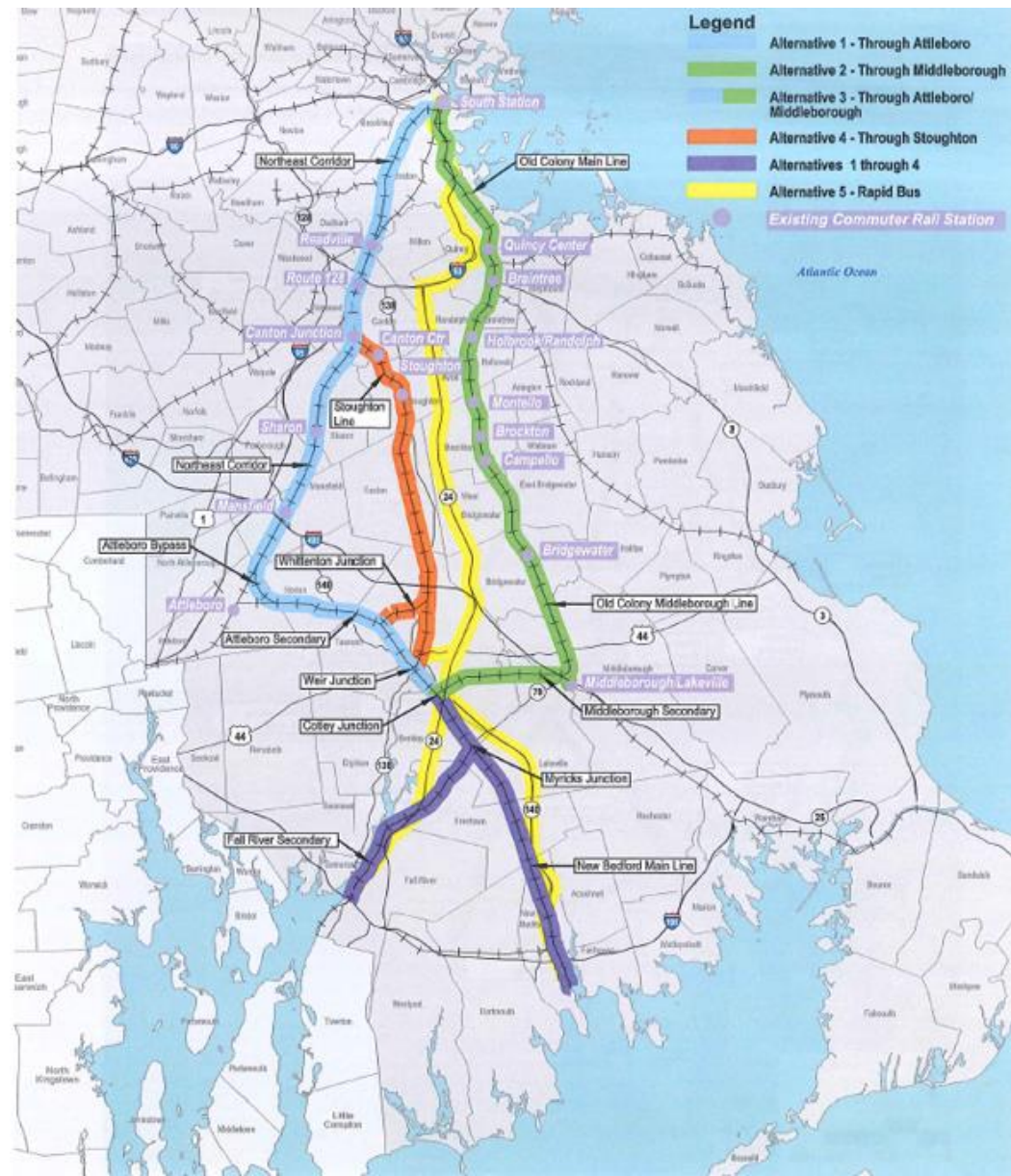
Provide Service while Full Build Complexities Are Addressed





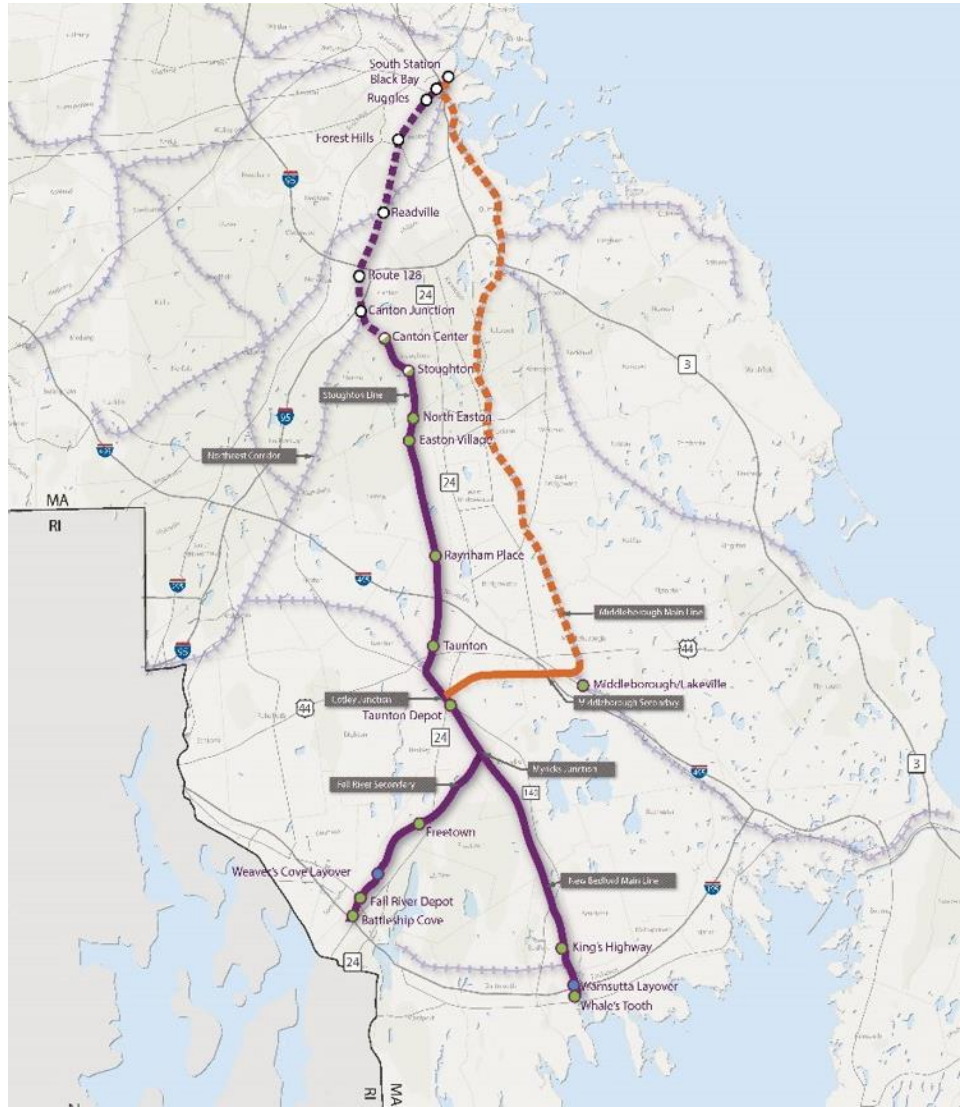
# Options/Requirements for Earlier Service, Less Cost

- **Service by 2022**
- **Cost < \$1B**
- **Service goals**
  - 1 seat ride
  - 3 peak period trains
- **Operational realities**
  - Limited track capacity
  - Limited platform capacity at South Station
  - Strategically locate double track sections to minimize environmental impacts
- **Infrastructure goals**
  - Optimize double track areas
  - Minimize wetland impacts
  - Maximize common infrastructure for Phase 1 and full build



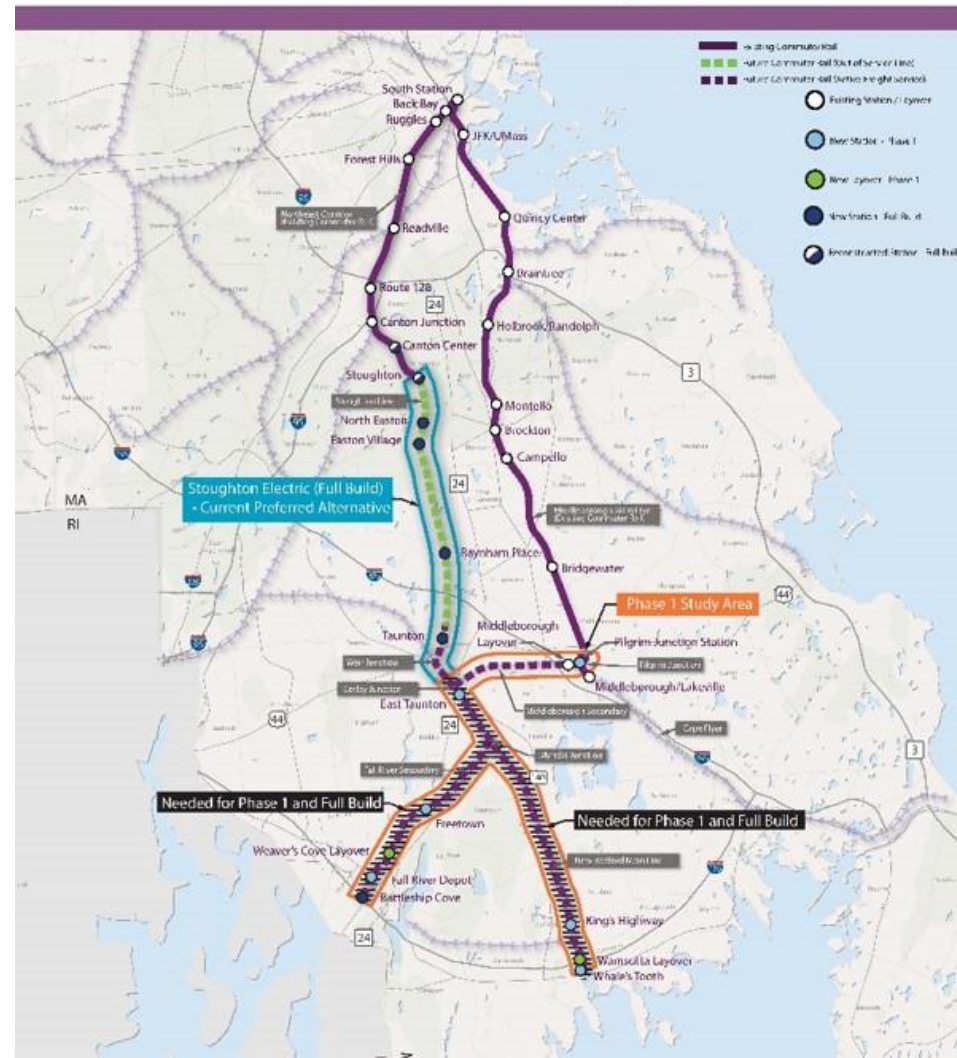
# Phase 1 Service Alternative Selected: Middleborough Option

- Extend existing Middleborough service to New Bedford and Fall River



# Phased Approach

- Phase 1: Middleborough
  - Construct Southern Triangle (Cotley Junction South)
  - Upgrade Middleborough Secondary
  - Station modifications and new station and layover locations
  - Recently complete 30% Design
- Phase 2: Staughton Electric
  - Advance design and permitting for section north of Cotley Junction





# Proposed Service under Phase 1

|                         | INBOUND   | OUTBOUND  | TOTAL     | PEAK PERIOD                                    |
|-------------------------|-----------|-----------|-----------|--|
| New Bedford             | 7         | 7         | 14        | 3 Morning Peak Trains<br>3 Evening Peak Trains |
| Fall River              | 6         | 6         | 12        | 3 Morning Peak Trains<br>3 Evening Peak Trains |
| Taunton & Middleborough | 13        | 13        | 26        | 6 Morning Peak Trains<br>6 Evening Peak Trains |
| <b>TOTAL</b>            | <b>13</b> | <b>13</b> | <b>26</b> | 6 Morning Peak Trains<br>6 Evening Peak Trains |

# Cost Estimate

- **Capital Cost – Phase 1: \$957M (service in 2022)**
  - 85% of cost is for the Southern Triangle
  - More than \$800M will go toward \$3.4B Full Build
  - Saves \$153M in escalation costs by building Southern Triangle sooner
  - Escalation savings offset cost for Middleborough Secondary Improvements
- **Capital Cost – Full Build: \$3.4B (service no sooner than 2030)**



# Phase 1 Summary - Benefits

- Immediately alleviate existing parking constraints and divert traffic to the new stations
- Provide approximately 837,000 trips per year, and 7 million trips over 8-9 years, while completing the Full Build
- Provide immediate VMT reductions and traffic congestion benefits
- Overall project cost savings by upgrading the Middleborough Secondary and avoiding Southern Triangle inflation
- Long-term resiliency for the South Coast Rail project
- Upgrades to be used by existing freight services and accomplish MassDOT/MBTA goals for State of Good Repair



# Program Management Strategies

- Managing Expectations - you can't please everyone
- Stakeholder Management - Multiple Environmental Agencies, Communities, residents, etc.
- "Real-Time" Cost Updates and Change Management
- The Realities of Planning vs Final Design; Value Engineering!
- Operations Expertise
- Tracking Design Development and Changes to Envr Impacts
- Using the Tools Effectively
- Team Continuity & Knowledge of the Project
- Nimble
- Schedule Updates
- Risk Management



# Managing the Goals

- **Cost- <\$1B**
  - Challenging every change, criteria, requests
  - Report cost impacts quickly
- **Schedule- service by 2022**
  - Constant tracking and testing
- **Service**
  - 3-peak period trains, minimize travel time, capacity constraints, one seat ride
- **Commitments and Requests**
  - Environmental commitments
  - Community enhancements

# Cost/Change Management

- Cost- <\$1B

## South Coast Rail Program Change Management Log Phase 1

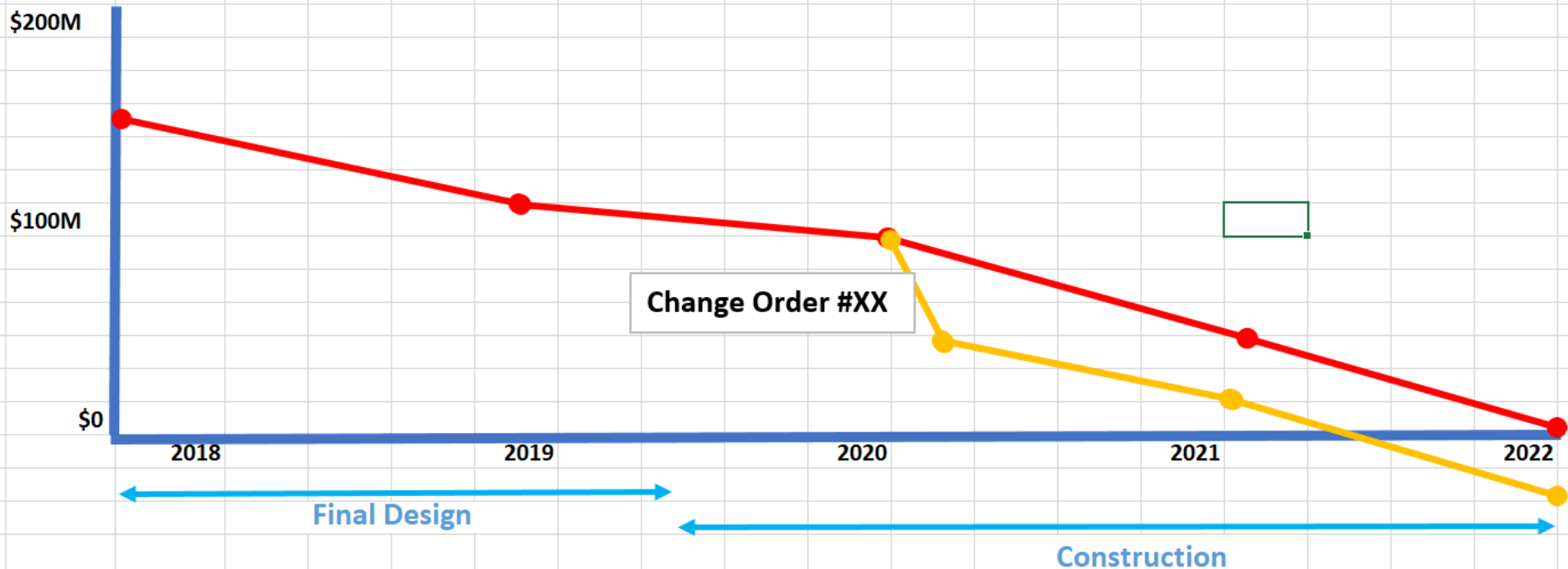
Last Updated: 07/10/2018

| Change Mgt. Request # | Date Submitted | Initiator | Type               | Detail Description of Proposed Change   | Justification for Proposed Change  | Cost Impact | Schedule Impact            | Disposition   | Date Approved | Disposition by |
|-----------------------|----------------|-----------|--------------------|---|--|-------------|----------------------------|---|---------------|----------------|
| 8                     | 5/5/2018       | VH8       | EA Culverts        | Early Action - Tarklin Hill Rd. Grade Crx civil work will be added to Early Action Culvert Contract, so advertise date will extend from 7/15/18 to 9/3/18 | City of New Bedford delay in getting Order of Conditions for King's Highway Project  | \$0         | Advertise delay 1.5 months |   |               |                |
| 9                     | 5/5/2018       | VH8       | Program Mitigation | Revisions to Noise Mitigation Program   | FEIR assumed quiet zones in each community, as MBTA does not prefer quiet zones, additional mitigation will be added for houses and buildings that have severe noise impacts from the train horn | \$5M        | No schedule impact         |   |               |                |
| 10                    | 5/5/2018       | VH8       | NBML               | Expansion of taking parcel from Cedar Realty for King's Highway station   | Based on discussions with Cedar Realty, who has requested to take the parcel with entire building as opposed to half the building.   |             | No schedule impact         |   |               |                |
| 11                    | 5/5/2018       | VH8       | NBML               | Relocate parking lot from Cedar Realty property to Cedar Fieldstone property for King's Highway Station   | The Team is looking at moving the King's Highway Station parking to this location  |             |                            | After review, it was determined to move forward with the Cedar Realty property. |               |                |
| 12                    | 5/5/2018       | VH8       | MS                 | Construction of roadway from Rt. 28 to Rt. 105 at Pilgrim Jct. Station. Current design has pedestrian access from Rt. 28 to Pilgrim Jct. Station          | Based on a roadway safety audit, this design change has the potential to alleviate traffic congestion at Rt./105 in Middleborough Center   |             |                            |   |               |                |
| 13                    | 5/5/2018       | HNTB      | FRS                | New Layout for Richmond Road (South) Grade Crx. Current design has pedestrian access from Rt. 28 to Pilgrim Jct. Station                                  | The Town of Freetown has asked the Team to revise the Richmond Rd (South) Grade Crx, due to potential development on a parcel identified for acquisition.  |             |                            |   |               |                |
| 14                    | 5/9/2018       | MBTA      | Signal &           | Provide additional fiber optic cable  |  |             |                            |   |               |                |

# Cost/Change Management

- Cost- <\$1B

## ***CONTINGENCY DRAWDOWN***



# Schedule Management

- Service by the end of 2022

| Data Date: 01-Aug-18   |  |      | SCR Phase 1 Program Schedule Level 1 Summary Update #2 |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    | Page 1 of 1<br>05-Sep-18 |      |    |    |      |    |
|--|--|------|--|-----------|--|----|----|------|----|----|------|----|----|------|----|----|------|----|--------------------------|------|----|----|------|----|
| Activity ID  | Activity Name                                      | Dur  | Start  | Finish    | 2017                                       |    |    | 2018 |    |    | 2019 |    |    | 2020 |    |    | 2021 |    |                          | 2022 |    |    | 2023 |    |
|  |  |      |  |           | Q2   | Q3 | Q4 | Q1   | Q2 | Q3 | Q4   | Q1 | Q2 | Q3   | Q4 | Q1 | Q2   | Q3 | Q4                       | Q1   | Q2 | Q3 | Q4   | Q1 |
| SCR Phase 1 Program Schedule Updated #2                            |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| Program Milestone  |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.NTP  | Notice To Proceed (NTP)                            | 0    | 03-Apr-17 A  |           | ◆ Notice To Proceed (NTP)                  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.MS.01  | Infrastructure Ready to Start Revenue Service      | 0    | 29-Nov-22*   |           | ◆ Infrastructure                           |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| Contract 1 - Special Trackwork Procurement                         |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.C1.1000  | Contract 1 - Special Trackwork Procurement         | 835  | 01-Nov-17 A  | 20-Aug-20 | Contract 1 - Special Trackwork Procurement |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| Contract 2 - Early Action Culverts and Tarklin Hill Grade Crossing |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.C2.1000  | Contract 2 - Early Action Culverts                 | 650  | 02-Jun-17 A  | 06-Jan-20 | Contract 2 - Early Action Culverts         |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| Contract 3 - Early Action 4 Bridges                                |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.C3.1000  | Contract 3 - Early Action 4 Bridges                | 602  | 25-Oct-17 A  | 19-Sep-20 | Contract 3 - Early Action 4 Bridges        |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| Contract 5 - Route 24 Highway Bridge Contract                      |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.C5.1110  | Contract 5 - Route 24 Highway Bridge Contract      | 1096 | 01-May-18 A  | 10-Nov-22 | Contract 5                                 |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| Contract 6 - New Bedford Main Line (NBML) Contract                 |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.C6.1000  | Contract 6 - New Bedford Main Line Contract        | 1725 | 08-May-17 A  | 22-Dec-21 | Contract 6 - New Bedford Ma                |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| Contract 7 - Fall River Secondary (FRS) Contract                   |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.C7.1000  | Contract 7 - Fall River Secondary (FRS) Contract   | 1401 | 01-Jun-17 A  | 04-Jan-22 | Contract 7 - Fall River Seco               |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| Contract 8 - Middleborough Secondary (MS) Contract                 |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.C8.1000  | Contract 8 - Middleborough Secondary (MS) Contract | 1367 | 08-May-17 A  | 26-Nov-21 | Contract 8 - Middleborough Se              |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| Contract 9 - Systems Contract                                      |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.C9.1000  | Contract 9 - Systems Contract                      | 1097 | 01-Jul-19  | 01-Jul-22 | Contract 9 - Syste                         |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| Contract 10 - Vehicle Procurement                                  |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.C10.1000   | Contract 10 - Vehicle Procurement                  | 3185 | 02-Jul-18 A  | 30-Apr-27 |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| Testing and Commissioning  |  |      |  |           |  |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |
| SCR.C9.1001  | Test and Commissioning-Project Wide Systems        | 307  | 26-Jan-22  | 28-Nov-22 | Test and C                                 |    |    |      |    |    |      |    |    |      |    |    |      |    |                          |      |    |    |      |    |



**SOUTH COAST RAIL**  
Design, Engineering and PM/CM Services  
MassDOT Contract No. 99771



| Date | Revision | Checked | Approved |
|------|----------|---------|----------|
|      |          |         |          |





# Risk Management

## ■ Risk

- Risk workshops – programmatic, project by project
- Risk Management Action Plan

| NO. | RISK ITEM | RISK NAME                              | RISK DESCRIPTION  | MITIGATION ACTION PLAN  |
|-----|-----------|--|---|---|
| 1   | M2        | Agency capacity                        | Agency capacity to support design and procurement   | SEE ABOVE   |
| 2   | M4        | Vehicle procurement                    | Potential cost increase and delays due to new vehicle procurement   | M4-1: Develop "fragnet" for vehicle needs, including delivery, test commissioning of vehicles as well as training of operators<br>M4-2: Set up regular (monthly?) coordination meeting with MBTA and update the schedule<br>M4-3: Identify, with MBTA, options for delivery of vehicles |
| 3   | M11       | Utility review during design           | Delayed utility review during design (power to bungalows, grade crossings, stations, etc.)  | SEE ABOVE   |
| 4   | M13       | Railroad review during design          | Delayed railroad review and force account support during design: Amtrak and Keolis  | SEE ABOVE   |
| 5   | M9        | Keolis signals / comm resources        | Resources for railroads may be limited and need increased due to concurrent construction  | SEE ABOVE   |
| 6   | M8        | MBTA procurement                       | Maintain MBTA 4 month procurement duration  | SEE ABOVE   |
| 7   | M15       | Safety Certification and Commissioning | Process may take longer than the 6 months allowed in the schedule for system-wide final testing. Certification process may require additional scope | SEE ABOVE   |

# Phase 1 Operations

## ■ Service

- One seat ride, minimize travel time, 3-peak period trains, double track. capacity constraints

Alternative 2 - Middleborough Shuttle to Bridgewater  
DRAFT Weekday Schedule - To New Bedford & Fall River with Middleborough Shuttle

| Northbound                           | M-02 | 002    | M-102 | 102    | M-04 | 004    | M-06 | 006    | M-08 | 008    | M-10 | 010    | M-12 | 012    | M-14  |
|--------------------------------------|------|--------|-------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|-------|
| Fall River                           | -    | -      | -     | 5:14   | -    | -      | -    | 6:25   | -    | -      | -    | 7:34   | -    | -      | -     |
| Whales Tooth                         | -    | 4:47   | -     | -      | -    | 5:27   | -    | -      | -    | 6:47   | -    | -      | -    | 9:05   | -     |
| King's Highway                       | -    | 4:52   | -     | -      | -    | 5:32   | -    | -      | -    | 6:52   | -    | -      | -    | 9:10   | -     |
| Taunton South                        | -    | 5:07   | -     | 5:34   | -    | 5:47   | -    | 6:45   | -    | 7:07   | -    | 7:54   | -    | 9:25   | -     |
| Middleborough / Lakeville [Existing] | 5:15 | -      | 5:42  | -      | 5:55 | -      | 6:53 | -      | 7:15 | -      | 8:02 | -      | 9:33 | -      | 11:05 |
| Bridgewater                          | 5:25 | → 5:30 | 5:52  | → 5:57 | 6:05 | → 6:10 | 7:03 | → 7:08 | 7:25 | → 7:30 | 8:12 | → 8:17 | 9:43 | → 9:48 | 11:15 |
| Campello                             | -    | 5:37   | -     | 6:05   | -    | 6:18   | -    | 7:16   | -    | 7:38   | -    | 8:25   | -    | 9:56   | -     |
| Brockton                             | -    | 5:41   | -     | 6:09   | -    | 6:22   | -    | 7:20   | -    | 7:42   | -    | 8:29   | -    | 10:00  | -     |
| Montello                             | -    | 5:44   | -     | 6:12   | -    | 6:25   | -    | 7:23   | -    | 7:45   | -    | 8:32   | -    | 10:03  | -     |
| Holbrook/Randolph                    | -    | 5:49   | -     | 6:17   | -    | 6:30   | -    | 7:28   | -    | 7:50   | -    | 8:37   | -    | 10:08  | -     |
| Braintree                            | -    | 5:56   | -     | 6:24   | -    | -      | -    | -      | -    | -      | -    | 8:44   | -    | -      | -     |
| Quincy Ctr                           | -    | -      | -     | -      | -    | 6:42   | -    | 7:39   | -    | 8:01   | -    | -      | -    | 10:20  | -     |
| JFK/UMass                            | -    | 6:10   | -     | 6:38   | -    | -      | -    | 7:48   | -    | 8:11   | -    | 8:58   | -    | -      | -     |
| S Stn                                | -    | 6:17   | -     | 6:45   | -    | 6:58   | -    | 7:56   | -    | 8:18   | -    | 9:05   | -    | 10:36  | -     |
| Travel Time                          | 1:02 | 1:30   | 1:03  | 1:31   | 1:03 | 1:31   | 1:03 | 1:31   | 1:03 | 1:31   | 1:03 | 1:31   | 1:03 | 1:31   | 1:02  |

| Southbound                           | 003  | M-03   | 005  | M-05   | 007   | M-07    | 009   | M-09    | 015   | M-15    | 017   | M-17    | 019   | M-19    | 021   |
|--------------------------------------|------|--------|------|--------|-------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|
| S Stn                                | 6:35 | -      | 8:24 | -      | 9:57  | -       | 11:57 | -       | 14:10 | -       | 15:43 | -       | 16:40 | -       | 17:12 |
| JFK/UMass                            | -    | -      | -    | -      | -     | -       | -     | -       | -     | -       | 15:49 | -       | -     | -       | -     |
| Quincy Ctr                           | 6:49 | -      | -    | -      | 10:10 | -       | 12:10 | -       | 14:23 | -       | -     | -       | 16:53 | -       | 17:25 |
| Braintree                            | 6:55 | -      | 8:43 | -      | -     | -       | -     | -       | -     | -       | -     | -       | -     | -       | -     |
| Holbrook/Randolph                    | 7:03 | -      | 8:51 | -      | 10:22 | -       | 12:23 | -       | 14:36 | -       | 16:10 | -       | 17:06 | -       | 17:37 |
| Montello                             | 7:08 | -      | 8:56 | -      | 10:27 | -       | 12:28 | -       | 14:41 | -       | 16:15 | -       | 17:11 | -       | 17:42 |
| Brockton                             | 7:12 | -      | 8:59 | -      | 10:30 | -       | 12:31 | -       | 14:44 | -       | 16:18 | -       | 17:14 | -       | 17:45 |
| Campello                             | 7:20 | -      | 9:03 | -      | 10:34 | -       | 12:35 | -       | 14:48 | -       | 16:22 | -       | 17:18 | -       | 17:49 |
| Bridgewater                          | 7:38 | → 7:43 | 9:11 | → 9:16 | 10:42 | → 10:47 | 12:43 | → 12:48 | 14:56 | → 15:01 | 16:30 | → 16:35 | 17:26 | → 17:31 | 17:57 |
| Middleborough / Lakeville [Existing] | -    | 7:53   | -    | 9:26   | -     | 10:57   | -     | 12:58   | -     | 15:11   | -     | 16:45   | -     | 17:41   | -     |
| Taunton South                        | 8:02 | -      | 9:37 | -      | 11:07 | -       | 13:08 | -       | 15:21 | -       | 16:55 | -       | 17:51 | -       | 18:23 |
| King's Highway                       | 8:17 | -      | -    | -      | 11:22 | -       | -     | -       | 15:36 | -       | -     | -       | 18:06 | -       | -     |
| Whales Tooth                         | 8:22 | -      | -    | -      | 11:27 | -       | -     | -       | 15:41 | -       | -     | -       | 18:11 | -       | -     |
| Fall River                           | -    | -      | 9:57 | -      | -     | -       | 13:28 | -       | -     | -       | 17:15 | -       | -     | -       | 18:43 |
| Travel Time                          | 1:47 | 1:18   | 1:33 | 1:02   | 1:30  | 1:00    | 1:31  | 1:01    | 1:31  | 1:01    | 1:32  | 1:02    | 1:31  | 1:01    | 1:31  |

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