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Advisory Committee Meeting

JANUARY 22, 2019

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Purpose of Today's Meeting

1. Welcome
2. Tier 2 Service Alternatives
3. Tier 2 Variables: Fares and Parking
4. Tier 2 Evaluation Metrics and Tools
5. Public Outreach Efforts
6. Public Comment

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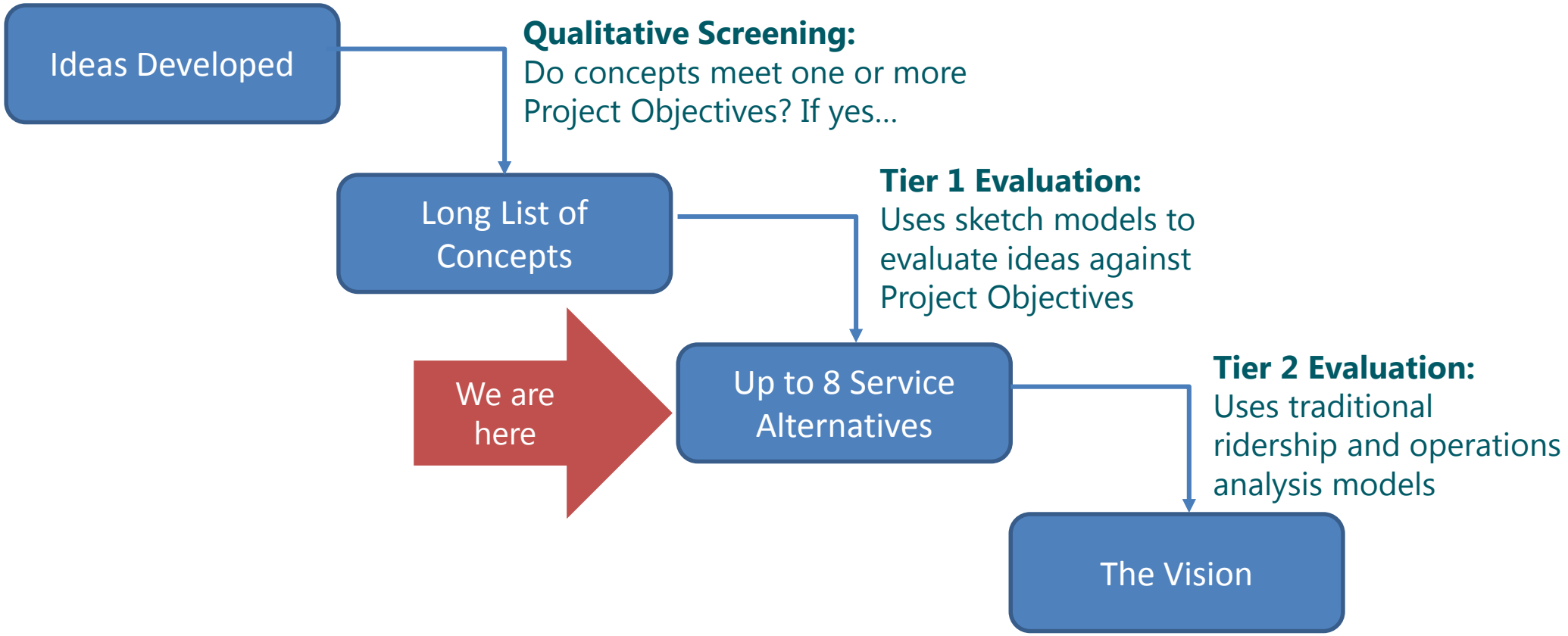
Evaluation Process



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Tier 2 Service Alternatives

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Revisions to Draft Tier 2 Alternatives

- To all: Change “Other” stations to “Outer” stations
- Alternative 1: Change title to “Optimization of Existing System”
- Alternative 2: Add electrification of Providence Line
- Alternative 3: No change
- Alternative 4: No change
- Alternative 5: Remove Urban Rail; Change focus to electrifying the full system and service to key stations. Extend service assumptions for Grand Junction to North Station
- Alternative 6: No change
- Alternative 7 (NEW): Line Optimization

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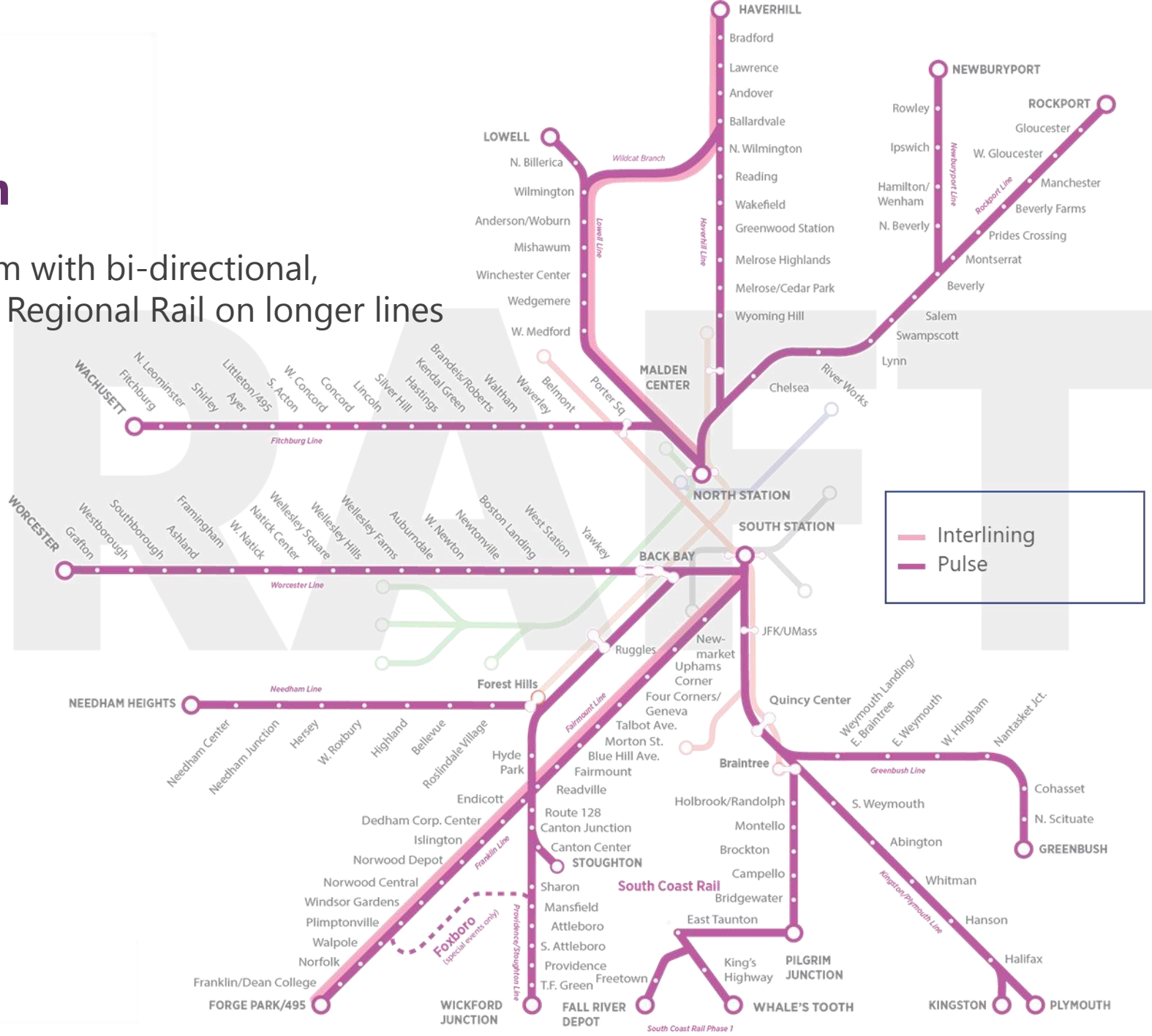
Service Alternative

#1: Optimize Existing System

Maximizes functionality of existing system with bi-directional, predictable, consistent pulse service and Regional Rail on longer lines

Key Features	
Typical Frequency	Key Stations: 30/60 bi-directional Inner Core: 30/60 bi-directional Outer Stations: 30/60 bi-directional
Electrification	None
Rolling Stock	Diesel Locomotive
Terminals	Existing
System Expansions	SCR Phase 1
Interlining	Haverhill/Lowell Franklin/Fairmount
Station Accessibility	Existing or Programmed



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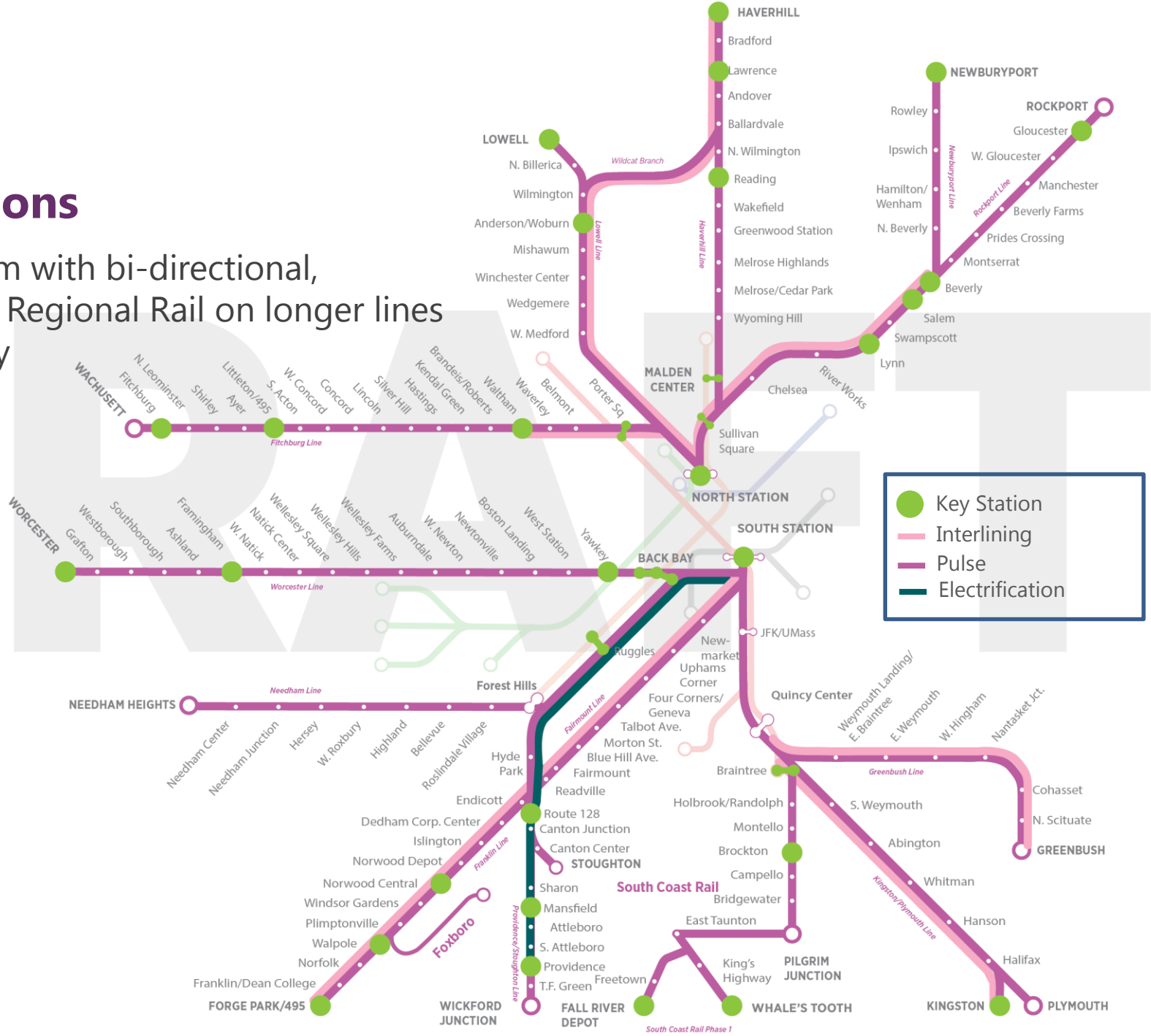
Service Alternative

#2: Regional Rail to Key Stations

Maximizes functionality of existing system with bi-directional, predictable, consistent pulse service and Regional Rail on longer lines and capacity to support added frequency

Key Features	
Typical Frequency	Key Stations: 15/15 bi-directional Inner Core: 30/60 bi-directional Outer Stations: 30/60 bi-directional
Electrification	Providence Line (Between Boston and Providence only)
Rolling Stock	Electric Locomotive (Providence Line) Diesel Locomotive
Terminals	Existing
System Expansions	SCR Phase 1 Foxboro
Interlining	Haverhill/Lowell Franklin/Fairmount Greenbush/Kingston Fitchburg/Newburyport-Rockport
Station Accessibility	Key Stations



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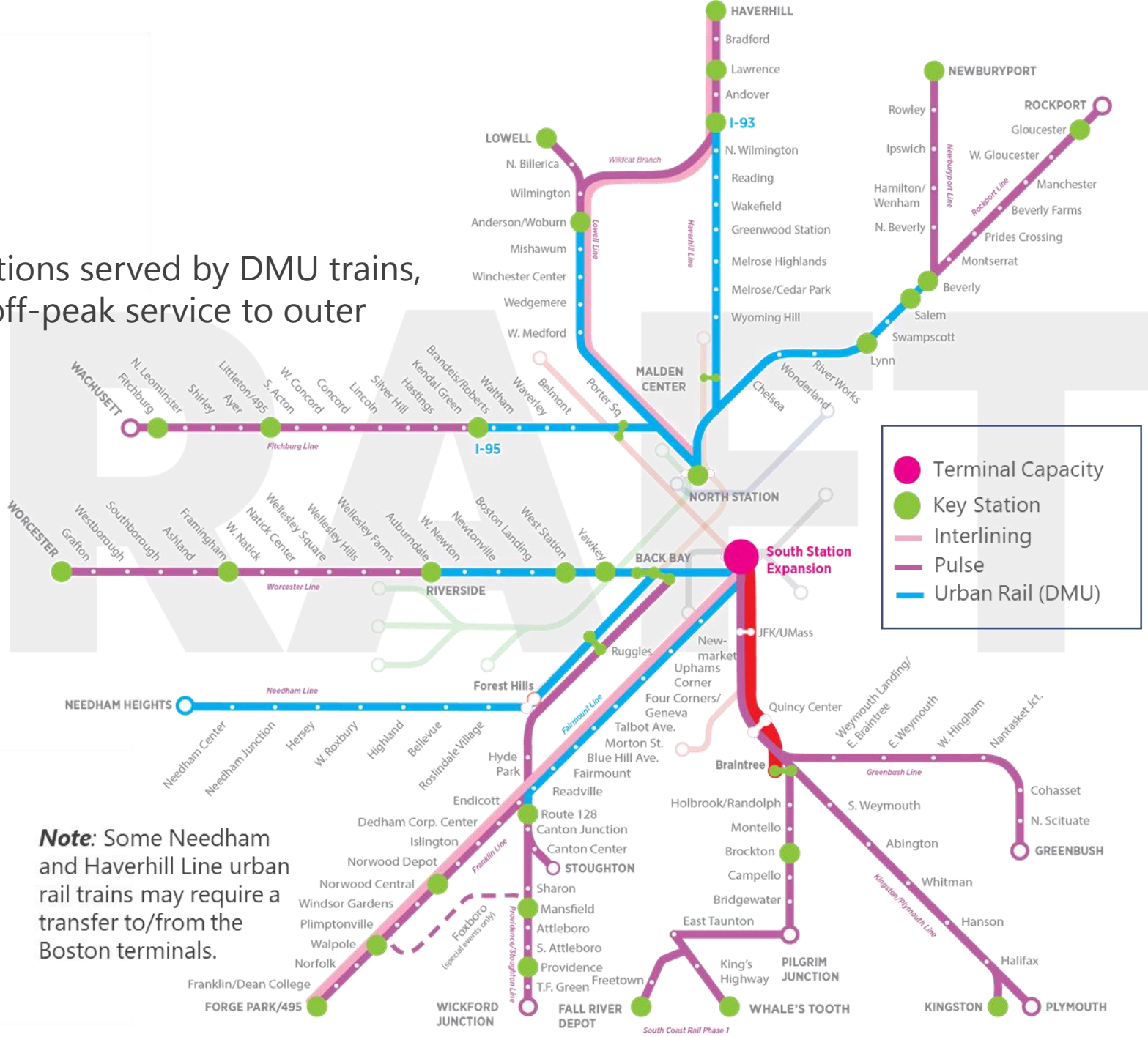
Service Alternative

#3: DMU Urban Rail

All-day frequent service to inner core stations served by DMU trains, supported by frequent peak and hourly off-peak service to outer stations, with South Station Expansion

Key Features	
Typical Frequency	Key Stations: 30/60 bi-directional Inner Core: 15/15 bi-directional Outer Stations: 30/60 bi-directional
Electrification	None
Rolling Stock	DMUs Diesel Locomotive
Terminals	South Station Expansion
System Expansions	SCR Phase 1
Interlining	Haverhill/Lowell Franklin/Fairmount
Station Accessibility	Inner Core



Note: Some Needham and Haverhill Line urban rail trains may require a transfer to/from the Boston terminals.

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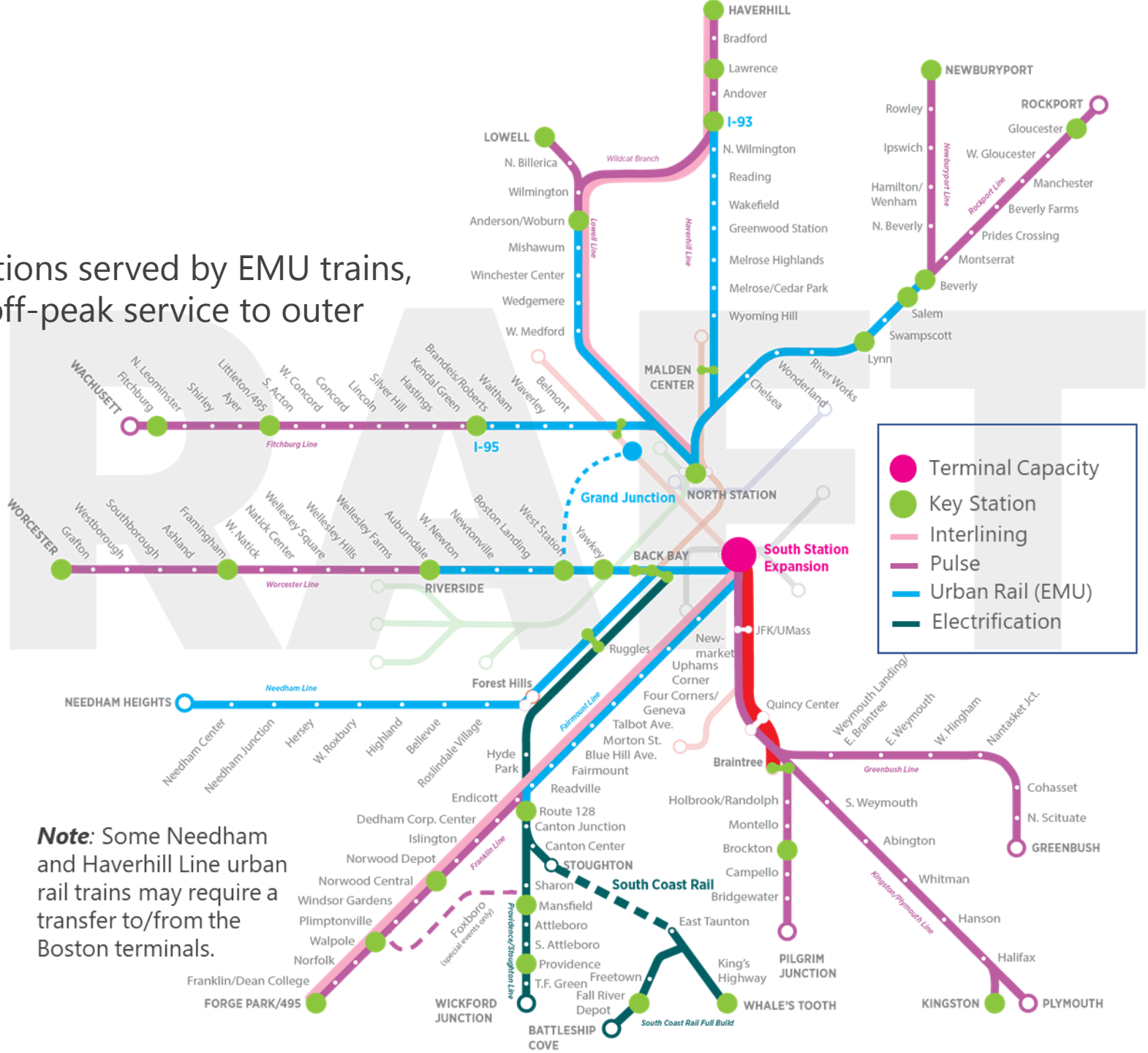
Service Alternative

#4: EMU Urban Rail

All-day frequent service to inner core stations served by EMU trains, supported by frequent peak and hourly off-peak service to outer stations, with South Station Expansion

Key Features	
Typical Frequency	Key Stations: 30/60 bi-directional Inner Core: 15/15 bi-directional Outer Stations: 30/60 bi-directional
Electrification	Urban Rail Providence Line SCR Full Build
Rolling Stock	EMUs Diesel Locomotive
Terminals	South Station Expansion
System Expansions	SCR Full Build Grand Junction
Interlining	Haverhill/Lowell Franklin/Fairmount
Station Accessibility	Inner Core



Note: Some Needham and Haverhill Line urban rail trains may require a transfer to/from the Boston terminals.

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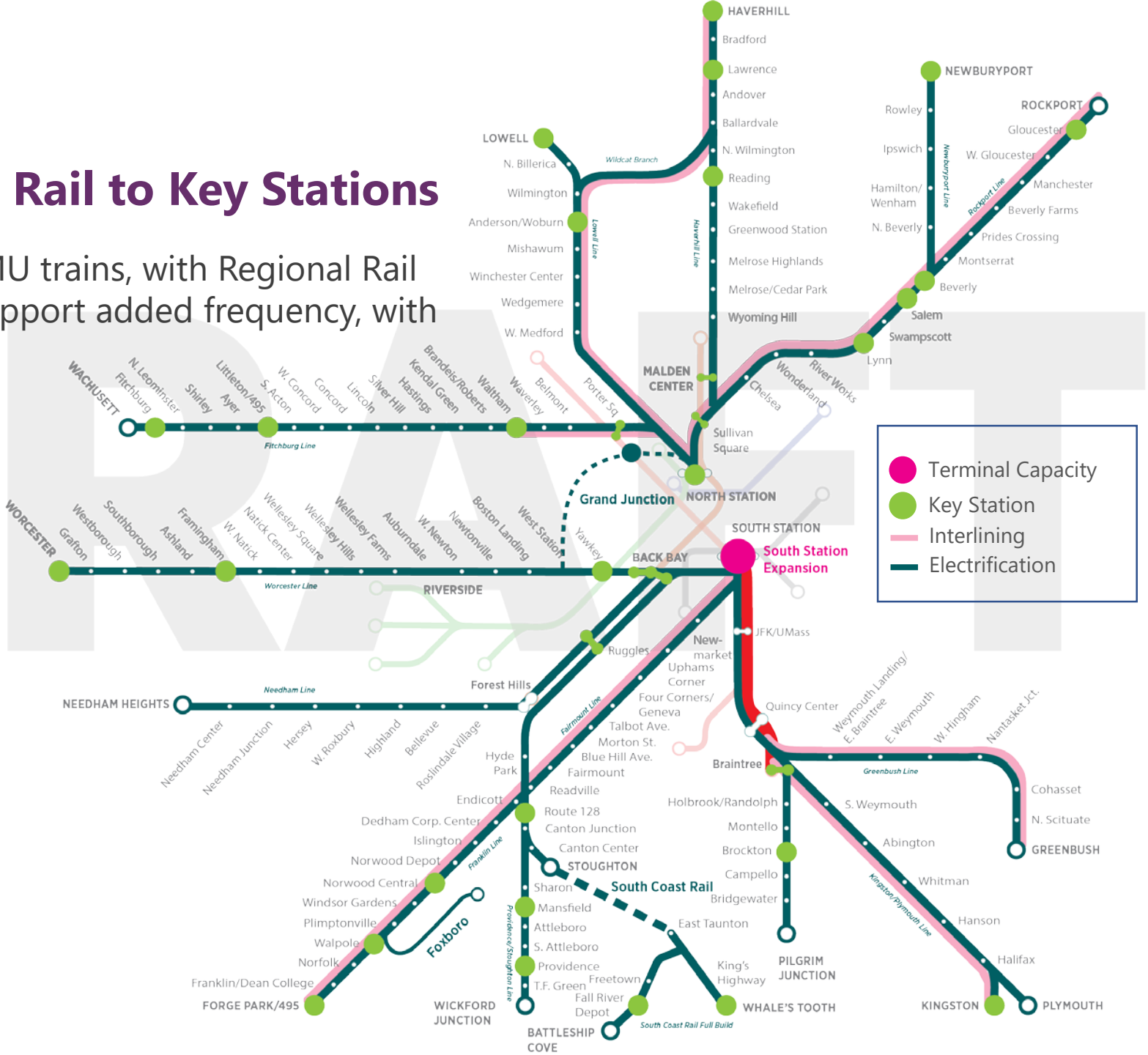
Service Alternative

#5: Electrification + Regional Rail to Key Stations

Electrification of the system served by EMU trains, with Regional Rail service on longer lines and capacity to support added frequency, with South Station Expansion

Key Features	
Typical Frequency	Key Stations: 15/15 bi-directional Inner Core: 15/15 bi-directional Outer Stations: 30/60 bi-directional
Electrification	Full System
Rolling Stock	EMUs
Terminals	South Station Expansion
System Expansions	SCR Full Build Grand Junction Foxboro
Interlining	Haverhill/Lowell Franklin/Fairmount Greenbush/Kingston Fitchburg/Newburyport-Rockport
Station Accessibility	Key Stations



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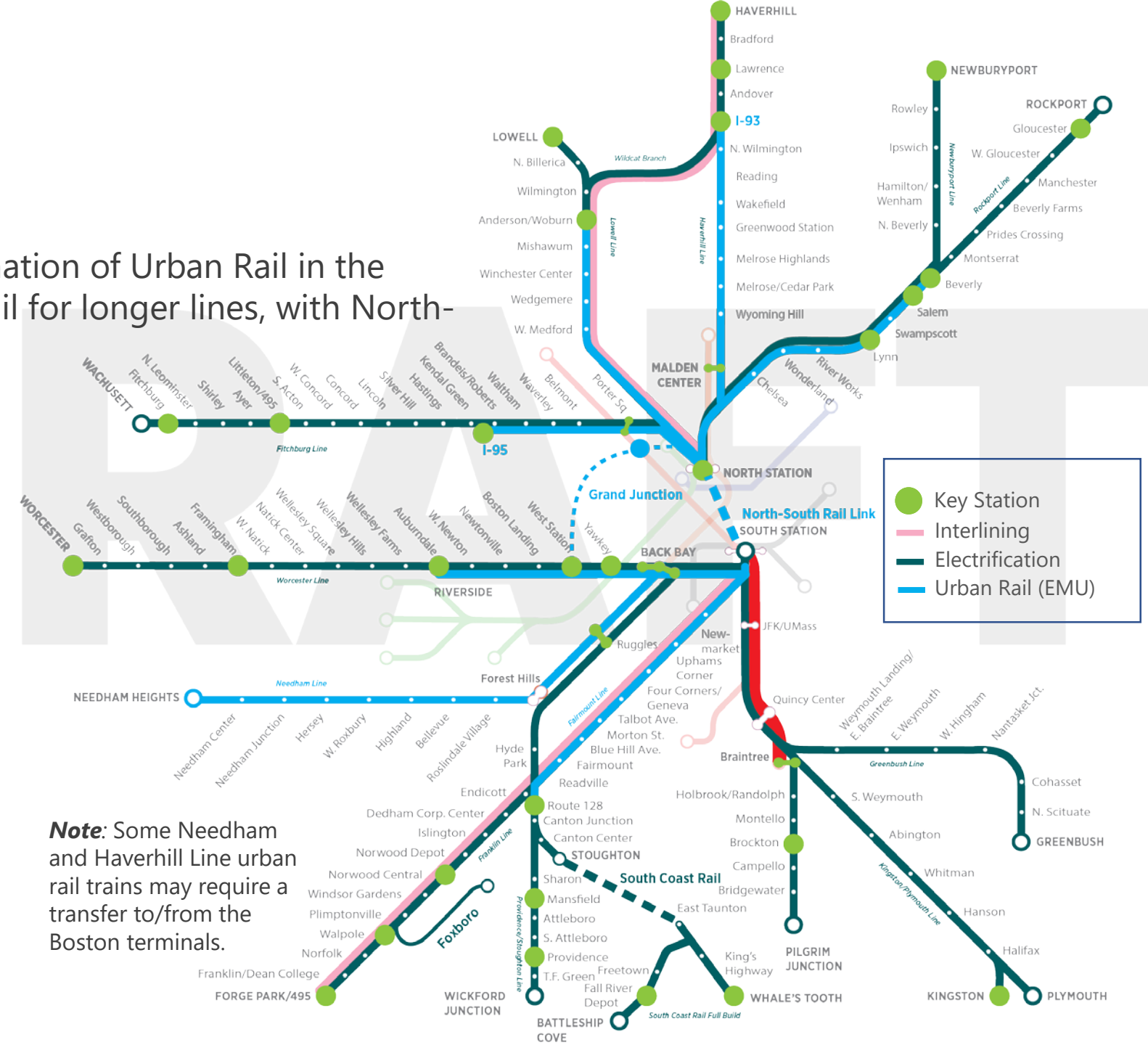
Service Alternative
#6: Electrified/Integrated

Full system electrification, with a combination of Urban Rail in the inner core communities and Regional Rail for longer lines, with North-South Rail Link.

Key Features	
Typical Frequency	Key Stations: 15/15 bi-directional Inner Core: 15/15 bi-directional Outer Stations: 15/30 bi-directional
Electrification	Full System
Rolling Stock	EMUs
Terminals	North-South Rail Link
System Expansions	SCR Full Build Grand Junction Foxboro
Interlining	Haverhill/Lowell Franklin/Fairmount Urban Rail/Urban Rail
Station Accessibility	All Stations Served



Note: Some Needham and Haverhill Line urban rail trains may require a transfer to/from the Boston terminals.

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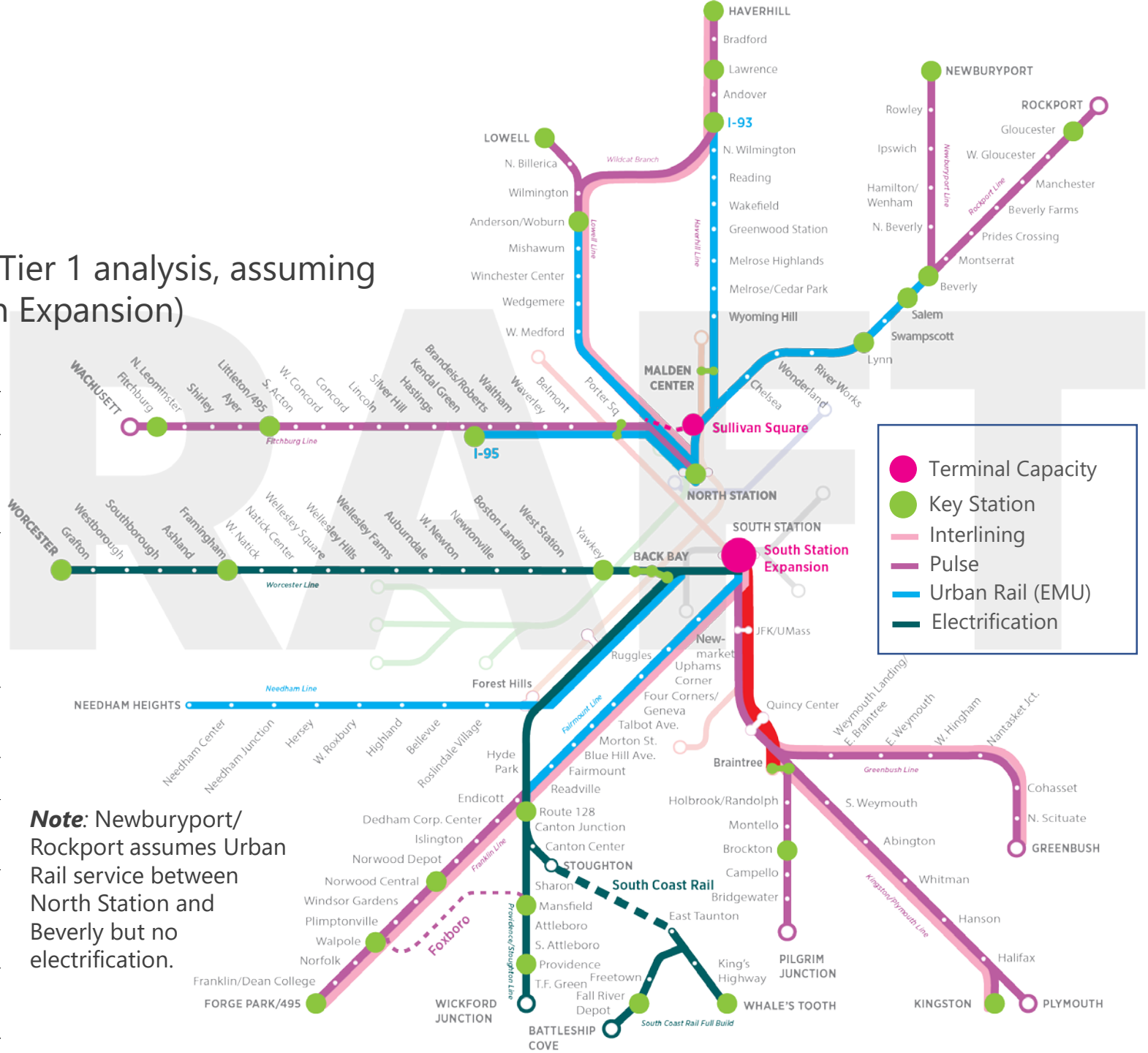
Service Alternative
#7: Line Optimization

Optimizes service for each line based on Tier 1 analysis, assuming *increased* terminal capacity (South Station Expansion)

Key Features	
Typical Frequency	Key Stations: 30/60 bi-directional or better Inner Core: 15/30 bi-directional or better Outer Stations: 30/60 bi-directional
Electrification	Urban Rail (Haverhill/Lowell, Fitchburg, Needham Heights, and Fairmount) Worcester Line Providence Line SCR Full Build
Rolling Stock	EMUs Diesel Locomotive
Terminals	South Station Expansion
System Expansions	SCR Full Build
Interlining	Haverhill/Lowell Franklin/Fairmount Greenbush/Kingston
Station Accessibility	Key Stations Inner Core (where Urban Rail on line)



Note: Newburyport/ Rockport assumes Urban Rail service between North Station and Beverly but no electrification.

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Tier 2 Variables: Fares and Parking

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Integrating Parking Analysis into Tier 2

What we have heard?

- Parking constrains current ridership – some lots fill up by 7am
- Parking will remain a concern, despite trends towards alternative transportation
- Modeling future ridership with parking constrained will not provide an accurate picture of the potential riders

Options and Considerations for Parking Analysis in Tier 2

- Model all stations with unconstrained parking
  - May artificially inflate ridership while excluding the cost and political considerations associated with construction of additional parking across the region
- Model all stations with current parking constraints
  - May limit the ridership potential and may not be realistic given the transformative level of investment included in these alternatives

Integrating Fare Analysis into Tier 2

What we have heard?

- The current fare structure limits ridership due to the cost burden
- Stations within the rapid transit geography should reflect rapid transit fares
- The MBTA should consider a single low fare, rather than a zonal structure

Considerations for Fare Analysis in Tier 2

- The MBTA is conducting a network-wide analysis of fare policy, which will identify and evaluate potential alternative fare structures
  - How can we potentially use Tier 2 to explore the modeled effect of different fare structures without getting ahead of the MBTA effort?

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Tier 2 Evaluation Tools and Metrics

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Rail Traffic Controller (RTC)

A simulation modeling software used to simulate railroad operations at a detailed and realistic level to test and evaluate railroad operating plans, proposed capital improvements and infrastructure alternatives. The RTC analysis will identify the feasibility of Alternatives' schedules based on coded infrastructure changes.

Available Metrics:

- Change in end-to-end trip time (or speed)
- Change in the number of daily commuter rail train trips (or train miles)
- Change in the number of daily commuter rail train trips serving EJ Communities

CTPS Travel Demand Model

The four-step travel demand model used to support major planning efforts in the Boston region. The model assigns trips in a region to modes based on a generalized cost. The CTPS model will provide ridership estimates for all seven Alternatives.

Available Metrics:

Change in

- Δ Daily commuter rail boardings
- Δ Daily commuter rail passenger miles
- Δ Daily MBTA systemwide boardings
- Δ Passenger trips on the core MBTA bus and rapid transit network
- Δ Number of jobs accessible within 1 hour of using commuter rail
- Δ Accessibility to employment for EJ compared to non-EJ communities
- Δ Commuter rail mode share
- Δ Number of daily auto diversions

- Tons of greenhouse gas emissions removed
- Reduction in average daily VMT for personal vehicles
- Reduction in average daily VHT for personal vehicles
- Order-of-magnitude change in annual revenue (fares, parking, and tolls)
- Volume/capacity ratio for selected roadways
- Average speed for selected roadways

Regional Dynamic Model (RDM)

A strategic simulation model focused on how transportation, land-use, population, and employment interact. Tier 2 will use the RDM to identify potential land-use and demographic effects of one or more Alternatives.

Available Metrics (for use in CTPS Model*):

- Population changes at a RDM-zonal level
- Employment changes at a RDM-zonal level

*Not produced for all alternatives

Cost Metrics

- Estimated capital costs (Capital Cost Estimates)
- Order-of-magnitude change in annual O&M cost (Operating Cost Model)
- Change in operating subsidy per passenger (Operating Cost Model and CTPS)

Using Metrics to Evaluate Alternatives

Project Objectives:

- Match Service with the Growing and Changing Needs
- Change in Number of Jobs Accessible within 1 Hour of Using Commuter Rail
- Improve the Passenger Experience
- Provide an Equitable and Balanced Suite of Investments
- Help the Commonwealth Achieve its Climate Change Resiliency Targets
- Maximize Return on Investment (Financial Stewardship)

Are we capturing the most important metrics in order to effectively evaluate the alternatives against our objectives?

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Public Outreach Plan

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Spread the Word

- ✓ Release a quick, easy to use digital survey
- ✓ Host an open house format public meeting the last week of February in a central Boston location
- ✓ Targeted briefings with interested stakeholder groups
- ✓ Attend relevant MAPC Long Range Plan public meetings to gather additional input

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Public Comment

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Appendix

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Project Objectives and Tier 2 Metrics

Objectives and Subobjectives	Tier 2 Metrics
No Objective Specified	
Reduce roadway congestion	Volume/capacity ratio for selected roadways *(CTPS)* Average speed for higher functional class roadways *(CTPS)*
Objective 1: Match Service with the Growing and Changing Needs	
Maximize commuter rail ridership	Change in daily commuter rail boardings *(CTPS)* Change in daily commuter rail passenger miles *(CTPS)*
Maximize transit ridership	Change in daily MBTA systemwide boardings *(CTPS)*
Objective 2: Change in Number of Jobs Accessible within 1 Hour of Using Commuter Rail	
Improve access to jobs and opportunities	Change in number of jobs accessible within 1 hour of using commuter rail *(CTPS)*
Objective 3: Improve the Passenger Experience	
Continue making commuter rail competitive to driving	Change in end-to-end trip time (or speed) *(RTC)*
Support ability to travel	Change in the number of daily commuter rail train trips (or train miles) *(RTC)*
Relieve capacity constraints on the core MBTA bus and rapid transit network	Change in passenger trips on the core MBTA bus and rapid transit network *(CTPS)*

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Project Objectives and Tier 2 Metrics

Objectives and Subobjectives	Tier 2 Metrics
Objective 4: Provide an Equitable and Balanced Suite of Investments	
Improve access to jobs for disadvantaged communities	Change in accessibility to employment for EJ compared to non-EJ communities *(CTPS)*
Improve the quality and level of commuter rail service to disadvantaged communities	Change in the number of daily commuter rail train trips serving EJ Communities *(RTC)*
Objective 5: Help the Commonwealth Achieve its Climate Change Resiliency Targets	
Reduce greenhouse gas emissions	Tons of greenhouse gas emissions removed *(CTPS)*
Reduce dependence on personal vehicles	Change in commuter rail mode share *(CTPS)* Number of daily auto diversions *(CTPS)* Reduction in average daily VMT for personal vehicles *(CTPS)* Reduction in average daily VHT for personal vehicles *(CTPS)*
Objective 6: Maximize Return on Investment (Financial Stewardship)	
Minimize capital cost, compared to benefit	Estimated capital costs *(Capital Cost Model)*
Minimize the annual O&M cost	Order-of-magnitude change in annual O&M cost *(Operating Cost Model)*
Maximize state agency revenues	Order-of-magnitude change in annual revenue (fares, parking, and tolls) *(CTPS)*
Maximize efficiency of the commuter rail system	Change in operating subsidy per passenger *(CTPS, Operating Cost Model)*