



A Rail Investment Plan for
the Northeast Corridor

RECORD OF DECISION

Appendix B (Definition
of Decision Matrix and
Schematic)

JULY 2017



U.S. Department of Transportation
Federal Railroad Administration



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Federal Railroad Administration

Record of Decision: NEC FUTURE A Rail Investment Plan for the Northeast Corridor

Washington, D.C., to Boston, Massachusetts
July 2017

APPENDIX B: DEFINITION OF DECISION MATRIX AND SCHEMATIC

Prepared by:



U.S. Department of Transportation
Federal Railroad Administration

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1 Introduction

The following Definition of Decision Matrix (Matrix) and Schematic (Schematic) describe the Selected Alternative service and performance objectives and infrastructure elements by geographic segment. In all cases, the geographic segment objectives and elements are consistent with the corridor-wide objectives and elements described in the Record of Decision (ROD) document. The Matrix and Schematic include details by segment not described in the ROD document itself and provide further detail about the characteristics of the Selected Alternative for specific geographic segments as a framework to stakeholders, NEC states, and railroads as they work towards advancing the Selected Alternative. The Selected Alternative infrastructure elements are not inclusive of all minor improvements or programmatic upgrades (i.e., curve adjustment, track realignment, signal improvements, catenary replacement, etc.) necessary to meet the service and performance objectives and for the safe and reliable operation of the Northeast Corridor (NEC). Although not specified in the ROD, the FRA will review, to the extent authorized, these minor improvements for consistency with the Selected Alternative service and performance objectives.

The Matrix and Schematic identify station improvements within each geographic segment. Station improvements are described as modified, new, or expanded. These improvement types are similar to those presented for the Preferred Alternative in the Tier 1 Final EIS (e.g., a modified station would be upgraded from a Local station with only Regional rail service to a Hub station with both Intercity and Regional rail service). Station improvement types are revised in some cases from the Tier 1 Final EIS to clarify the infrastructure improvements in addition to describing a change in station type and services offered. For the Selected Alternative, stations requiring some physical improvements to support service and performance objectives are also categorized as modified, although they are not proposed for a change in station type. Other stations improvements have been clarified and the type of improvement (modified, new, or expanded) updated from what was presented in the Tier 1 Final EIS. In all cases, the proposed service levels are consistent with the definitions in the Tier 1 Final EIS for the Preferred Alternative.

The Matrix identifies specific commitments or thresholds as well as post-ROD planning or Tier 2 considerations. The Matrix and Schematic are companion documents to be used in conjunction with the ROD document itself. Specific aspects of the Selected Alternative summarized herein are described in the ROD document Sections 3 (Description of Selected Alternative), 5 (Consistency Criteria), and 6 (Tier 2 Considerations and Environmental Resources).

While the Matrix identifies service and performance objectives, the ROD is not prescriptive regarding how or who should operate service in the future. The FRA evaluated rail operations without being constrained by existing jurisdictional boundaries or other interagency operating agreements. Furthermore, the service and performance objectives will require infrastructure investments as noted in the Matrix and Schematic, and the adoption of enhanced service concepts, as appropriate. The Matrix identifies where opportunities for implementing enhanced service concepts should be considered in the design and implementation of infrastructure (see the Integrated Rail Network discussions included under Service and Performance Objectives for each geographic segment).

The Schematic identifies the service and performance targets, infrastructure elements, and key features of the NEC by NEC milepost.

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Elements of the Selected Alternative by Geographic Segment

Washington Union Station to Baltimore Penn Station			
Tier 1 Decision		Post-ROD Planning or Tier 2 Consideration	Highlighted Environmental Resources
Service & Performance Objectives	Infrastructure (* = Related Project)		
<ul style="list-style-type: none"> ■ <u>Frequency Target:</u>¹ <ul style="list-style-type: none"> – 20 trains per peak hour (tpph) in the peak direction for combined Intercity and Regional rail (passenger rail) service <ul style="list-style-type: none"> • 10 Intercity tpph in the peak direction ■ <u>New Station Connections on NEC:</u> <ul style="list-style-type: none"> – Intercity – expanded access to metropolitan areas (represented by Odenton Station) ■ <u>Conflict-free Operations:</u> <ul style="list-style-type: none"> – Four-track, express/local operations New Carrollton to Baltimore, including through New Baltimore Tunnel ■ <u>Integrated Rail Network:</u> <ul style="list-style-type: none"> – Support enhanced connecting corridor service south of Washington D.C. – 14 daily trains Richmond to Penn Station New York (PSNY) ■ <u>Freight:</u> Protect freight access to the Port of Baltimore 	<p>Two- to four-track railroad to accommodate a mix of passenger rail services</p> <ul style="list-style-type: none"> ■ <u>Chokepoint Relief:</u> New Carrollton, Odenton, and BWI* Airport Stations ■ <u>New Track:</u> New Carrollton to Halethorpe* ■ <u>Curve Modification:</u> N/A ■ <u>Bridge Replacement:</u> N/A ■ <u>New Segment:</u> New Baltimore Tunnel (B&P Tunnel Replacement*) ■ <u>Station Improvement:</u> <ul style="list-style-type: none"> – Modified: Odenton – Expanded: Washington Union Station,* BWI Airport* ■ <u>Systems Upgrade:</u> <ul style="list-style-type: none"> – High Density Signaling – Washington, D.C., to New Carrollton, MD; Seabrook, MD, to West Baltimore, MD – As appropriate to achieve service and performance objectives 	<ul style="list-style-type: none"> ■ Coordinate with Southeast High Speed Rail (SEHSR) and Richmond to Washington Corridor (DC2RVA) improvements and plans ■ Coordinate with Washington Union Station Expansion and B&P Tunnel Replacement projects ■ Coordinate with Long Bridge (Related Project not included in the Selected Alternative) and D.C. Yard projects. ■ Consider infrastructure necessary to expand intercity access to metropolitan areas and accommodate corridor-wide and geographic segment service and performance objectives ■ Consider storage and maintenance requirements to accommodate service and performance objectives (e.g., facilities in the vicinity of Ivy Yard, Washington, D.C.) 	<ul style="list-style-type: none"> ■ Patuxent Research Refuge ■ National Register of Historic Places sites such as Bolton Hill Historic District ■ Areas at risk from storm surge flooding and riverine flooding ■ Environmental Justice communities in Baltimore City, MD

¹ At the Washington Union Station screenline, service frequency between Washington Union Station and Baltimore Penn Station could vary with changes in Regional rail service.

Elements of the Selected Alternative by Geographic Segment (continued)

Baltimore Penn Station to Philadelphia 30 th Street Station			
Tier 1 Decision		Post-ROD Planning or Tier 2 Consideration	Highlighted Environmental Resources
Service & Performance Objectives	Infrastructure (* = Related Project)		
<ul style="list-style-type: none"> ■ <u>Frequency Target:</u>² <ul style="list-style-type: none"> – 18 tpph in the peak direction for passenger rail service <ul style="list-style-type: none"> • 10 Intercity tpph in the peak direction ■ <u>New Station Connections on NEC:</u> <ul style="list-style-type: none"> – Intercity – expanded access to metropolitan areas (represented by Philadelphia International Airport Station) – Intercity and Regional – expanded access to metropolitan areas (represented by Bayview and Baldwin Stations) – Regional – expanded access to Metropolitan areas (represented by Elkton, MD, Newport and Edgemoor, DE, stations) ■ <u>Conflict-free Operations:</u> <ul style="list-style-type: none"> – High-speed express tracks between Bayview, MD, and Edgemoor, DE (non-stop through Wilmington) ■ <u>Integrated Rail Network:</u> <ul style="list-style-type: none"> – Support enhanced Keystone Corridor service – 24 daily trains, Harrisburg, PA, to PSNY – Cross-platform transfers to support pulse-hub operations at Philadelphia 30th Street Station for NEC and Keystone Corridor services ■ <u>Freight:</u> Protect freight access to the ports of Baltimore, Wilmington, and Philadelphia 	<p>Four- to six-track railroad to accommodate a mix of passenger rail services</p> <ul style="list-style-type: none"> ■ <u>Chokepoint Relief:</u> Newark, DE, Station; Philadelphia 30th Street – Penn Interlocking ■ <u>New Track:</u> Union Tunnel; Aberdeen to Havre de Grace, Newark to Newport ■ <u>Curve Modification:</u> near Baltimore Penn Station to I-895 ■ <u>Bridge Replacement:</u> Bush, Gunpowder, Susquehanna Bridges* ■ <u>New Segment:</u> Bayview, MD to Newport, DE; Wilmington Segment; Philadelphia Segments: Baldwin, PA, to Philadelphia 30th Street Station; Philadelphia International Airport Station ■ <u>Station Improvement:</u> <ul style="list-style-type: none"> – Modified: MD – Baltimore Penn, Martin Airport, Aberdeen; DE – Newark, DE – New: MD – Bayview, Elkton; DE – Newport, Edgemoor; PA – Baldwin, Philadelphia Airport – Expanded: PA – Philadelphia 30th Street ■ <u>Systems Upgrade:</u> <ul style="list-style-type: none"> – Broadway to Bayview, MD; Bayview, MD, to Gunpowder River; Bush River to Aberdeen, MD; Perryville, MD, to Newport, DE; Edgemoor, DE, to Baldwin, PA – As appropriate to achieve service and performance objectives 	<ul style="list-style-type: none"> ■ Minimize new impacts to the John Heinz Wildlife Refuge ■ Coordinate with CSX/SEPTA and City of Philadelphia regarding airport connection ■ Incorporate ongoing Susquehanna Bridge Replacement ■ Coordinate with Newark Regional Transportation Center (NRTC) project sponsors on specific location and design of modified Newark, DE Station. ■ Consider infrastructure necessary to expand intercity access to metropolitan areas and accommodate corridor-wide and geographic segment service and performance objectives 	<ul style="list-style-type: none"> ■ Conversion of land cover (undeveloped to developed) ■ Agricultural lands in Harford and Cecil Counties, MD ■ Effects on ecological and hydrologic resources associated with the Gunpowder and Bush rivers, Gasheys Run Critical Habitat, Christina River and Brandywine Creek ■ Gunpowder Falls State Park, John Heinz Wildlife Refuge, David Craig Park and Banning Park ■ National Register of Historic Places sites such as Delaware Boundary Markers, the Havre de Grace Historic District and Sophia's Dairy ■ White Clay Creek, a wild and scenic river

² At the Baltimore Penn Station screenline, service frequency between Baltimore Penn Station and Philadelphia 30th Street Station could vary with changes in Regional rail service.

Elements of the Selected Alternative by Geographic Segment (continued)

Philadelphia 30 th Street Station to Trenton, NJ			
Tier 1 Decision		Post-ROD Planning or Tier 2 Consideration	Highlighted Environmental Resources
Service & Performance Objectives	Infrastructure (* = Related Project)		
<ul style="list-style-type: none"> ■ <u>Frequency Target:</u>³ <ul style="list-style-type: none"> – 18 tpph in the peak direction for passenger rail service <ul style="list-style-type: none"> • 10 Intercity tpph in both directions ■ <u>New Station Connections on NEC:</u> N/A ■ <u>Conflict-free Operations:</u> <ul style="list-style-type: none"> – High-speed express tracks from north of Philadelphia 30th Street Station to Bridesburg, PA on new segment – Eliminate speed restrictions and chokepoints at Trenton Station for stopping and non-stop passenger rail trains and Regional rail yard access ■ <u>Integrated Rail Network:</u> <ul style="list-style-type: none"> – Schedule coordination for Intercity and Regional rail service at Trenton, NJ, Cornwells Heights and North Philadelphia, PA stations ■ <u>Freight:</u> N/A 	<p>Four- to six-track railroad to accommodate a mix of passenger rail services</p> <ul style="list-style-type: none"> ■ <u>Chokepoint Relief:</u> Trenton Station and Yard Access ■ <u>New Track:</u> N/A ■ <u>Curve Modification:</u> near Bridesburg and Holmesburg stations ■ <u>Bridge Replacement:</u> N/A ■ <u>New Segment:</u> Philadelphia Segments: Philadelphia 30th Street Station to Bridesburg, PA ■ <u>Station Improvement:</u> <ul style="list-style-type: none"> – Modified: PA – Cornwells Heights ■ <u>Systems Upgrade:</u> <ul style="list-style-type: none"> – North Philadelphia, PA; Bridesburg, PA to Trenton, NJ – As appropriate to achieve service and performance objectives 	<ul style="list-style-type: none"> ■ Consider alternative construction type(s) and specific locations for the Philadelphia new segment between Philadelphia 30th Street Station and Bridesburg, PA to avoid or minimize impacts to Section 4(f) resources including Fairmont Park and the Philadelphia Zoo ■ Consider storage and maintenance requirements to accommodate passenger rail service objectives (e.g. expansion of facilities in the vicinity in Philadelphia) ■ Consider infrastructure necessary to expand intercity access to metropolitan areas and accommodate corridor-wide and geographic segment service and performance objectives 	<ul style="list-style-type: none"> ■ West Park and East Park (Fairmont Park system) ■ National Register of Historic Places and National Historic Landmark sites such as Andalusia, The Woodlands, John Bartram House, Fairmont Waterworks ■ Known concentrations of hazardous waste/contaminated sites ■ Environmental Justice communities in Philadelphia County, PA

³ At the Philadelphia 30th Street Station screenline, service between Philadelphia 30th Street Station and Trenton, NJ, could vary with changes in Regional rail service.

Elements of the Selected Alternative by Geographic Segment (continued)

Trenton, NJ, to Penn Station New York			
Tier 1 Decision		Post-ROD Planning or Tier 2 Consideration	Highlighted Environmental Resources
Service & Performance Objectives	Infrastructure (* = Related Project)		
<ul style="list-style-type: none"> ■ <u>Frequency Target:</u>⁴ <ul style="list-style-type: none"> – 52 tpph in the peak direction for passenger rail <ul style="list-style-type: none"> • No less than 42 Regional tpph in the peak direction • 10 Intercity tpph in both directions ■ <u>New Connections on NEC:</u> <ul style="list-style-type: none"> – Intercity- expanded access to metropolitan areas (represented by North Brunswick and Secaucus in the Selected Alternative); – Expanded Intercity service at existing stations (represented by Metropark in the Selected Alternative) ■ <u>Conflict-free Operations:</u> <ul style="list-style-type: none"> – Relieve capacity chokepoints and create separate express tracks between Newark, NJ and PSNY ■ <u>Integrated Rail Network:</u> <ul style="list-style-type: none"> – One-seat ride west of Hudson River for select Regional rail services – Multi-operator Regional rail run-through services at PSNY ■ <u>Freight:</u> Protect freight access to the port of Newark 	<p>Four- to six-track railroad to accommodate a mix of passenger rail services</p> <ul style="list-style-type: none"> ■ <u>Chokepoint Relief:</u> Metropark Station, Hunter Flyover,* Westbound Waterfront Connection; Portal Bridge;* Sawtooth Bridge ■ <u>New Track:</u> N/A ■ <u>Curve Modification:</u> N/A ■ <u>Bridge Replacement:</u> see Chokepoint Relief ■ <u>New Segment:</u> North Brunswick, NJ to Secaucus, NJ; Secaucus/Bergen Loop; Secaucus, NJ to PSNY (Hudson Tunnel Project*) ■ <u>Station Improvement:</u> <ul style="list-style-type: none"> – Modified: Newark Penn Station, Secaucus – New: North Brunswick, NJ – Expanded: Metropark, Penn Station New York* ■ <u>Systems Upgrade:</u> <ul style="list-style-type: none"> – North Brunswick, NJ to Secaucus, NJ; Secaucus, NJ to Jersey City, NJ – As appropriate to achieve service and performance objectives 	<ul style="list-style-type: none"> ■ Consider stations in proximity to one another when evaluating service improvements and deciding on new connections and station locations to allow flexibility in response to site-specific conditions ■ Continued rail planning with railroad owners, operators and stakeholders for the Penn Station Complex ■ Consider high existing trans-Hudson travel demand and future growth (beyond 2040) in evaluating infrastructure between Secaucus, NJ, and PSNY (and connections east of Sunnyside Yard) ■ Consider storage and maintenance requirements to accommodate passenger rail service objectives (e.g., expansion of Sunnyside Yard and/or additional storage at new site in Northern New Jersey) ■ Consider infrastructure necessary to expand intercity access to metropolitan areas and accommodate corridor-wide and geographic segment service and performance objectives 	<ul style="list-style-type: none"> ■ Ecological and hydrologic resources associated with Passaic, Hackensack, and Hudson Rivers ■ National Register of Historic Places sites such as Dock Bridge ■ Merrill Park ■ Known concentrations of hazardous waste/contaminated sites ■ Environmental Justice communities in Somerset and Essex Counties, NJ

⁴ At the Hudson River screenline, service between Trenton, NJ, and Penn Station New York could vary with changes in Regional rail service.

Elements of the Selected Alternative by Geographic Segment (continued)

Penn Station New York to New Rochelle, NY			
Tier 1 Decision		Post-ROD Planning or Tier 2 Consideration	Highlighted Environmental Resources
Service & Performance Objectives	Infrastructure (* = Related Project)		
<ul style="list-style-type: none"> ■ <u>Frequency Target</u>⁵ <ul style="list-style-type: none"> – 10 Intercity tpph in both directions ■ <u>New Station Connections to NEC</u>: <ul style="list-style-type: none"> – Intercity – expanded access to metropolitan areas (represented by Morris Park) – Regional – Hunts Point, Parkchester/Van Ness, Co-op City ■ <u>Conflict-free Operations</u>: <ul style="list-style-type: none"> – Relieve capacity chokepoints and create separate express tracks from PSNY to New Rochelle – Grade separation to improve operations between Hell Gate and New Haven lines ■ <u>Integrated Rail Network</u>: <ul style="list-style-type: none"> – Support multi-operator Regional rail run-through services at PSNY – “Transit-style” Regional rail service from New York City to New Rochelle, NY – Support enhanced Empire Corridor service – 22 daily trains Albany to PSNY ■ <u>Freight</u>: Protect freight access to the port of New York and to points north along the NEC via Hell Gate Bridge* 	<p>Four- to six-track railroad to accommodate a mix of passenger rail services</p> <ul style="list-style-type: none"> ■ <u>Chokepoint Relief</u>: Pelham Bay Bridge;* New Rochelle (Shell Junction) ■ <u>New Track</u>: Hell Gate Line expansion between Queens and Bronx Counties ■ <u>Curve Modification</u>: Bronx County, near the I-95 and I-895 interchange; and near Pelham Bay Park; near New Rochelle Rail Station ■ <u>Bridge Replacement</u>: see Chokepoint Relief ■ <u>New Segment</u>: East River Tracks in tunnel to Hell Gate Bridge ■ <u>Station Improvement</u>: <ul style="list-style-type: none"> – Modified: New Rochelle – New: Hunts Point,* Parkchester/Van Ness;* Morris Park;* Co-op City* – Expanded: Penn Station New York* ■ <u>Systems Upgrade</u>: <ul style="list-style-type: none"> – Woodside, NY to New Rochelle, NY – As appropriate to achieve service and performance objectives 	<ul style="list-style-type: none"> ■ Consider stations in proximity to one another when evaluating service improvements and deciding on new connections and station locations to allow flexibility in response to site-specific conditions ■ Continued rail planning with railroad owners, operators and stakeholders for the Penn Station Complex ■ Consider infrastructure necessary to expand intercity access to metropolitan areas and accommodate corridor-wide and geographic segment service and performance objectives 	<ul style="list-style-type: none"> ■ Ecological and hydrologic resources associated with the Hudson and East Rivers ■ Environmental Justice communities in Bronx County, NY

⁵ At the East River screenline, Intercity target for service between Penn Station New York (PSNY) and New Rochelle, NY. Targets for Regional rail service on the NEC (New Haven and Hell Gate lines) may vary; estimated frequencies at key screenlines are further described in the Tier 1 Final EIS, Chapter 4. Regional frequencies assume a mix of services operating between PSNY and New Rochelle, NY, including MNR service to GCT (via New Haven Line), LIRR service to PSNY (via East River tunnels), LIRR service to GCT (planned with East Side Access), and MNR service to PSNY (proposed with Penn Station Access).

Elements of the Selected Alternative by Geographic Segment (continued)

New Rochelle, NY, to New Haven, CT			
Tier 1 Decision		Post-ROD Planning or Tier 2 Consideration	Highlighted Environmental Resources
Service & Performance Objectives	Infrastructure (* = Related Project)		
<ul style="list-style-type: none"> ■ <u>Frequency Target</u>:⁶ <ul style="list-style-type: none"> – 10 Intercity tpph in both directions ■ <u>New Station Connections on NEC</u>: <ul style="list-style-type: none"> – Intercity – expanded access to metropolitan areas (represented by Cross-Westchester, NY; Stamford and Greens Farms, CT, stations) – Regional – expanded access to metropolitan areas: Barnum (east of Bridgeport) and Orange (east of Milford) stations – <u>Conflict-free Operations</u>: <ul style="list-style-type: none"> – High-speed express tracks from New Rochelle, NY, to Green Farms, CT ■ <u>Integrated Rail Network</u>: <ul style="list-style-type: none"> – Cross-platform, pulse-hub operations at New Haven Station – “Transit-Style” Regional rail service between New Rochelle, NY, and New Haven, CT ■ <u>Freight</u>: N/A 	<p>Four- to six-track railroad to accommodate a mix of passenger rail and freight services</p> <ul style="list-style-type: none"> ■ <u>Chokepoint Relief</u>: New Haven Station ■ <u>New Track</u>: N/A ■ <u>Bridge Replacement</u>: Cos Cob,* Saugatuck,* Devon* movable bridges ■ <u>New Segment</u>: New Rochelle, NY, to Greens Farms, CT ■ <u>Station Improvement</u>: <ul style="list-style-type: none"> – Modified: CT – Greens Farms, Stamford, New Haven – New: NY – Cross-Westchester; CT – Barnum; Orange ■ <u>Systems Upgrade</u>: <ul style="list-style-type: none"> – New Rochelle, NY, to Norwalk, CT – As appropriate to achieve service and performance objectives 	<ul style="list-style-type: none"> ■ Consider storage and maintenance requirements needed to accommodate passenger rail service objectives (e.g., expansion of New Haven Yard) ■ Consider infrastructure necessary to expand intercity access to metropolitan areas and accommodate corridor-wide and geographic segment service and performance objectives 	<ul style="list-style-type: none"> ■ Agricultural lands in New Haven County, CT ■ Ecologic and hydrologic resources associated with Saugatuck and Cos Cob Rivers ■ Environmental Justice communities in Fairfield County, CT

⁶ At the New Rochelle, NY, screenline, Intercity target for service between New Rochelle, NY, and New Haven, CT. Targets for Regional rail service on the NEC (New Haven Line) may vary; estimated frequencies at key screenlines are further described in the Tier 1 Final EIS, , Chapter 4. Regional frequencies assume a mix of services operating between New Rochelle, NY, and New Haven, CT, including MNR to GCT and MNR to PSNY (proposed).

Elements of the Selected Alternative by Geographic Segment (continued)

New Haven, CT, to Providence, RI			
Tier 1 Decision		Post-ROD Planning or Tier 2 Consideration	Highlighted Environmental Resources
Service & Performance Objectives	Infrastructure (* = Related Project)		
<ul style="list-style-type: none"> Frequency Target:⁷ <ul style="list-style-type: none"> 6–8 Intercity tpph in the peak direction New Connections on NEC: N/A Conflict-free Operations: N/A Integrated Rail Network: N/A Freight: N/A 	<p>Two-track railroad to accommodate a mix of passenger rail services</p> <ul style="list-style-type: none"> Chokepoint Relief: N/A New Track: N/A Curve Modification: N/A Bridge Replacement: Connecticut River* New Segment: N/A Station Improvement: N/A Systems Upgrade: N/A Modernize systems and infrastructure: Yes 	<ul style="list-style-type: none"> Commit to working with Connecticut and Rhode Island to identify on-and off-corridor infrastructure to expand railroad capacity between New Haven, CT, and Providence, RI, as part of the New Haven to Providence Capacity Planning Study. Completion of this Planning Study will be a pre-condition to any Tier 2 project studies that are intended to increase capacity in this area and will include coordination with Massachusetts and appropriate stakeholders as well as the public. Coordinate with the Rhode Island Department of Transportation and Amtrak on further study of improvements at T.F. Green Airport Train and Intermodal Station. 	<p>Results in a range of potential environmental effects depending on whether or not a coastal route or more inland route is identified:</p> <ul style="list-style-type: none"> Conversion of land cover (undeveloped to developed) in New London, New Haven, Hartford, Tolland, Windham, Counties CT. B. McKinney National Wildlife Refuge – Salt Meadow Unit in Middlesex County, CT; Nathaniel Hale State Forest, Tolland County, CT; Natchaug State Forest, Windham County, CT. National Register of Historic Places sites such as Clinton Village Historic District, Old Lyme Historic District, and Mystic River Historic District, Nathan Hale Homestead, South Coventry Historic District; Historic Village of the Narragansetts, Ecological and hydrologic resources associated with the Connecticut, Quinnipiac, Thames, Saugatuck, Mianus, and Cos Cob, Niantic, Mystic, Wood, Pawcatuck, and Pequonack Rivers and the Groton and Mystic Reservoirs Environmental Justice communities in Worcester County, RI Rhode Island Greenway Areas at risk from sea level rise, storm surge, or riverine flooding; Inland routing reduces risks from sea level rise and storm surge flooding

⁷ At the New Haven Station screenline, service between New Haven, CT, and Providence, RI, could vary with changes in Regional rail service. Routing for trains between New Haven, CT, and Providence, RI, will be evaluated in the New Haven to Providence Capacity Planning Study.

Elements of the Selected Alternative by Geographic Segment (continued)

Providence, RI, to Boston, MA			
Tier 1 Decision		Post-ROD Planning or Tier 2 Consideration	Highlighted Environmental Resources
Service & Performance Objectives	Infrastructure (* = Related Project)		
<ul style="list-style-type: none"> ■ <u>Frequency Target</u>:⁸ <ul style="list-style-type: none"> – 20 tpph in the peak direction for passenger rail service <ul style="list-style-type: none"> • 6-8 Intercity tpph in the peak direction ■ <u>New Connections on NEC</u>: <ul style="list-style-type: none"> – Regional rail station at Pawtucket* (east of Providence) ■ <u>Conflict-free Operations</u>: N/A ■ <u>Integrated Rail Network</u>: N/A ■ <u>Freight</u>: N/A 	<p>Two- to four-track railroad to accommodate a mix of Intercity and Regional services</p> <ul style="list-style-type: none"> ■ <u>Chokepoint Relief</u>: Canton Junction to Readville track and junction improvements ■ <u>New Track</u>: Pawtucket, RI, to Sharon, MA ■ <u>Curve Modification</u>: N/A ■ <u>Bridge Replacement</u>: N/A ■ <u>New Segment</u>: Neponset (Sharon to Hyde Park, MA) ■ <u>Station Improvement</u>: <ul style="list-style-type: none"> – Modified: MA – Route 128, Readville, Forrest Hills, Ruggles Street – New: Pawtucket, RI* – Expanded: Boston South Station* ■ <u>Systems Upgrade</u>: <ul style="list-style-type: none"> – As appropriate to achieve service and performance objectives 	<ul style="list-style-type: none"> ■ Coordinate with Northern New England Intercity Rail Initiative (NNEIRI) service proposed west of Boston, MA ■ Incorporate and coordinate with South Station Expansion project ■ Consider storage and maintenance requirements to accommodate passenger rail service objectives (e.g., expansion of Southampton Street Yard and/or additional new site to accommodate growth) ■ Coordinate with New Haven to Providence Capacity Planning Study ■ Consider infrastructure necessary to expand intercity access to metropolitan areas and accommodate corridor-wide and geographic segment service and performance objectives 	<ul style="list-style-type: none"> ■ Potential effects to National Register of Historic Places' sites such as South End District and the South Station Headhouse, the termination point of the NEC.

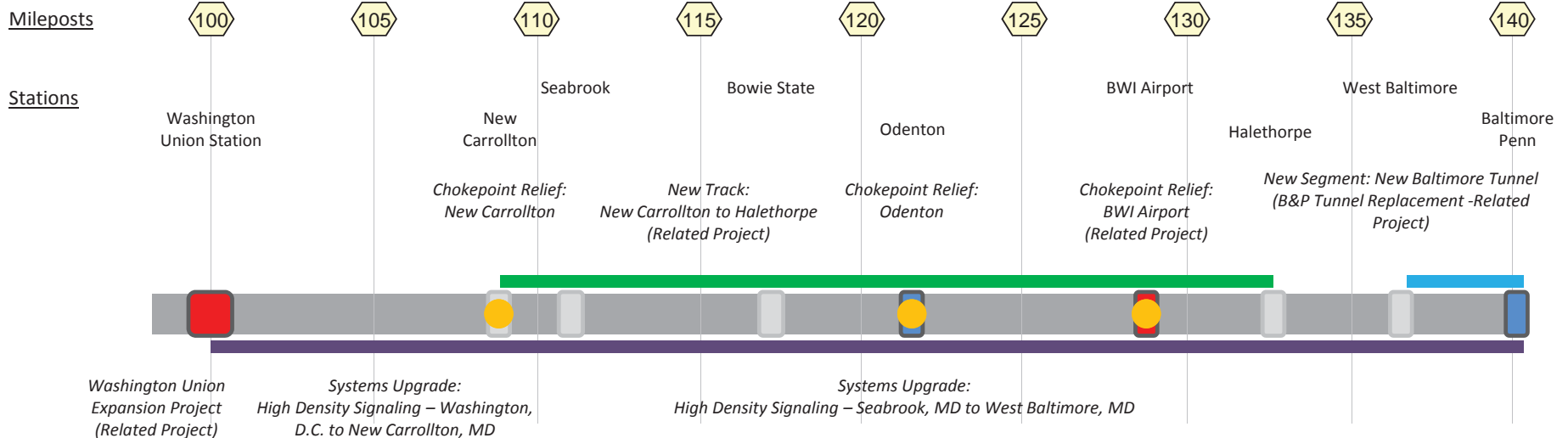
⁸ At the Providence Station screenline, service between Providence, RI, and Boston, MA, could vary with changes in Regional rail service.

Schematic

Washington Union Station to Baltimore Penn Station: Two- to four-track railroad

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Infrastructure Elements:



Service and Performance Objectives:

Frequency

Screenline: Washington, D.C. (north of Anacostia River):

20 passenger rail trains per peak hour in the peak direction

Target

10 Intercity trains per peak hour in the peak direction

New Connections

on NEC

Intercity – expanded access to metropolitan areas (represented by Odenton Station)

Conflict-free

Operations

Four-track, express/local operations New Carrollton to Baltimore including through New Baltimore Tunnel (B&P Tunnel Replacement - Related Project)

Integrated Rail

Network

Support enhanced connecting corridor service south of Washington D.C. – 14 daily trains Richmond to Penn Station New York (PSNY)

Freight

Protect freight access to the Port of Baltimore



Legend:

Track

Existing/Modernized Track

Curve Modification

Station Type

New

Modified

Projects

New Track

Systems Upgrade

Expanded

Existing

New Segment

Bridge Replacement



Seaport



Milepost

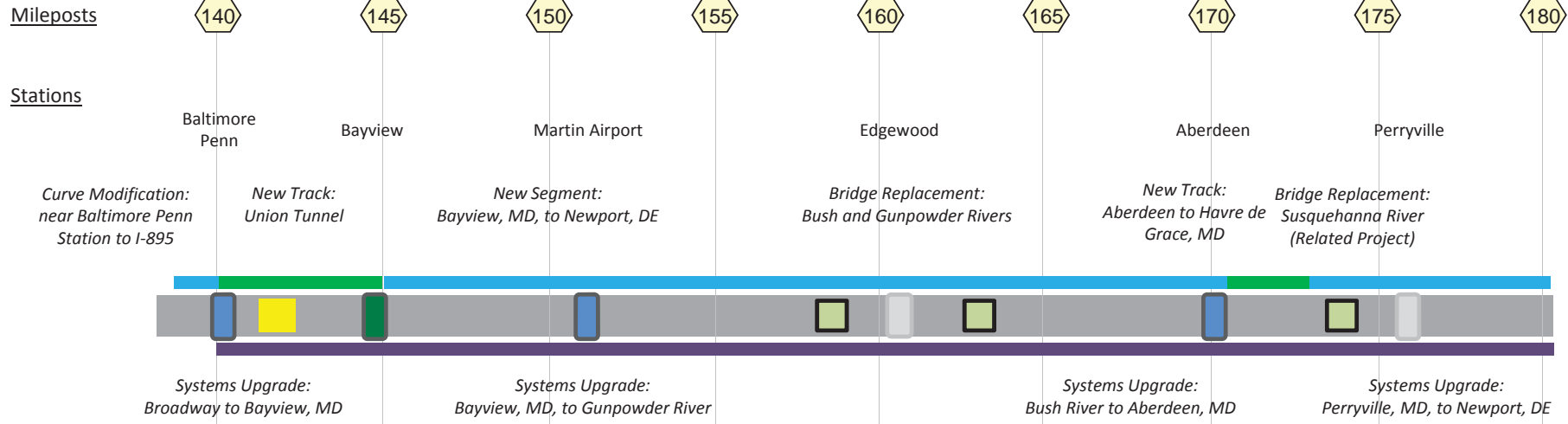


FRA Record of Decision: Selected Alternative Schematic

Note: This schematic includes infrastructure elements defined for the Selected Alternative and is not intended to be inclusive of all minor or programmatic improvements (i.e. curve adjustment, track realignment, catenary replacement, etc.) necessary to meet the service and performance objectives and for the safe and reliable operation of the NEC.

Baltimore Penn Station to Philadelphia 30th Street Station: Four- to six-track railroad

Infrastructure Elements:



Service and Performance Objectives:

Frequency

Target

New Connections on NEC

Intercity and Regional – expanded access to metropolitan areas (represented by Bayview station)

Conflict-free Operations

High-speed express tracks between Bayview, MD, and Edgemoor, DE (non-stop through Wilmington)

Integrated Rail Network

Freight

Legend:

Track

- Existing/Modernized Track
- New Track
- New Segment

- Curve Modification
- Systems Upgrade

Station Type

- New
- Expanded

- Modified
- Existing

Projects

- Chokepoint Relief
- Bridge Replacement
- Seaport
- Milepost



Baltimore Penn Station to Philadelphia 30th Street Station: Four- to six-track railroad (continued)

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Infrastructure Elements:

Mileposts

180

185

190

195

200

205

210

215

220

Stations

Elkton

Newark, DE

Churchman's
Crossing

Newport

Wilmington

Edgemoor

Claymont

Marcus Hook

Highland
Avenue

New Segment: Bayview, MD, to Newport, DE

Chokepoint Relief:
Newark, DE, Station

New Track:
Newark to Newport, DE

New Segment:
Wilmington Segment

Systems Upgrade:
Perryville, MD, to Newport, DE

NEC Systems Upgrade:
Edgemoor, DE, to Baldwin, PA

Service and Performance Objectives:

Frequency

Target

New Connections

on NEC

Regional – expanded access to Metropolitan areas
(represented by Elkton, MD, station)

Regional – expanded access to Metropolitan areas
(represented by Newport and Edgemoor, DE, stations)

Conflict-free

Operations

High-speed express tracks between Bayview, MD, and Edgemoor, DE (non-stop through Wilmington)

Integrated Rail

Network

Freight



Protect freight access to the Port of Wilmington

Legend:

Track

Existing/Modernized Track

Curve Modification

Station Type

New

Modified

Projects

Chokepoint Relief

Seaport

New Track

Systems Upgrade

Expanded

Existing

Bridge Replacement

Milepost

New Segment



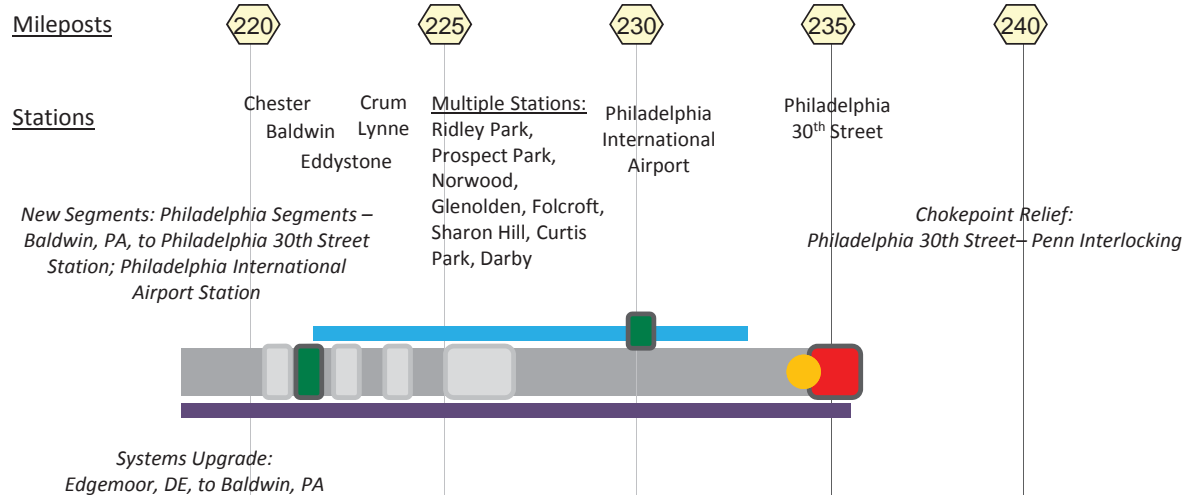
FRA Record of Decision: Selected Alternative Schematic

Note: This schematic includes infrastructure elements defined for the Selected Alternative and is not intended to be inclusive of all minor or programmatic improvements (i.e. curve adjustment, track realignment, catenary replacement, etc.) necessary to meet the service and performance objectives and for the safe and reliable operation of the NEC.

Baltimore Penn Station to Philadelphia 30th Street Station: Four- to six-track railroad (continued)

Page 4 of 16

Infrastructure Elements:



Service and Performance Objectives:

Frequency

Screenline: Philadelphia (south of Philadelphia 30th Street Station):

18 Passenger rail trains per peak in the peak direction

10 Intercity trains per peak hour in the peak direction

Target

New Connections

on NEC

Intercity and Regional rail – expanded access to metropolitan areas (represented by Baldwin Station)

Intercity – expanded access to metropolitan areas (represented by Philadelphia International Airport Station)

Conflict-free

Operations

Integrated Rail

Network

Cross-platform transfers to support pulse-hub operations at Philadelphia 30th Street Station for NEC and Keystone Corridor services

Support enhanced Keystone Corridor service – 24 daily trains Harrisburg, PA, to PSNY

Freight



Protect freight access to the Port of Philadelphia

Legend:

Track

Existing/Modernized Track

New Track

New Segment

Curve Modification

Systems Upgrade

Station Type

New

Expanded

Modified

Existing

Projects

Chokepoint Relief

Bridge Replacement

Seaport

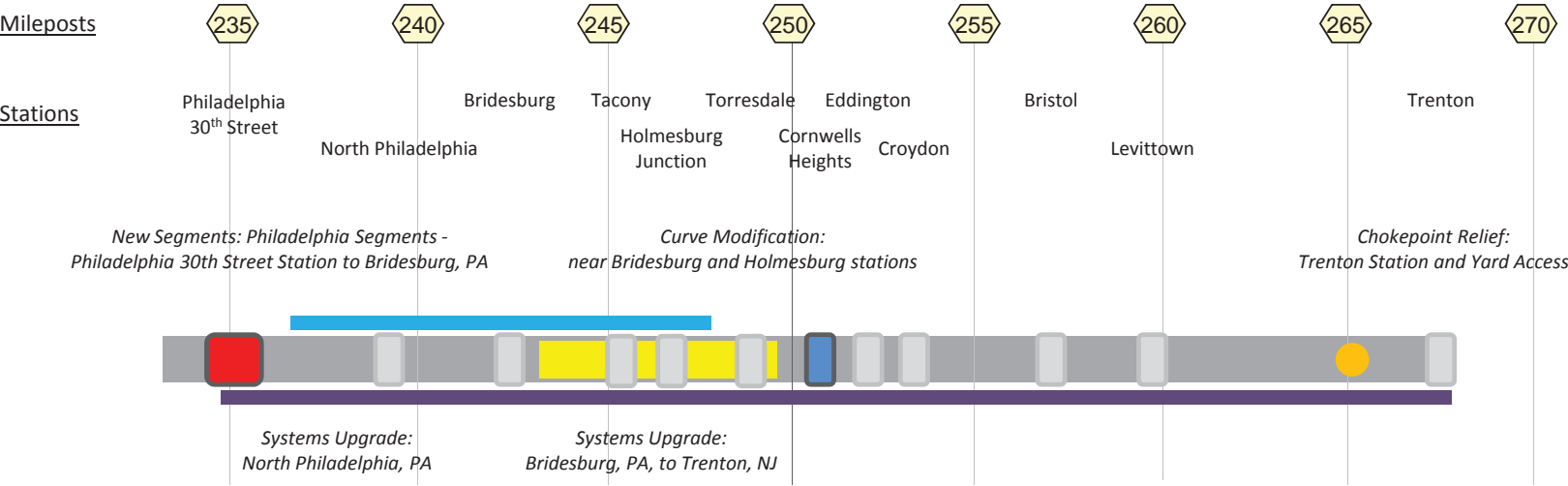
Milepost



FRA Record of Decision: Selected Alternative Schematic

Note: This schematic includes infrastructure elements defined for the Selected Alternative and is not intended to be inclusive of all minor or programmatic improvements (i.e. curve adjustment, track realignment, catenary replacement, etc.) necessary to meet the service and performance objectives and for the safe and reliable operation of the NEC.

Philadelphia 30th Street Station to Trenton, NJ: Four- to six-track railroad
Infrastructure Elements:



Service and Performance Objectives:

Frequency	<u>Screenline: Philadelphia (north of Philadelphia 30th Street Station):</u>	
Target	18 Passenger rail trains per peak hour in the peak direction	
	10 Intercity trains per peak hour in both directions	
New Connections on NEC		
Conflict-free Operations	High-speed express tracks from north of Philadelphia 30th Street Station to Bridesburg, PA	Eliminate speed restrictions and chokepoints at Trenton Station for stopping and non-stop passenger rail trains and Regional rail yard
Integrated Rail Network	Schedule coordination for Regional rail and Intercity service at Trenton, NJ, Cornwells Heights and North Philadelphia, PA stations	
Freight		

Legend:

Track		Station Type		Projects	
Existing/Modernized Track	Grey bar	New	Green square	Chokepoint Relief	Yellow circle
New Track	Green bar	Expanded	Red square	Bridge Replacement	Green rectangle
New Segment	Blue bar	Modified	Blue square	Seaport	Anchor icon
		Existing	Grey square	Milepost	Yellow hexagon
		Systems Upgrade	Purple bar		
		Curve Modification	Yellow bar		

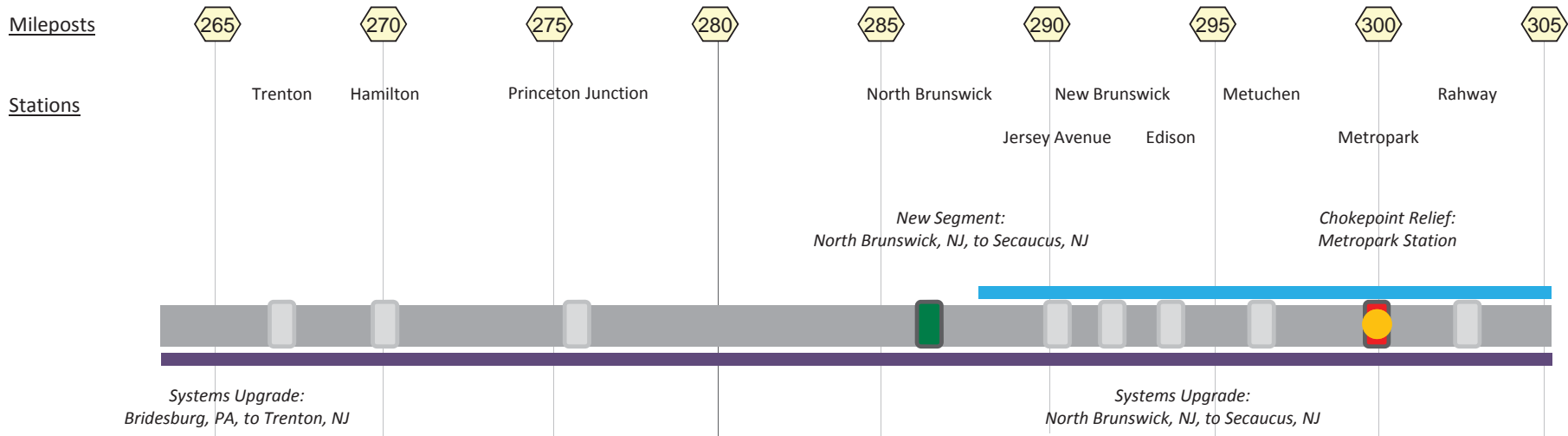
Note: This schematic includes infrastructure elements defined for the Selected Alternative and is not intended to be inclusive of all minor or programmatic improvements (i.e. curve adjustment, track realignment, catenary replacement, etc.) necessary to meet the service and performance objectives and for the safe and reliable operation of the NEC.



Trenton, NJ, to Penn Station New York: Four- to six-track railroad

Infrastructure Elements:

Page 6 of 16



Service and Performance Objectives:

Frequency
Target

New Connections
on NEC

Intercity - expanded access to metropolitan areas (represented by North Brunswick in the Selected Alternative)

Expanded Intercity service at existing stations (represented by Metropark in the Selected Alternative)

Conflict-free
Operations

Integrated Rail
Network

Freight

Legend:

Track

Existing/Modernized Track
New Track
New Segment

Curve Modification
Systems Upgrade

Station Type

New
Expanded

Modified
Existing

Projects

Chokepoint Relief
Bridge Replacement

Seaport
Milepost

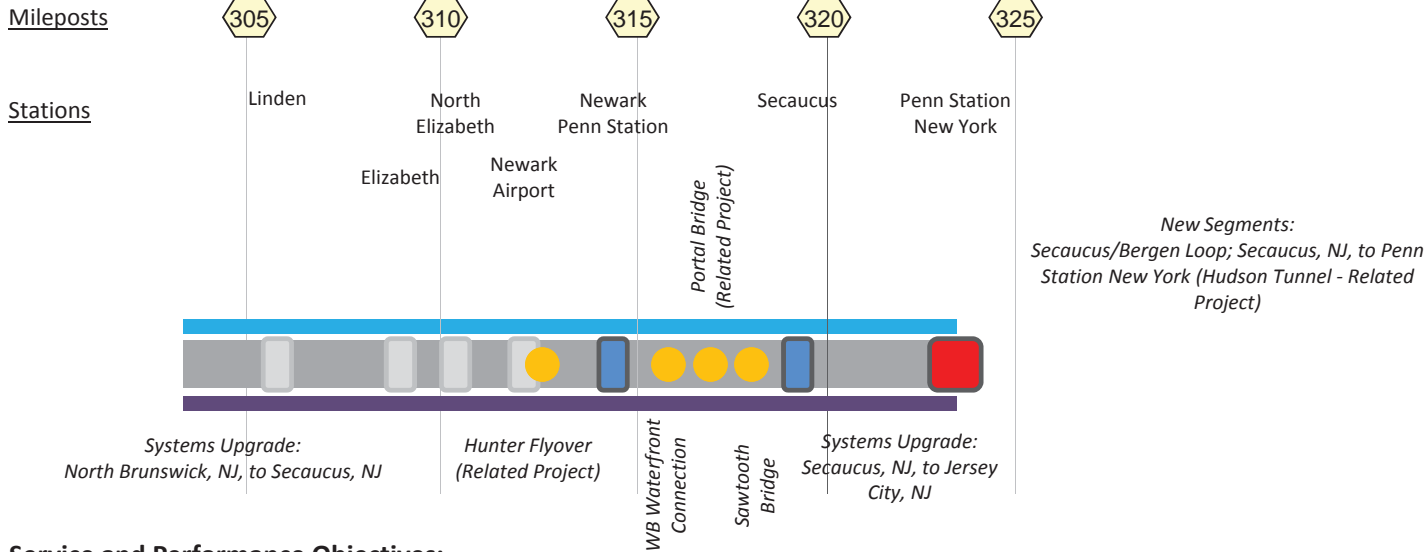


FRA Record of Decision: Selected Alternative Schematic

Note: This schematic includes infrastructure elements defined for the Selected Alternative and is not intended to be inclusive of all minor or programmatic improvements (i.e. curve adjustment, track realignment, catenary replacement, etc.) necessary to meet the service and performance objectives and for the safe and reliable operation of the NEC.

Trenton, NJ, to Penn Station New York: Four- to six-track railroad (continued)

Infrastructure Elements:



Service and Performance Objectives:

Frequency

Target

Screenline: Hudson River (trans-Hudson service between NJ and NY):

10 Intercity trains per peak hour in both directions

No less than 42 Regional rail trains per peak hour in the peak direction

New Connections

on NEC

Intercity - expanded access to metropolitan areas (represented by Secaucus in the Selected Alternative)

Conflict-free

Operations

Relieve capacity chokepoints and create separate express tracks between Newark, NJ, and PSNY

Integrated Rail

Network

One-seat ride west of Hudson River for select Regional rail services

Multi-operator Regional rail run-through services at PSNY

Freight

Protect freight access to the Port of Newark



Legend:

Track

Existing/Modernized Track

New Track

New Segment

Curve Modification

Systems Upgrade

Station Type

New

Expanded

Modified

Existing

Projects

Chokepoint Relief

Bridge Replacement



Seaport



Milepost

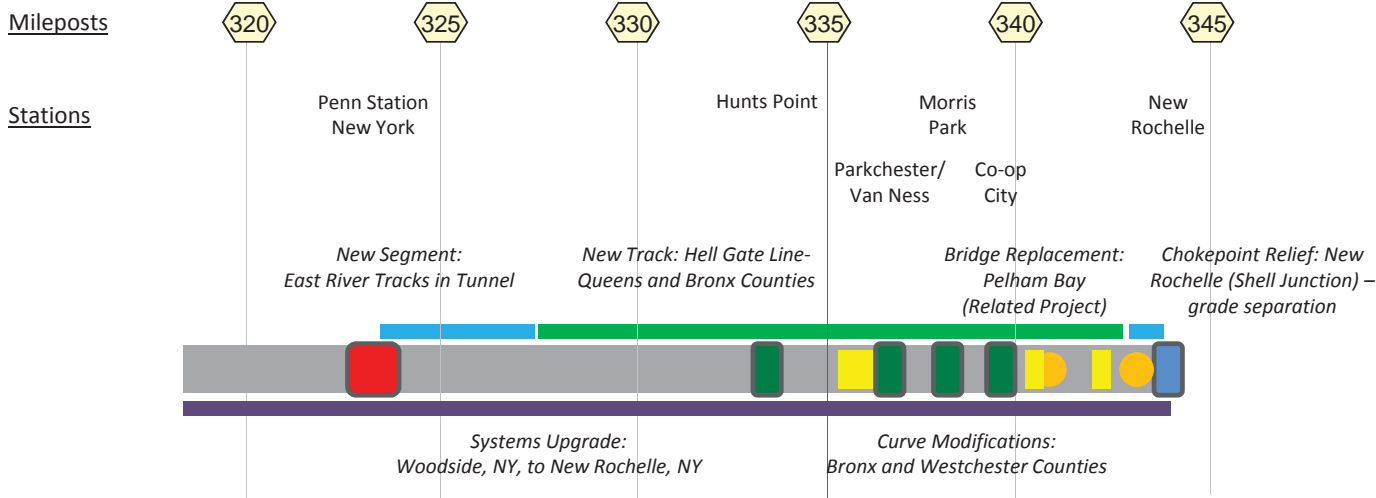


FRA Record of Decision: Selected Alternative Schematic

Note: This schematic includes infrastructure elements defined for the Selected Alternative and is not intended to be inclusive of all minor or programmatic improvements (i.e. curve adjustment, track realignment, catenary replacement, etc.) necessary to meet the service and performance objectives and for the safe and reliable operation of the NEC.

Penn Station New York to New Rochelle, NY: Four- to six-track railroad

Infrastructure Elements:



Service and Performance Objectives:

Frequency Target

Screenline: East River (between Penn Station New York and Queens):
10 Intercity trains per peak hour in both directions

New Connections on NEC

Regional – Hunts Point, Parkchester/Van Ness, Co-op City
Intercity – expanded access to metropolitan areas
(represented by Morris Park)

Conflict-free Operations

Relieve capacity chokepoints and create separate express tracks from PSNY to New Rochelle

Grade separation to improve operations
between Hell Gate and New Haven lines

Integrated Rail Network

Support enhanced Empire Corridor service –
22 daily trains Albany to PSNY

Support multi-operator Regional rail through-
running services at Penn Station New York

Support “Transit-Style” Regional rail service
from New York City to New Rochelle, NY

Freight



Protect freight access to the Port of New York and to points
north along the NEC via Hell Gate Bridge

Legend:

Track

Existing/Modernized Track

New Track

New Segment

Curve Modification

Systems Upgrade

Station Type

New

Expanded

Modified

Existing

Projects

Chokepoint Relief

Bridge Replacement



Seaport



Milepost

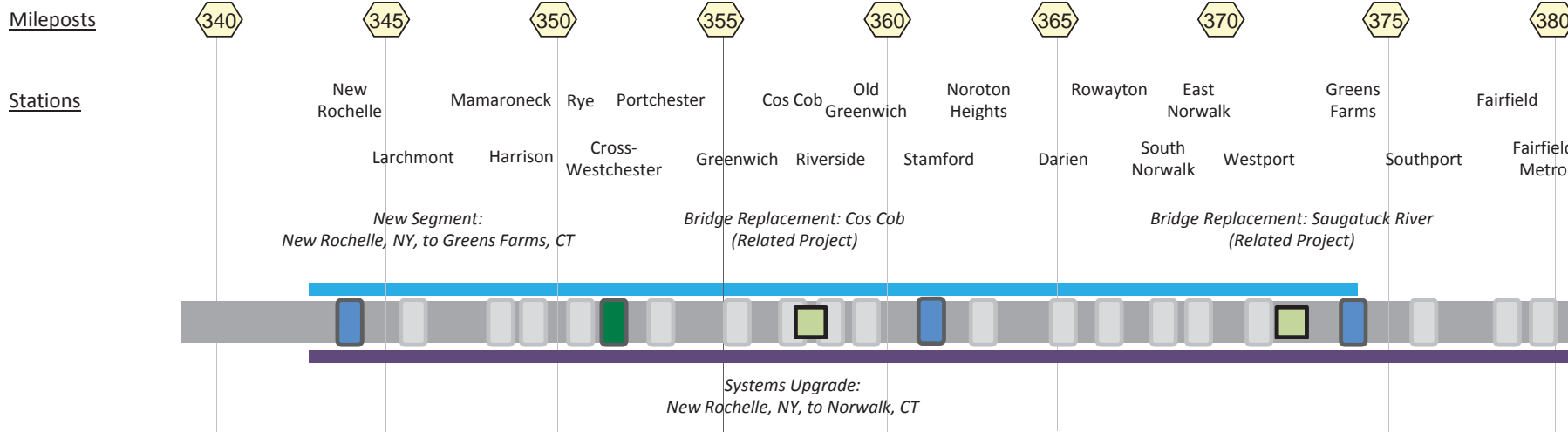


FRA Record of Decision: Selected Alternative Schematic

Note: This schematic includes infrastructure elements defined for the Selected Alternative and is not intended to be inclusive of all minor or programmatic improvements (i.e. curve adjustment, track realignment, catenary replacement, etc.) necessary to meet the service and performance objectives and for the safe and reliable operation of the NEC.

New Rochelle, NY, to New Haven, CT: Four- to six-track railroad Infrastructure Elements:

Page 9 of 16



Service and Performance Objectives:

Frequency
Target

Screenline: New Rochelle (at New Rochelle Station):
10 Intercity trains per peak hour in both directions

New Connections
on NEC

Intercity – expanded access to metropolitan areas (represented by Cross-Westchester station)

Intercity – expanded service to metropolitan areas (represented by Stamford Station)

Intercity – expanded access to metropolitan areas (represented by Greens Farms Station)

Conflict-free
Operations

High-speed express tracks from New Rochelle, NY, to Green Farms, CT

Integrated Rail
Network

“Transit-Style” Regional rail service between New Rochelle, NY, and New Haven, CT

Freight

Legend:

Track

Existing/Modernized Track

New Track

New Segment

Curve Modification

Systems Upgrade

Station Type

New

Expanded

Modified

Existing

Projects

Chokepoint Relief

Bridge Replacement

Seaport

Milepost

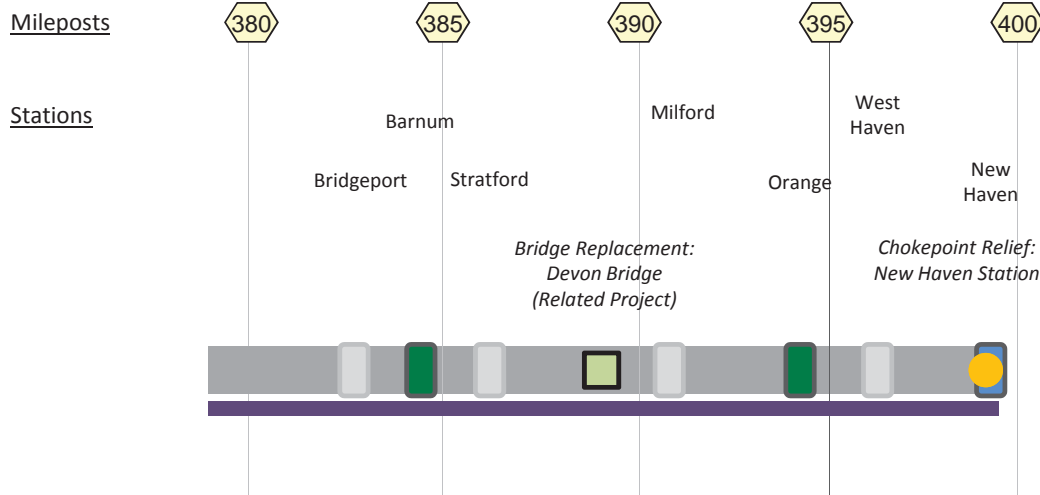


FRA Record of Decision: Selected Alternative Schematic

Note: This schematic includes infrastructure elements defined for the Selected Alternative and is not intended to be inclusive of all minor or programmatic improvements (i.e. curve adjustment, track realignment, catenary replacement, etc.) necessary to meet the service and performance objectives and for the safe and reliable operation of the NEC.

New Rochelle, NY, to New Haven, CT: Four- to six-track railroad (continued)

Infrastructure Elements:



Service and Performance Objectives:

Frequency

Target

New Connections on NEC

Regional rail – expanded access to metropolitan areas:
Barnum (east of Bridgeport) and Orange (east of Milford)
stations

Conflict-free Operations

Integrated Rail Network

“Transit-Style” Regional rail service between
New Rochelle, NY, and New Haven, CT

Cross-platform, pulse-hub
operations at New Haven Station

Freight

Legend:

Track

Existing/Modernized Track

New Track

New Segment

Curve Modification

Systems Upgrade

Station Type

New

Expanded

Modified

Existing

Projects

Chokepoint Relief

Bridge Replacement

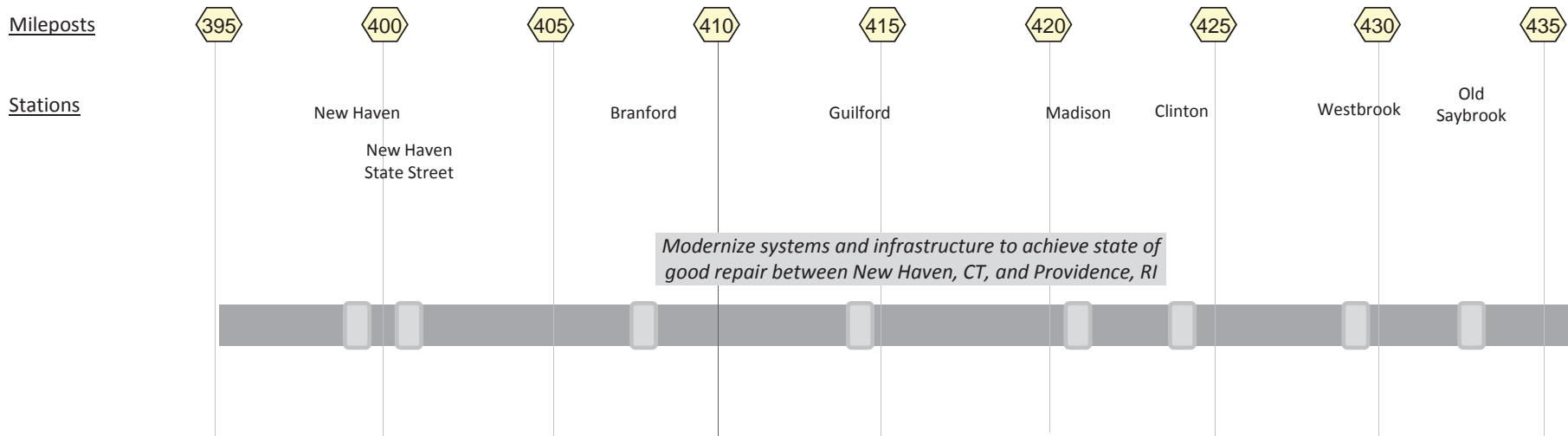
Seaport

Milepost



New Haven, CT, to Providence, RI: Two-track railroad Infrastructure Elements:

Page 11 of 16



Service and Performance Objectives:

Frequency
Target

Screenline: New Haven (north/east of New Haven Station):
6-8 Intercity trains per peak hour in the peak direction

New Connections
on NEC

Conflict-free
Operations

The FRA commits to working with Connecticut and Rhode Island to identify, in coordination with Massachusetts and other stakeholders as appropriate, on- and off-corridor infrastructure to expand railroad capacity between New Haven, CT, and Providence, RI, as part of the New Haven to Providence Capacity Planning Study.

Integrated Rail
Network

Freight

Legend:

Track

- Existing/Modernized Track
- New Track
- New Segment

- Curve Modification
- Systems Upgrade

Station Type

- New
- Expanded

- Modified
- Existing

Projects

- Chokepoint Relief
- Bridge Replacement

- Seaport
- Milepost

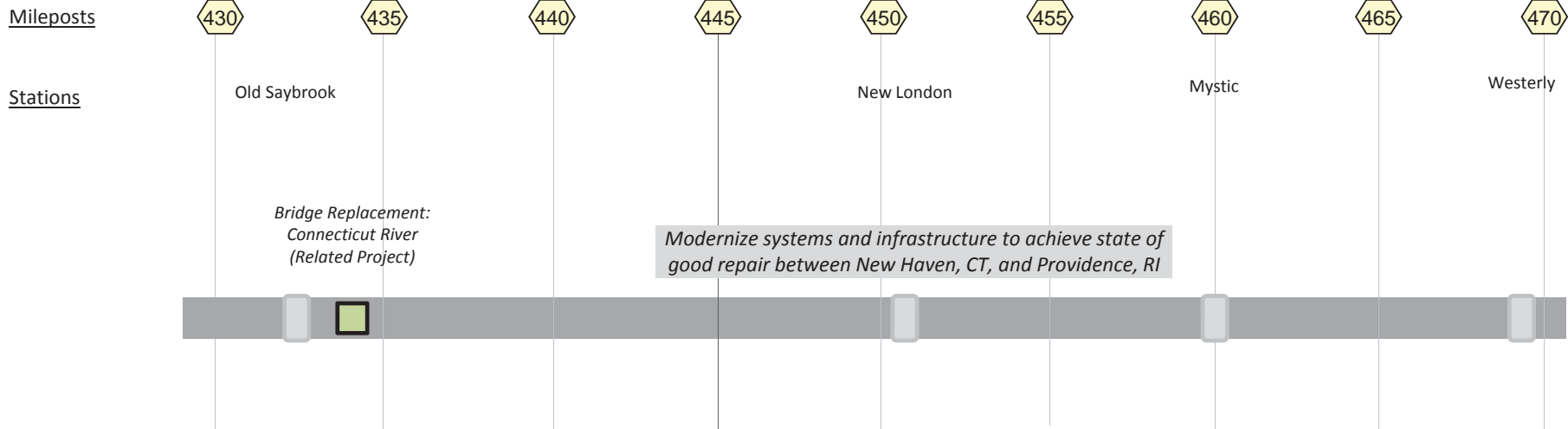


FRA Record of Decision: Selected Alternative Schematic

Note: This schematic includes infrastructure elements defined for the Selected Alternative and is not intended to be inclusive of all minor or programmatic improvements (i.e. curve adjustment, track realignment, catenary replacement, etc.) necessary to meet the service and performance objectives and for the safe and reliable operation of the NEC.

New Haven, CT, to Providence, RI: Two-track railroad (continued)

Infrastructure Elements:



Service and Performance Objectives:

Frequency

Target

New Connections

on NEC

Conflict-free

Operations

Integrated Rail

Network

Freight

Legend:

Track

Existing/Modernized Track

New Track

New Segment

Curve Modification

Systems Upgrade

Station Type

New

Expanded

Modified

Existing

Projects

Chokepoint Relief

Bridge Replacement

Seaport

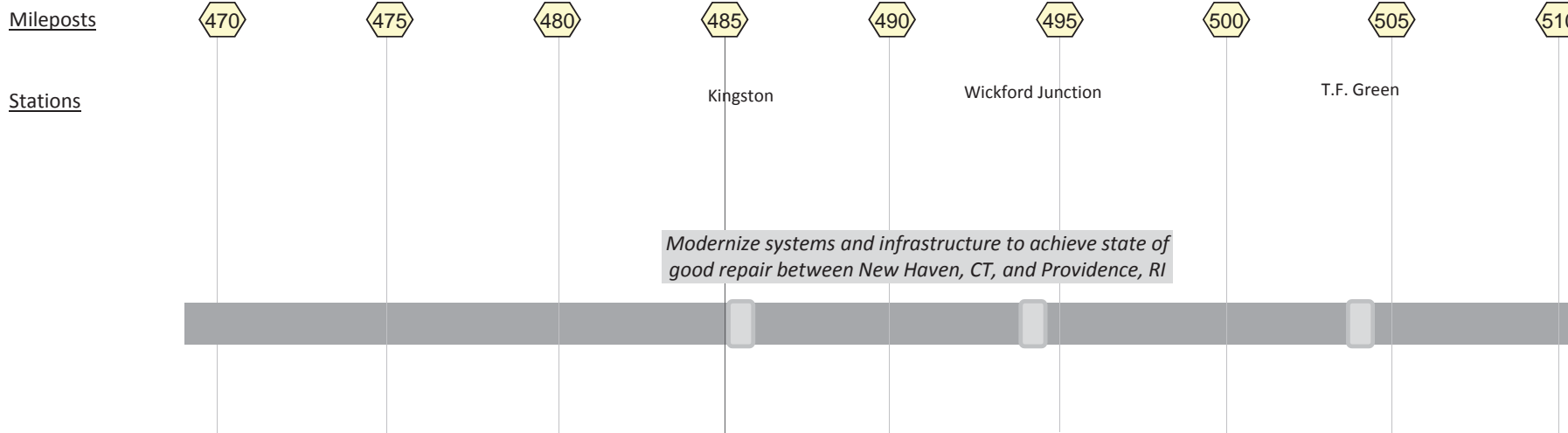
Milepost

The FRA commits to working with Connecticut and Rhode Island to identify, in coordination with Massachusetts and other stakeholders as appropriate, on- and off-corridor infrastructure to expand railroad capacity between New Haven, CT, and Providence, RI, as part of the New Haven to Providence Capacity Planning Study.

Note: This schematic includes infrastructure elements defined for the Selected Alternative and is not intended to be inclusive of all minor or programmatic improvements (i.e. curve adjustment, track realignment, catenary replacement, etc.) necessary to meet the service and performance objectives and for the safe and reliable operation of the NEC.

New Haven, CT, to Providence, RI: Two-track railroad (continued)

Infrastructure Elements:



Service and Performance Objectives:

Frequency

Target

New Connections

on NEC

Conflict-free Operations

The FRA commits to working with Connecticut and Rhode Island to identify, in coordination with Massachusetts and other stakeholders as appropriate, on- and off-corridor infrastructure to expand railroad capacity between New Haven, CT, and Providence, RI, as part of the New Haven to Providence Capacity Planning Study.

Coordinate with the Rhode Island Department of Transportation and Amtrak on further study of improvements at T.F. Green Airport Train and Intermodal Station.

Integrated Rail Network

Freight

Legend:

Track

Existing/Modernized Track

New Track

New Segment

Curve Modification

Systems Upgrade

Station Type

New

Expanded

Modified

Existing

Projects

Chokepoint Relief

Bridge Replacement

Seaport

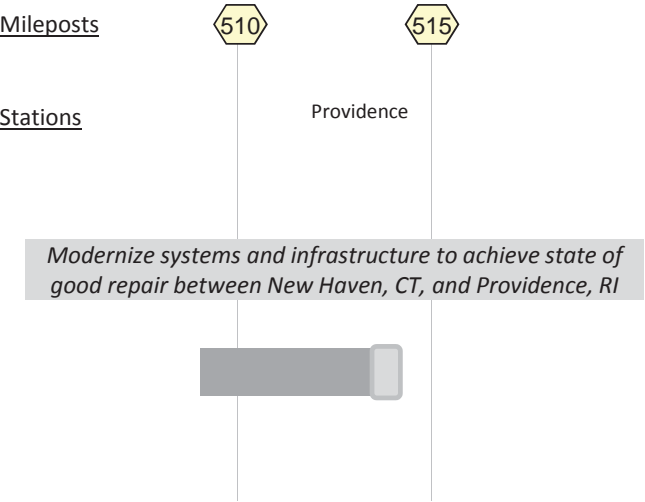
Milepost



FRA Record of Decision: Selected Alternative Schematic

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New Haven, CT, to Providence, RI: Two-track railroad (continued)
Infrastructure Elements:



Service and Performance Objectives:

Frequency
Target

Providence (north/east of Providence Station):
20 Passenger rail trains per peak hour in the peak direction
6-8 Intercity trains per peak hour in the peak direction

New Connections
on NEC














Conflict-free
Operations

The FRA commits to working with Connecticut and Rhode Island to identify, in coordination with Massachusetts and other stakeholders as appropriate, on- and off-corridor infrastructure to expand railroad capacity between New Haven, CT, and Providence, RI, as part of the New Haven to Providence Capacity Planning Study.

Integrated Rail
Network

Freight

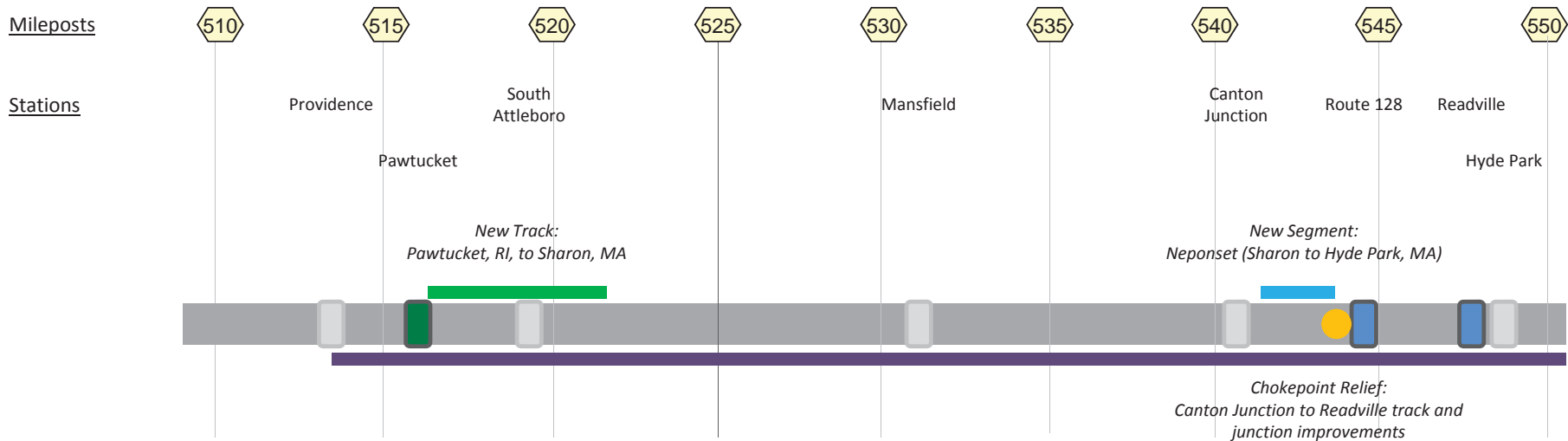
Legend:

Track		Station Type		Projects							
	Existing/Modernized Track		Curve Modification		New		Modified		Chokepoint Relief		Seaport
	New Track		Systems Upgrade		Expanded		Existing		Bridge Replacement		Milepost
	New Segment										

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Providence, RI, to Boston, MA: Two- to four-track railroad Infrastructure Elements:



Service and Performance Objectives:

Frequency
Target

New Connections
on NEC

Regional rail station at
Pawtucket (east of Providence)

Conflict-free
Operations

Coordinate with New Haven to Providence Capacity Planning Study

Integrated Rail
Network

Freight

Legend:

Track

Existing/Modernized Track

New Track

New Segment

Curve Modification

Systems Upgrade

Station Type

New

Expanded

Modified

Existing

Projects

Chokepoint Relief

Bridge Replacement

Seaport

Milepost

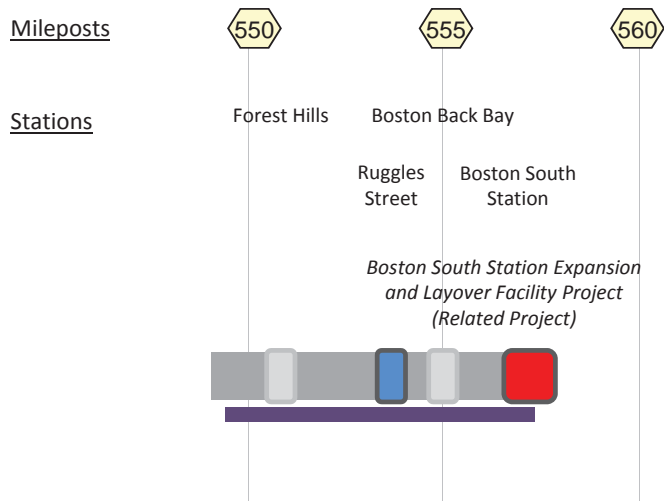


FRA Record of Decision: Selected Alternative Schematic

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Providence, RI, to Boston, MA: Two- to four-track railroad (continued)

Infrastructure Elements:



Service and Performance Objectives:

Frequency

Screenline: Boston (south/west of Back Bay Station):

Target

20 trains per peak hour in the peak direction for passenger rail service
6-8 Intercity trains per peak hour in the peak direction

New Connections

on NEC

Conflict-free

Operations

Coordinate with New Haven to Providence Capacity Planning Study

Integrated Rail

Network

Freight

Protect freight access to the Port of Boston

Legend:

Track

Existing/Modernized Track

 New Track

 New Segment

Curve Modification

■ Systems Upgrade

Station Type

 New

 Expanded

Modified

☐ Existing

Projects

- Chokepoint Relief

 Bridge Replacement



Seaport



Milepost