

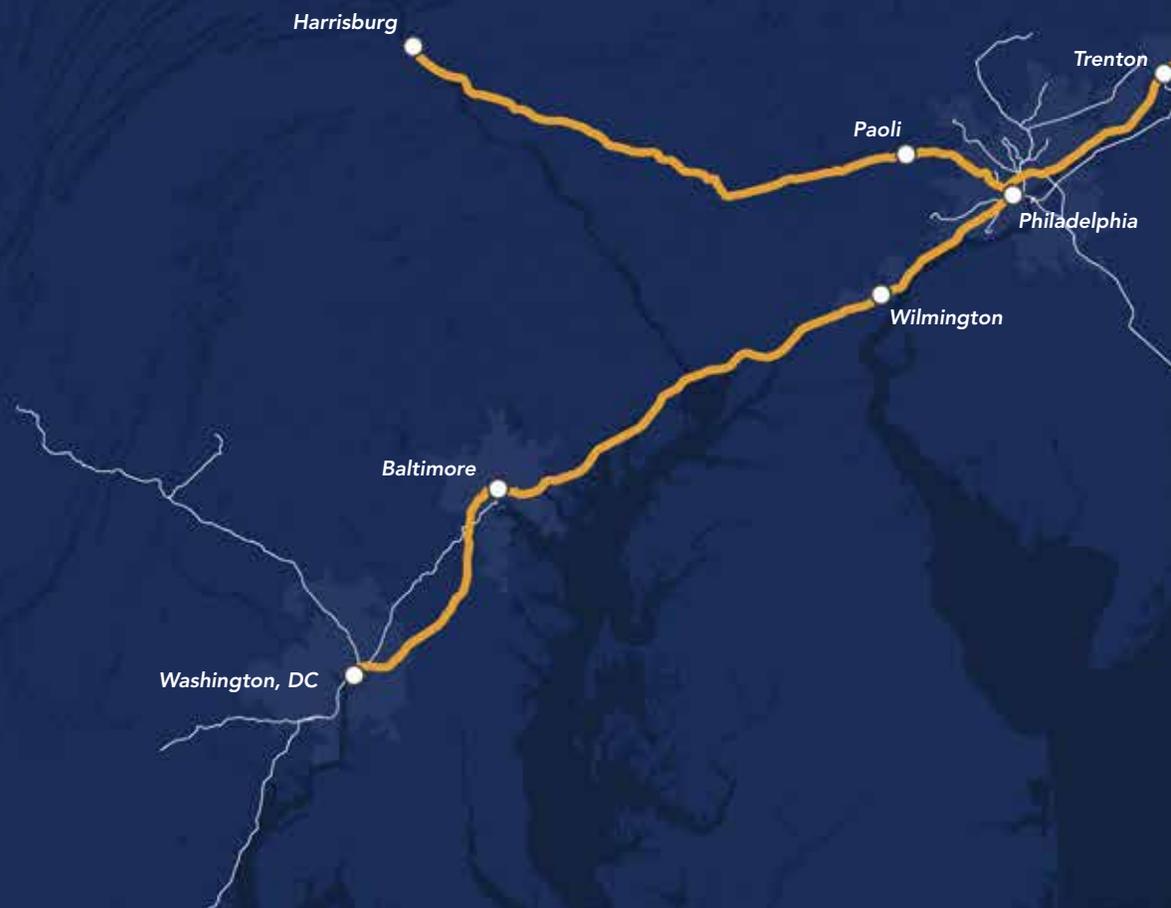


CONNECT 2035

A 15-Year Service Development Plan
and Infrastructure Planning Process
for the Northeast Corridor

July 2021

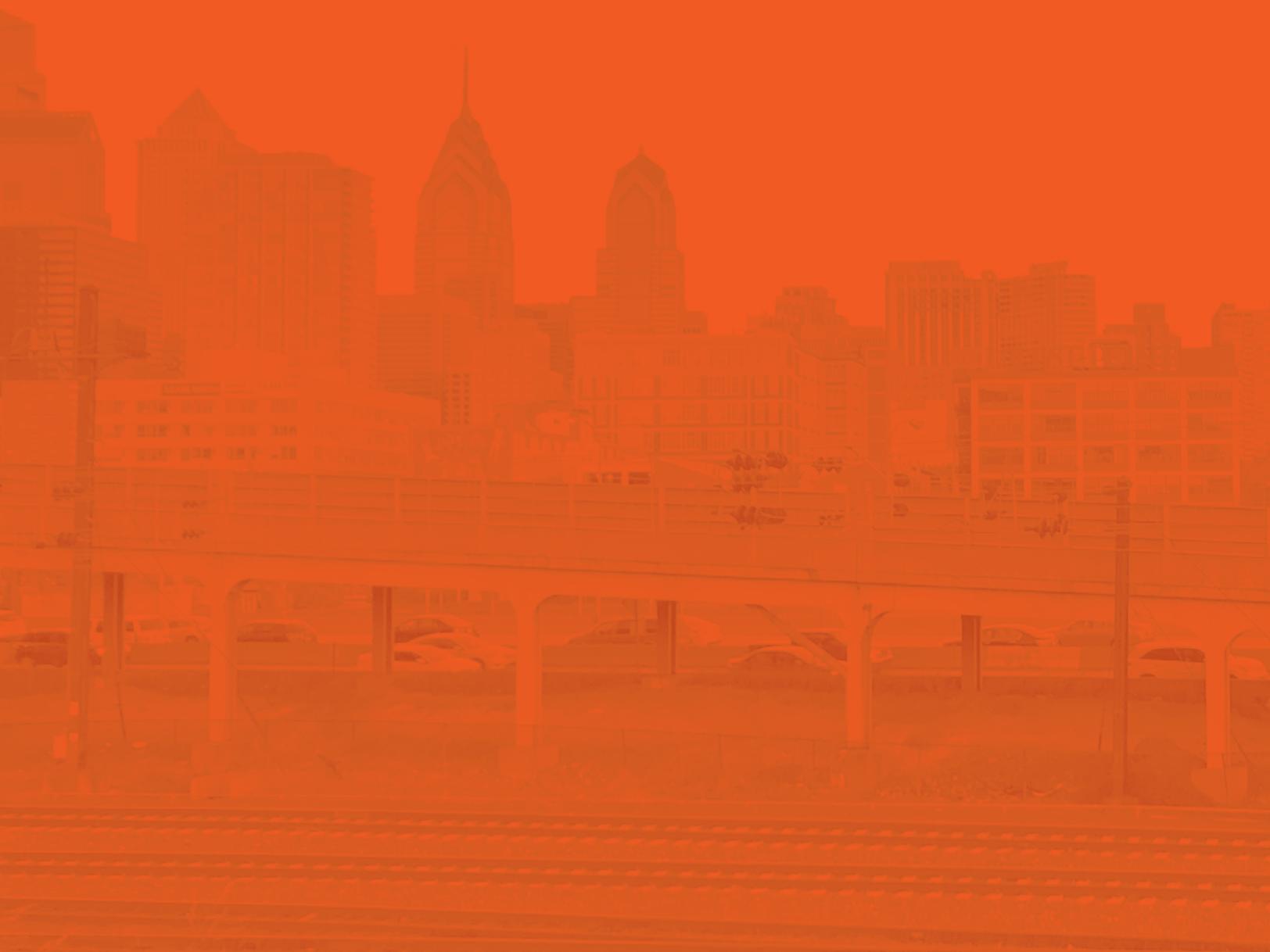
The Northeast Corridor is the economic backbone of the Northeast region, serving hundreds of thousands of people a day



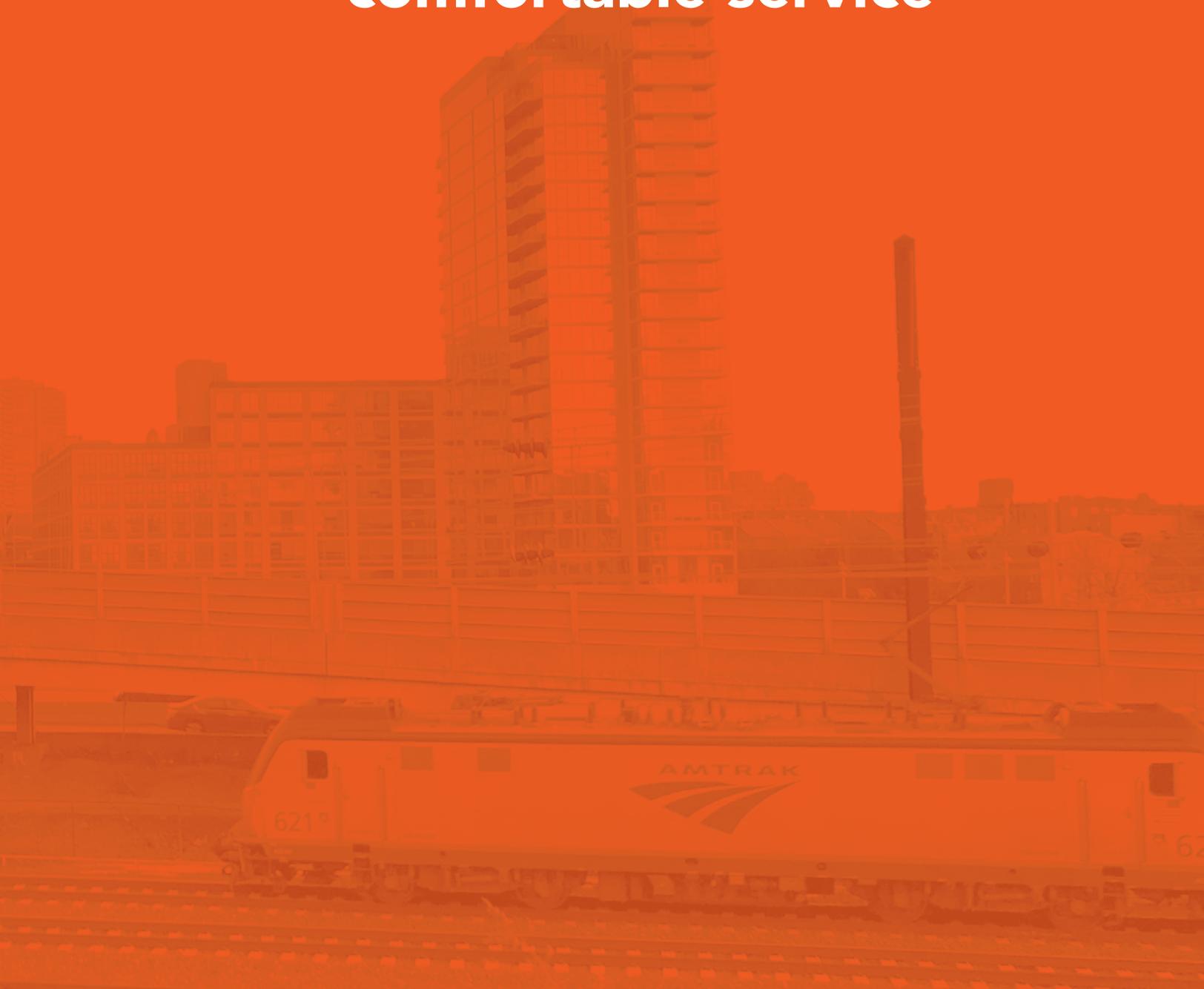


CONNECT NEC 2035 is a **once-in-a-generation opportunity to replace aging bridges and tunnels, add rail capacity, improve performance, and enhance customer experience in the corridor**

CONNECT NEC 2035
includes over **150**
projects to make our
nation's most important
rail corridor stronger
than ever



These projects pave the way for a **21st century corridor** with frequent, fast, safe, reliable, and comfortable service





MARC train approaching Odenton Station (MD)





Exterior of Washington Union Station (DC)

July 2021

CONNECT 2035

A 15-Year Service Development Plan and Infrastructure Planning
Process for the Northeast Corridor



A Report by the
Northeast Corridor Commission

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In Partnership with:

Massachusetts Department of Transportation (MassDOT)

Massachusetts Bay Transportation Authority (MBTA)

Rhode Island Department of Transportation (RIDOT)

Connecticut Department of Transportation (CTDOT)/CTrail

Metropolitan Transportation Authority (MTA)

MTA Metro-North Railroad (Metro-North)

MTA Long Island Rail Road (LIRR)

New Jersey Transit (NJ TRANSIT)

Southeastern Pennsylvania Transportation Authority (SEPTA)

Pennsylvania Department of Transportation (PennDOT)

Delaware Department of Transportation (DelDOT)

Maryland Department of Transportation (MDOT), Maryland Transit
Association (MTA)/Maryland Area Regional Commuter (MARC)

The District of Columbia Department of Transportation (DDOT)

Virginia Railway Express (VRE)

Amtrak

U.S. Department of Transportation (USDOT)



Passengers waiting to board a Metro-North train at Bridgeport Station (CT)



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Glossary

Key Concept/Terminology	Definition
Americans With Disabilities Act (ADA)	A civil rights law protecting the rights of people with disabilities in public life, including their access to transportation services.
Automatic Block Signaling (ABS)	The system of wayside and/or in-cab signaling that governs train movement between interlockings.
Capital renewal	Routine state of good repair and replacement of existing basic infrastructure, such as track/roadbed, signals, catenary, and undergrade bridges. Capital renewal is sometimes included in a special project.
Capital renewal program	A combination of capital renewal sections to optimize project delivery and minimize rider impact.
Capital renewal section	The geographic boundaries, generally from universal interlocking to universal interlocking, that form the limits of the C35 capital renewal programs.
Chokepoint	A capacity constrained location along the railroad due to the overall volume of trains, the mix of services, or the trackwork configuration. Chokepoints create bottlenecks that lead to delays or require service reductions.
Commission member agencies	Includes the NEC Commission voting members from each of the NEC states (MA, RI, CT, NY, NJ, PA, DE, and MD), the District of Columbia, Amtrak, and the USDOT as well as representatives from commuter and freight railroads.
CONNECT NEC 2035 (C35)	A corridor-wide 15-year service development plan for the NEC that describes an initial phase towards advancing the NEC FUTURE vision.
C35 Delivery Analysis	Packaging of special projects and capital renewal to gain efficiencies in project delivery and optimize the use of available track outages and other railroad resources. Analysis assumes unconstrained funding and railroad resources.
Direct jobs	Occupations required to deliver the C35 plan, such as project planners, designers, engineers, and construction workers.
Enabling project	An improvement to the rail network that supports the construction of, or that is necessary to complement, special projects or capital renewal. Enabling projects provide additional network flexibility or capacity during construction and generally provide similar long-term operational benefits.
Environmental Impact Statement (EIS)	Documentation associated with one of three classes of action to comply with federal requirements established in the National Environmental Policy Act (42 USC §4332 et seq.) and implementing regulations (40 CFR Parts 1500–1508). An agency decision supported by an EIS is conveyed in a Record of Decision.
Greenhouse gas (GHG)	Gases that trap heat in the atmosphere are called greenhouse gases. CO ₂ makes up the largest component of GHG emissions. Other prominent transportation GHGs include methane (CH ₄) and NO _x .

Key Concept/Terminology	Definition
Indirect jobs	Non-construction jobs at suppliers of materials generated to support infrastructure investment, such as steel, concrete, wood, and specialized railroad equipment.
Induced Jobs	Jobs created by the spending of monies such as project salaries for items such as groceries, gas, and entertainment.
Integrated 2035 Operating Plan (2035 Operating Plan)	A comprehensive 24-hour weekday schedule of proposed 2035 revenue and non-revenue passenger train movements on the NEC. This is based on service plans and operating assumptions provided by NEC agencies and reflects necessary adjustments to resolve routing schedule conflicts. The integrated operating plan will be regularly updated by NEC agencies and will be incorporated in future CONNECT NEC analyses and plans.
Major backlog projects	Projects which are necessary for achieving a state of good repair but are not undertaken on a routine basis. Examples include rehabilitation or replacement of major bridges and tunnels.
NEC FUTURE	The Federal Railroad Administration's long-term vision for the NEC to improve the existing NEC and grow the role of rail for both commuter and intercity services. The NEC FUTURE vision is expressed as the Selected Alternative in the NEC FUTURE Record of Decision (2017; https://www.fra.dot.gov/necfuture/).
Northeast Corridor (NEC)	Northeast Corridor or NEC refers to the rail line which runs 457 miles from Washington, DC to Boston, MA as well as connecting corridors to Harrisburg, PA; Spuyten Duyvil, NY; and Springfield, MA. Commuter, intercity and freight services all operate on the NEC.
Northeast Corridor Commission (the Commission)	The Northeast Corridor Commission was established by Congress (49 U.S.C. § 24905) in order to develop coordinated strategies that improve the Northeast's core rail network. The membership is comprised of the eight NEC states and the District of Columbia, Amtrak, and the USDOT.
Operating plan	A more detailed version of a service plan, showing train schedules, train equipment assignments, and (optionally) train cycling through a rail network.
On-Time-Performance (OTP)	A measure of train schedule adherence as defined by each rail operator, generally focused on end-terminal arrivals. Though exceptions exist by operator and by specific service, commuter trains are generally counted as late if arriving six or more minutes behind schedule and Amtrak trains are generally counted as late if arriving ten or more minutes behind schedule. OTP reflects the percentage of scheduled train trips that do not arrive late based on these definitions.
Passenger Miles Traveled (PMT)	The total number of passengers carried by a rail system for a unit of time multiplied by the number of miles they travel.
Peak period	The busiest travel periods on the NEC, which are generally 7-9 AM in the morning and 4-6 PM in the evening.

Glossary

Key Concept/Terminology	Definition
Project list	Compilation of special projects included in CONNECT NEC 2035.
Record of Decision (ROD)	A lead agency issues a ROD to complete their environmental review under the National Environmental Policy Act after they prepare and issue a Final EIS. The ROD is a document that states what the agency decision is; identifies the alternatives considered, including the environmentally preferred alternative; and identifies required mitigation commitments, including any enforcement and monitoring commitments (CEQ NEPA Regulations, 40 C.F.R. § 1505.2).
Right-of-way	The strip of land controlled by a railroad or government entity through ownership or perpetual easement that accommodates railroad tracks, associated utilities and maintenance access.
Route miles	The distance between mileposts or other landmarks along the rail right-of-way.
Service Plan	Definition of rail service in terms of level of service (trains per hour/trains per day), travel times and station stopping patterns. Service plans do not include train schedules with specific station stopping times.
Special projects	Includes “major backlog projects” which represent the complete overhaul or replacement of major bridges and tunnels, and “improvement projects” aimed at creating new infrastructure above and beyond existing assets or replacing existing structures with markedly superior ones. In some cases, special projects include capital renewal work.
Special project groups	A grouping of special projects geographically combined with capital renewal efforts in the same area.
State of good repair or state-of-good-repair (SOGR)	The condition in which the existing physical assets, both individually and as a system are: (a) functioning as designed within their “useful lives,” and (b) sustained through regular maintenance and replacement programs. SOGR represents one element of a comprehensive capital investment program that builds infrastructure to modern safety standards and addresses system capacity and performance.
Territory or analysis territory	Five sections of the NEC identified to support the project delivery analysis and to establish service objectives (New England, Connecticut-Westchester, New York City Metro, Mid-Atlantic North, and Mid-Atlantic South). Territories allowed for an integrated analysis where multiple operators share NEC track and facilities.
Track miles	Defined as the distance between mileposts or other landmarks along the rail right-of-way multiplied by the number of tracks.
Turn the crank	A round of analysis to confirm the feasibility of delivering C35 special projects, capital renewal and the 2035 operating plan. An approach that analyzes sequencing, resources, and track outages to support implementation.
Vehicle Miles Traveled (VMT)	Measurement of the total vehicle miles traveled for all vehicles within a specific time period.

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Construction crew at Harold Interlocking (NY)

Executive Summary

The Northeast Corridor (NEC) commuter and intercity rail system, long the nation's busiest passenger railroad, has been a cornerstone of the region's development and continues to be a driver of its economic success. With stations in the center of every major and mid-size city and in many small towns, the NEC can continue to be the region's mode of choice for even more trips by 2035, following 15 years of transformative investment guided by the CONNECT NEC 2035 (C35) plan.

The implementation of C35 will result in a modern and resilient railroad with safe, reliable, and more frequent service; connections to new markets; and reduced travel times between communities.

C35



Passengers at Baltimore Penn Station (MD)

What is CONNECT NEC 2035?

C35 represents the most ambitious reinvestment program in the NEC's history and a new way of planning: a multi-agency, multi-year, shared action plan guided by a long-term vision. The state governments of the Northeast, the federal government, eight commuter rail agencies, and Amtrak have come together through the NEC Commission as never before to develop a detailed and efficient sequencing of infrastructure investments over 15 years. If funded, this program will achieve significant progress on improving service and **eliminating the state-of-good-repair (SOGR) backlog**, while keeping this critical system running **safely and reliably**, and supporting our economy.

C35 is the first phase of the long-term vision for the corridor established in the Federal Railroad Administration's 2017 NEC FUTURE plan. The Commission looks forward to completing this first phase of critical backlog work and initial investment in higher speed and capacity on existing infrastructure shared by commuter rail and Amtrak, while also advancing the planning and development of new rail segments between New Haven, CT - Providence, RI and Maryland - Delaware that can provide even greater speed and capacity benefits for all customers.

CONNECT NEC is also the start of an ongoing, iterative process. The Commission will refine the plan as new project, resource, and funding information becomes available. C35 will be updated in two years, with CONNECT NEC 2037 [C37] expected to be completed by fall 2023.

2035 Benefits of a Renewed NEC and Thriving Northeast



IMPROVE MOBILITY AND CONNECTIONS

- Travel time savings valued at nearly \$140 million annually for intercity and commuter rail passengers corridor-wide
- Nearly 30 minutes faster for Acela riders traveling from DC to NYC & NYC to Boston
- 25 minutes faster for commuters traveling from New Haven to NYC
- Daily Amtrak NEC service will increase by 33% and double for several commuter railroads
- New one-seat ride services in NJ, NY, and CT into Penn Station New York



COMBAT CLIMATE CHANGE

- 60 million new rail trips using a lower carbon emitting mode than air/bus/auto
- Invests in hardened infrastructure to build a more resilient railroad



SUPPORT DESIRABLE CITIES AND COMMUNITIES

- Supports innovation districts and is a catalyst for ongoing development initiatives in places such as Newark, DE, Philadelphia, PA, Providence, RI, and Boston, MA
- Provides reliable, frequent access to support and sustain transit-oriented development



CREATE ECONOMIC OPPORTUNITY

- Generates nearly 1.7 million new jobs and \$90 billion in earnings over 15 years throughout the US
- Enhanced and new connections between affordable housing and job centers
- New off-peak and reverse-peak services offer opportunities to underserved markets



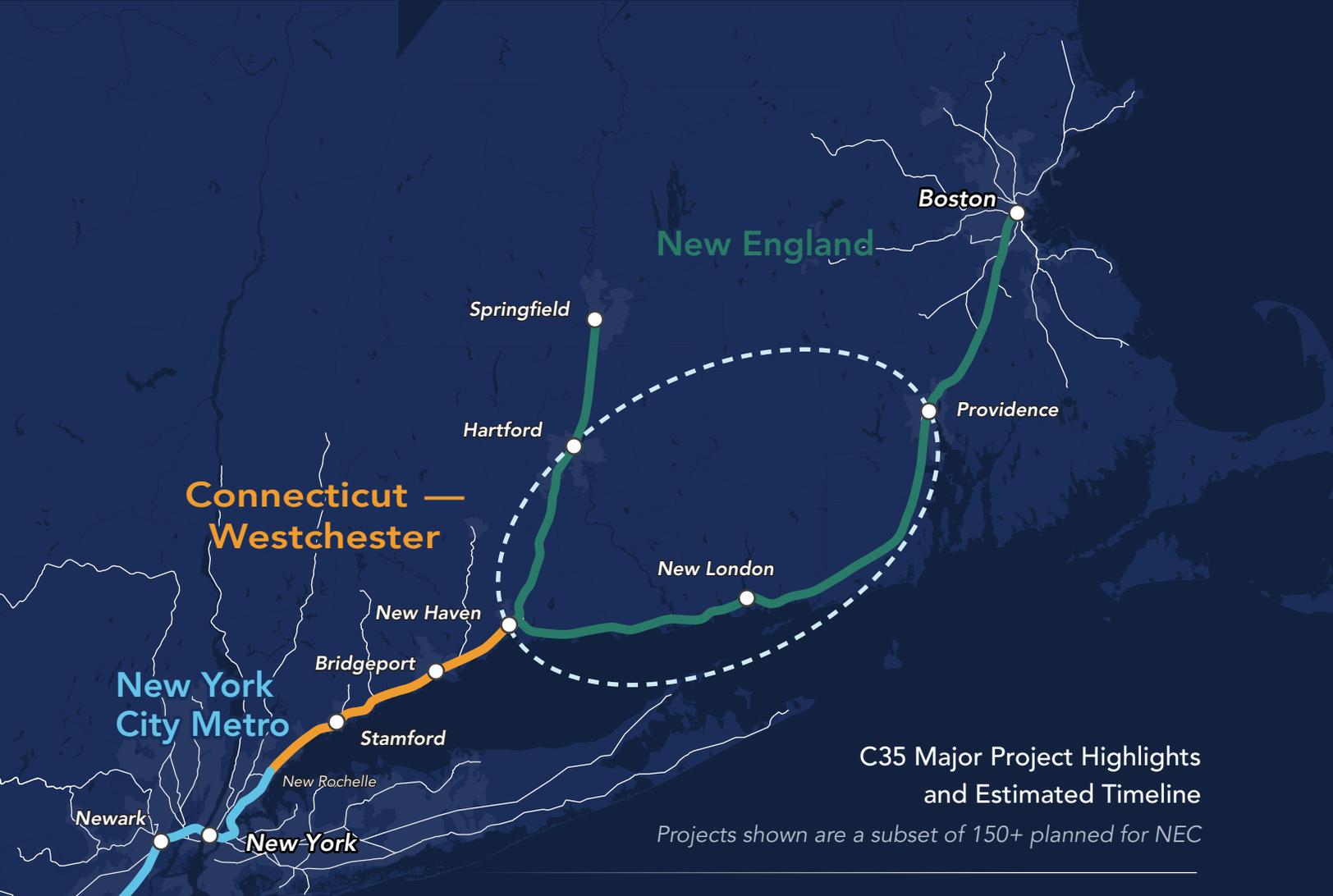
Planning/Design for High Speed Segments



Commuter Rail Lines



Figure E-1
Source: C35 Analysis, 2021



C35 Major Project Highlights and Estimated Timeline

Projects shown are a subset of 150+ planned for NEC

CONSTRUCTION STARTS BY

2025

TERRITORY LOCATION (COLOR) AND PROJECT TYPE (ICON)

-  Providence Station
-  Connecticut River Bridge Replacement
-  Stamford Station
-  Walk Bridge Program
-  East River Tunnel Rehabilitation
-  Penn Station Reconstruction & Expansion
-  Gateway: Hudson Tunnel Project
-  Gateway: Portal North Bridge
-  Gateway: Sawtooth Bridge
-  Harrisburg Line Interlocking projects
-  Harrisburg Line Catenary & Signal projects
-  30th Street Station Improvements
-  Susquehanna River Bridge Replacement Phase 1
-  Baltimore Penn Station Improvements
- Baltimore & Potomac Tunnel Replacement
- Washington Union Station

CONSTRUCTION STARTS BY

2030

-  Boston South Station Expansion
-  New Haven Line Track & Speed Improvements
-  Hartford Station Relocation
-  Devon Bridge Replacement
-  Saugatuck River Bridge Replacement
-  Cos Cob Bridge Replacement
-  Pelham Bay Bridge Replacement
-  Wilmington Station Improvement Project
-  Bush River Bridge Major Rehabilitation

CONSTRUCTION STARTS BY

2035

-  Gateway: Highline Renewal and State of Good Repair
-  Gunpowder River Bridge Major Rehabilitation

C35 Delivers Faster and More Convenient Service by 2035

Peak Express Service to Central Business Districts

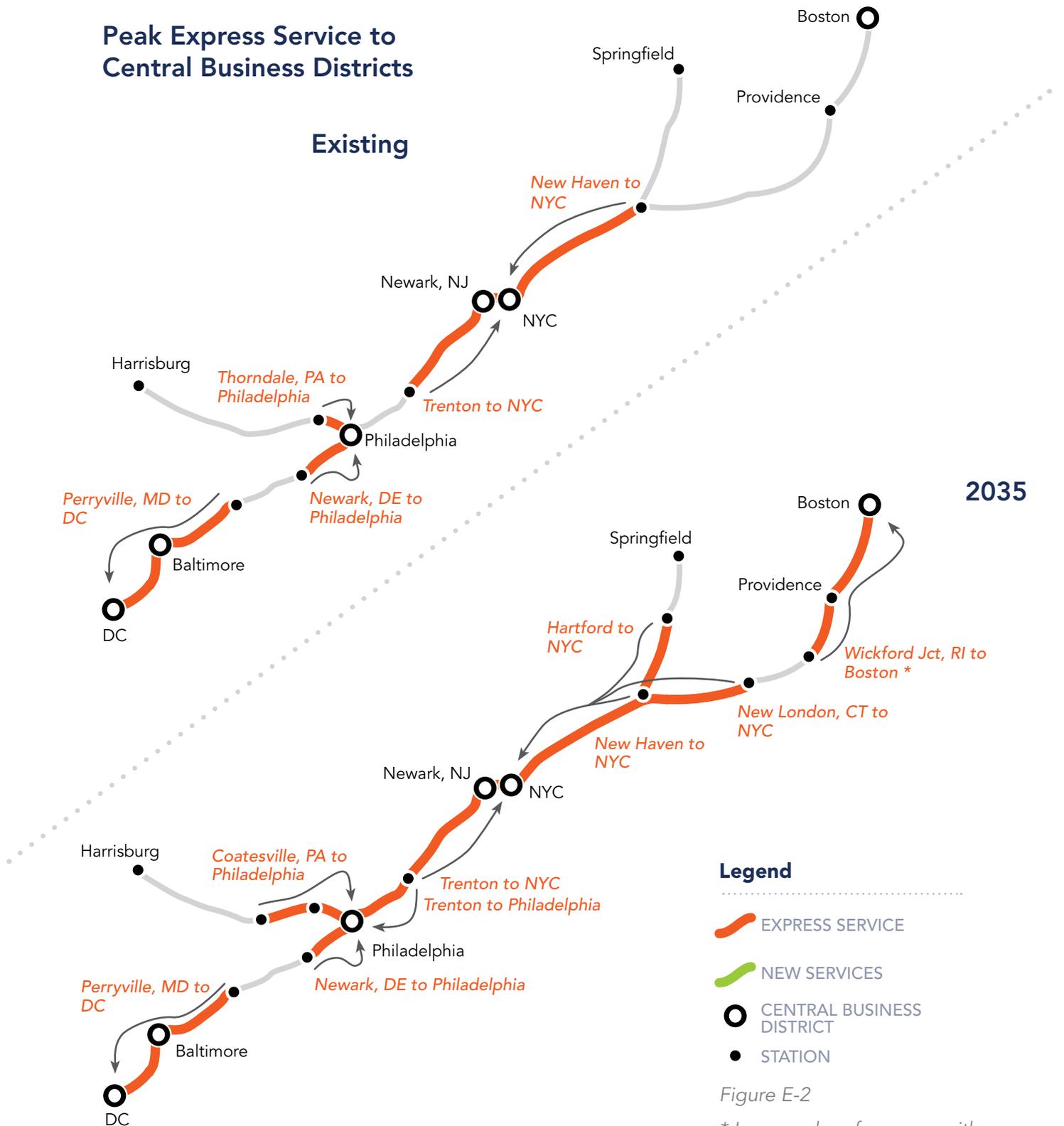
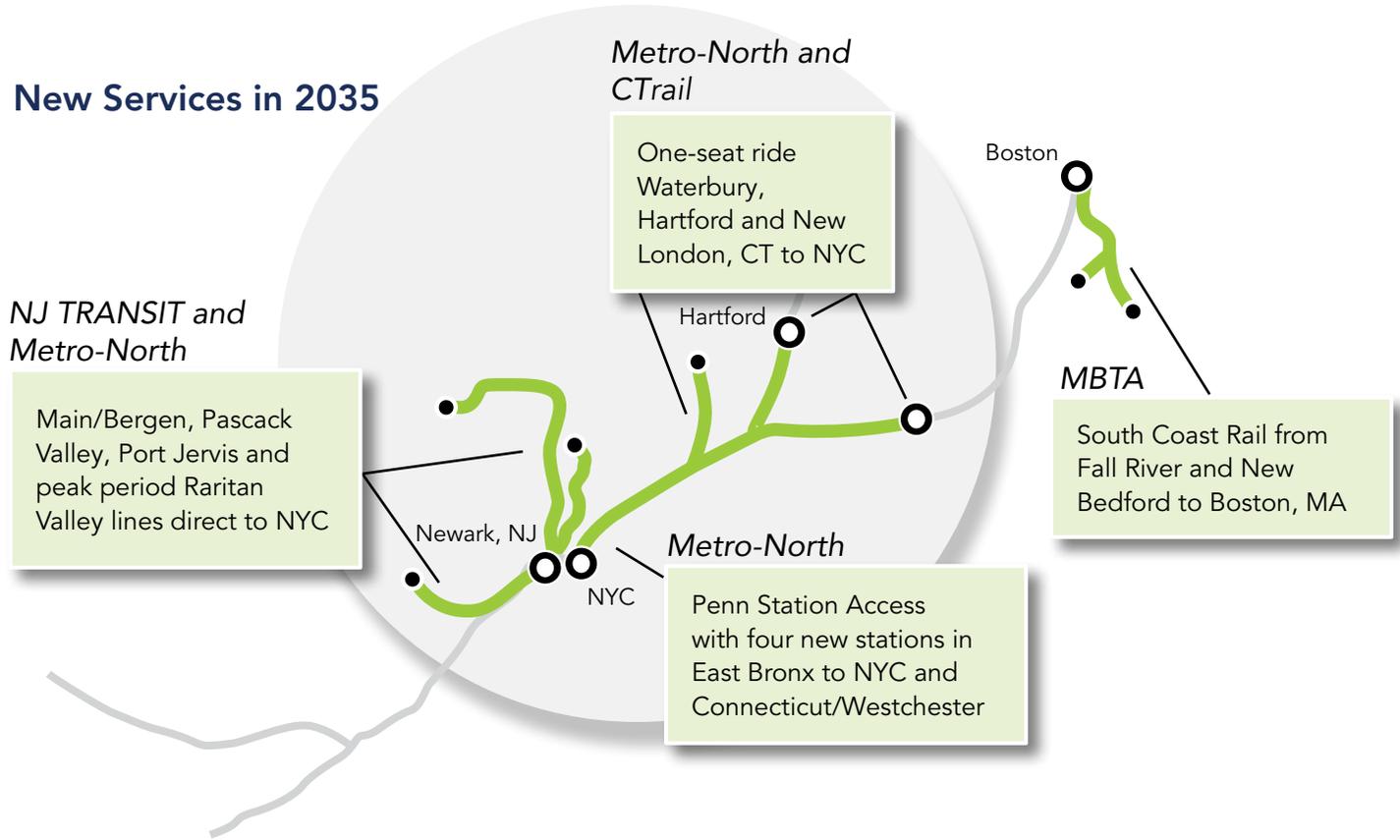


Figure E-2

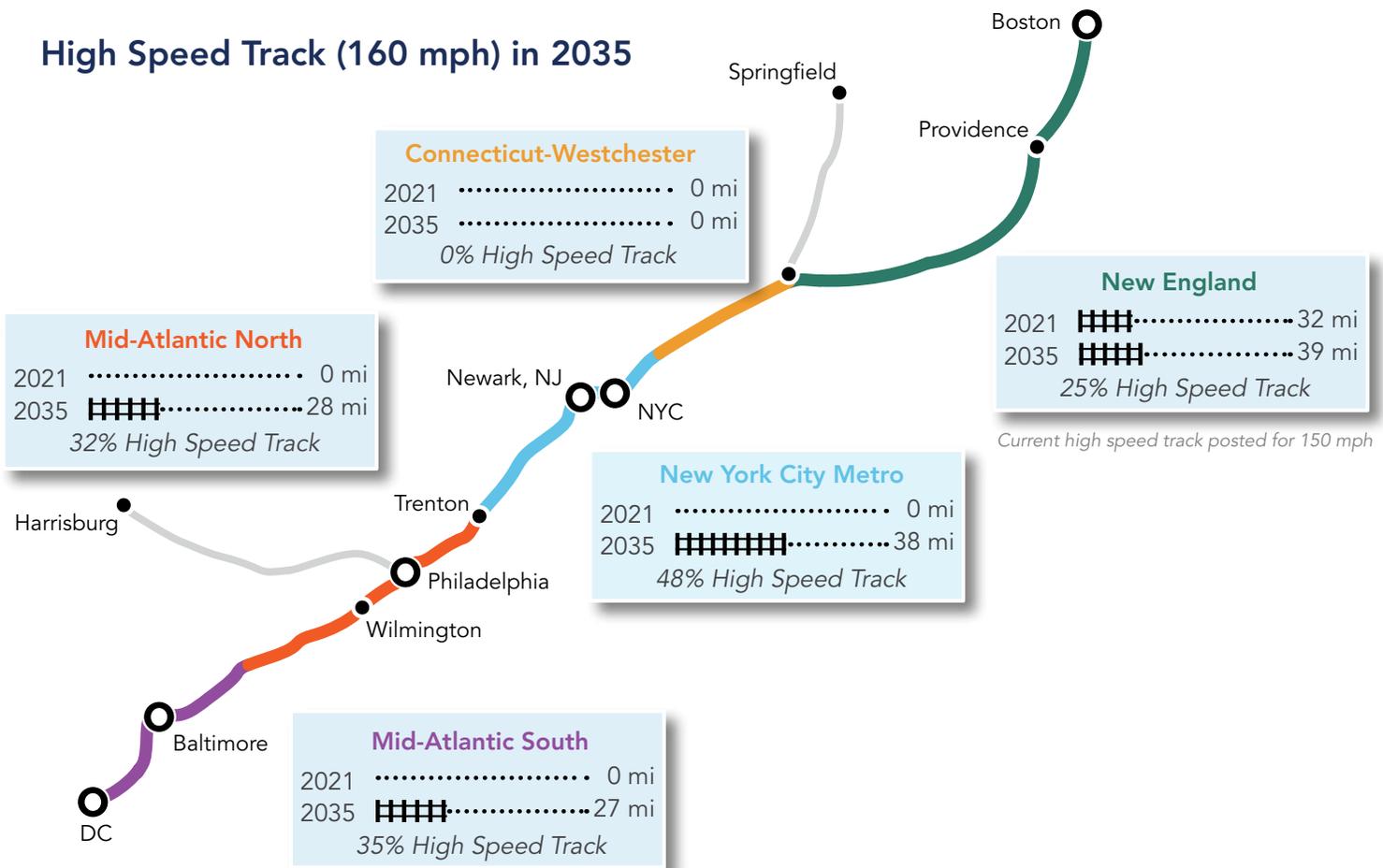
* Improved performance with new electric vehicles

Source: C35 Analysis, 2021

New Services in 2035



High Speed Track (160 mph) in 2035



Why Invest in the NEC?

Improving the NEC commuter and intercity rail system is the region’s most critical infrastructure need. Before the coronavirus pandemic, the NEC supported 760,000 daily trips on eight commuter railroads and 40,000 daily trips on Amtrak. However, those services rely on bridges and tunnels over 100 years old, and aging track, signal, and power supply systems prone to breakdowns that cause service disruptions.

Continued failure to address the NEC SOGR backlog will impact service, safety, and reliability, and jeopardize the economic well-being of the Northeast region and the nation. **A single day without service on the NEC would cost the economy \$100 million** in lost productivity and other transportation-related impacts.¹ C35 will address the NEC’s backlog and build a foundation for growth.



IMPROVE MOBILITY AND CONNECTIONS

Provide more reliable, frequent, and faster NEC service while implementing new service patterns that provide express and one-seat rides



Why CONNECT NEC 2035 Now?

Although the pandemic dramatically reduced all travel throughout the U.S. and the world, the Commission expects rail travel to rebound just as it did following the ridership drops associated with other major events that disrupted the transportation industry like 9/11 and the 2008 recession. Rail will continue to be a primary mode of travel for many people, including those without access to a car, and we must provide high-quality service and equitable accessibility for these customers.

C35 can be a mobilizing force in putting people back to work by building a rail system that can reabsorb travel demand and support new travel patterns that may grow as our economy returns to full strength. Sustained investment in the NEC will deliver improved mobility for millions of Americans, create jobs, open access to opportunity, support our fight against the growing threat of climate change, and continue to make the Northeast a global economic powerhouse.



CREATE ECONOMIC OPPORTUNITY

Generate skilled jobs, and support social equity and underserved communities



A Unique Challenge and a New Way of Doing Business

The NEC is one of the nation's oldest passenger railroads with bridges and tunnels dating back to the 1800's and track, signal, and power supply systems beyond their useful life. The NEC is also the nation's busiest passenger railroad with capacity constraints that make it difficult to take tracks out of service for construction and that limit future growth.

Today, most construction projects advance independently and track outages are scheduled on a "ready to go" basis. Just like a utility company that rips up a road shortly after it's been repaved, when another project is identified in the same area, the same track is shut down again, impacting the same trains and customers.

In select areas, such as Penn Station New York where capacity constraints are most acute, railroads have collaborated on coordinated

track outages with as much programmed work as possible to minimize impacts on customers. C35's groundbreaking analytical approach applies this new construction paradigm to the entire NEC: **project delivery driven by efficient use of track outages, for everything from routine capital renewal to major improvement projects.**

C35's analytical approach also accounted for the fact that the NEC is a network of highly interdependent assets. Additional track capacity 30 miles from a major station may not provide any service frequency benefits if other capacity chokepoints exist at or near the station. C35 considered each individual project in the context of the overall infrastructure to ensure the sum of the plan is greater than its parts: **advancing projects that collectively unlock measurable and significant service benefits by 2035.**



People walking through Newark Penn Station (NJ)

Principles for an NEC Funding Program

C35 will require a strong federal-state funding partnership. The total investment needed to implement C35 over the 15-year period is estimated to be \$117 billion in 2020 dollars and the funding gap is approximately \$100 billion, to be shared between the federal government and states. Below are principles for a new or restructured funding program to implement C35.

- **Make Funding Predictable.** C35's immense workforce and other resource needs make funding predictability critically important. Agencies cannot hire workers, buy equipment, invest time and money in advancing projects through the design and development process when there is no certainty that funding will be available for future construction.
- **Fund the Plan Rather than Individual Projects.** C35 is a detailed sequencing of 15 years of NEC investment organized to maximize the productivity of construction during track outages while supporting existing service. The uncertainty inherent in project-based annual grant competitions and relying on a patchwork of FRA and FTA funding sources prevents agencies from executing work according to this kind of plan efficiently. Agencies should receive funding allocations that allow them to advance projects within the plan in the most efficient way possible.

Many C35 outcomes, such as reduced travel time, are achievable not through the implementation of individual projects, but by the synergies created by multiple projects at multiple locations, and in some cases, in multiple states. Less than full funding for the plan simply means those benefits will take longer than 15 years to achieve. Though C35's funding needs are large, they represent a once-in-many-generations investment to restore a vital asset and build a foundation for growth.



SUPPORT DESIRABLE CITIES AND COMMUNITIES

Improve access to current and future station area developments to enhance the value of our communities

.....



COMBAT CLIMATE CHANGE

Invest in improvements to the NEC that will have a positive impact on the environment through the reduction of greenhouse gas (GHG) emissions and more resilient infrastructure

.....

The NEC Commission is ready to rise to the challenge of advancing this plan. Less than full funding for the plan will delay the replacement of critical assets and needed travel time and capacity improvements across the corridor.

The foundation of partnership is strong. Together, we can at long last rebuild this critical public asset and ensure a bright future for this region and the nation.

Next Steps

The implementation of C35 will require new ways of working together, a much larger workforce, and innovative construction and project delivery methods. **Key next steps include: development of Program Management Plans, creation of a corridor-wide Program Coordination Office, targeted long-term workforce development plans, and continuation of the CONNECT NEC effort, in C37, to refine the plan as new information becomes available.**



People walking through Moynihan Train Hall (NY)



N.E. Regional No. 88
To Boston
Status - Now 1:03P

Location
D
Track 2

Regional No. 88
To Boston
Status - Now 1:03P

E
Track 2

N.E. Regional No. 88
To Boston
Status - Now 1:03P

F
Track 2

Passengers waiting for a train at Wilmington Station (DE)



Preface

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There is an urgent need for significant infrastructure investment in the U.S., and improving the Northeast Corridor (NEC) intercity and commuter rail system is the Northeast’s most critical infrastructural need. CONNECT NEC 2035 (C35) is a transformative 15-year investment plan for the NEC that is the result of unprecedented collaboration among Northeast Corridor Commission (the Commission) member agencies. It is the first major milestone towards advancing the Federal Railroad Administration’s (FRA) corridor-wide vision established in NEC FUTURE.

.....

The Northeast Corridor Commission

NEC Commission Voting Members

- NEC States
 - Massachusetts
 - Rhode Island
 - Connecticut
 - New York
 - New Jersey
 - Pennsylvania
 - Delaware
 - Maryland
 - District of Columbia
- Amtrak
- U.S. Department of Transportation

The Commission was established by Congress in 2008 (49 U.S.C. § 24905) to develop coordinated strategies to improve the Northeast’s core rail network in recognition of the inherent challenges of planning, financing, and implementing major infrastructure improvements that cross multiple jurisdictions. The expectation is that by coming together to take collective responsibility for the NEC, Commission member agencies will achieve a level of success that far exceeds the potential reach of any individual organization.

The Commission maintains a five-year Capital Investment Plan, reports on train performance on the NEC and delivery of the capital program, and implements and updates the NEC Commuter and Intercity Rail Cost Allocation Policy. The Commission’s Cost Allocation Policy allocates over \$1.3 billion annually in shared operating costs and normalized replacement capital costs among the NEC’s right-of-way owners and operators.



Exterior of Wilmington Station (DE)

NEC FUTURE

NEC FUTURE is a corridor-wide long-term vision to improve the reliability, capacity, connectivity, performance, and resiliency of passenger rail services on the NEC by modernizing the existing corridor and expanding capacity to grow the role of intercity and commuter rail to meet mobility needs for 2040 and beyond. The FRA completed a Tier 1 Environmental Impact Statement (EIS) and the NEC FUTURE vision is expressed as the Selected Alternative in its Record of Decision (ROD). The NEC FUTURE vision includes four components:

- Improve Rail Service
- Modernize NEC Infrastructure
- Expand Rail Capacity
- Study New Haven to Providence Capacity

References to passenger rail throughout the ROD consistently refer to both intercity and regional (commuter rail within a metropolitan area) service. The ROD emphasized the importance of collaboration and encouraged the nine railroads to work together to improve connectivity and create efficiencies in the use of existing and planned infrastructure. Service and performance objectives similarly applied to both intercity and regional rail. Travel time targets were estimated for intercity service; and frequency targets were estimated by geographic segment to support both intercity and regional rail service. The ROD provides a framework that recognizes the complex, multi-operator environment of the NEC and builds in the flexibility necessary for each railroad to achieve their service objectives.

The NEC FUTURE vision identifies infrastructure improvements but does not define implementation phases or project sequencing. The next step was to create a phased Strategic Development Plan (SDP) to advance progress towards that vision. The Commission led a collaborative and inclusive process to create a blueprint for advancing the NEC FUTURE vision; **C35 is the initial phased SDP to advance this future vision.**

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NEC FUTURE Corridor-Wide Long-Term Intercity Service Vision

Amtrak Acela and Regional Intercity Frequency

10 trains per hour/peak direction from Washington, DC to New Haven, CT

6 – 8 trains per hour/peak directions from New Haven, CT to Boston, MA

Amtrak Acela Intercity Travel Time (hr: min)

Washington, DC to Boston, MA = 5:00

Washington, DC to New York City = 2:10

Washington, DC to Philadelphia, PA = 1:25

New York City to New Haven, CT = 1:05

New York City to Boston, MA = 2:45

Source: NEC FUTURE Record of Decision, Federal Railroad Administration, July 2017

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Guide to the Document

This document reviews the C35 analysis, benefits, investments, funding, and next steps. The document is structured as follows:

- **Chapter 1, Rebuilding the Future** – includes a general introduction to the C35 plan and why this effort is needed.
- **Chapter 2, Planning Process** – provides an overview of the technical analyses and planning processes followed to develop the C35 plan.
- **Chapter 3, Benefits of a Renewed NEC and a Thriving Northeast** – describes the anticipated corridor-wide benefits of investing in the C35 plan. It articulates the service outcomes enabled by the proposed infrastructure investments, as well as the social, economic, and environmental benefits associated with improved mobility.
- **Chapters 4-8, NEC Territories** – for each territory (New England (NE), Connecticut-Westchester (CTW), New York City Metro (NYM), Mid-Atlantic North (MAN), and Mid-Atlantic South (MAS)) highlights the critical infrastructure projects that will advance in the C35 plan, the delivery analysis results including project sequencing, workforce requirements, and costs, as well as the territory-specific benefits of implementing the C35 plan.
- **Chapter 9, Financial Strategy** – summarizes the corridor-wide capital cost, identifies the funding gap, and presents an approach to close the gap.
- **Chapter 10, Next Steps** – discusses the critical next steps to implement the C35 plan.



Main waiting room at New Haven Union Station (CT)

Figure P-1: Territory Map



Source: C35 Analysis, 2021



Rebuilding for the Future

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The NEC rail system, long the nation’s busiest passenger railroad, was a cornerstone of the region’s development and continues to be a driver of its economic success. With stations in the center of every major and mid-size city and in many small towns, the NEC can continue to be the region’s mode of choice for even more trips by 2035, following 15 years of transformative investment guided by the C35 plan. The implementation of C35 will result in a more reliable railroad that provides more service, connects new markets, and reduces travel times between communities.

The NEC depends on bridges and tunnels over 100 years old. Continued failure to address the NEC’s backlog of state-of-good-repair (SOGR) needs will further impact service reliability and jeopardize the economic well-being of the Northeast region and the entire nation. In addition, continued failure to address the NEC’s backlog will greatly reduce the NEC’s potential to improve equitable access to public transportation and reduce greenhouse gas (GHG) emissions. C35 will create a more resilient railroad, built to modern safety standards, with faster speeds, greater capacity, and enhanced reliability.

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What is CONNECT NEC 2035?



C35 is an unprecedented corridor-wide action plan for the NEC. Building toward the long-term vision for the corridor established in the FRA's 2017 NEC FUTURE plan, C35 provides detailed project sequencing to deliver a first phase of measurable benefits for the region.

C35 is the result of an intensely collaborative process where Commission member agencies worked together for two and a half years to develop and analyze the infrastructure investments necessary to meet ambitious first phase SOGR and service objectives by 2035.

C35 will substantially increase, and in some cases double, commuter rail service; speed up trips with new express services; and connect residents from more parts of the region with one-seat service from their homes to employment centers and other destinations. For the Amtrak Acela traveler, C35 will shave 26 minutes off trips from Washington, DC to New York City and 28 minutes on trips from New York City to Boston, MA.

At the same time, implementing C35 will vastly improve service reliability for all users by replacing or rehabilitating century-old major bridges and tunnels, and upgrading signal and power supply systems.

As part of C35, Commission member agencies have not only analyzed the eventual outcomes resulting from new infrastructure investment; they have developed a detailed guide for how to invest in the NEC in a manner that aims to preserve as much existing service as possible during construction and have identified workforce and other resources needed to deliver the plan.

The result is an ambitious plan for what can be done primarily within the existing NEC footprint to help minimize potential community impacts during construction and generate long-term social, economic, and environmental benefits.

C35 Analysis Framework

The C35 analysis identified a viable and efficient sequence for completing a comprehensive set of special projects and capital renewal activities by 2035 that support agencies' service goals and make significant progress towards eliminating the NEC SOGR backlog. The analysis was conducted with a focus on maximizing the productivity and efficiency of track outages and minimizing service impacts to passengers.

Importantly, the analysis was not constrained by funding and other resources, such as the workforce and equipment that will be available to complete this ambitious—yet critical—set of investments. As discussed in Chapter 10, Commission member agencies are mobilizing to better understand these constraints in the context of this plan, develop strategies for addressing any implementation barriers, and refine the project delivery analyses based on realistic funding and workforce levels, that will inform future iterations of our CONNECT NEC planning process.

This Commission-led CONNECT NEC effort will continue to evolve and will be updated as new project, resource, and funding information becomes available. The delivery analysis and formal documentation, including any changes to sequencing, will be updated roughly every two years, with the next iteration (CONNECT NEC 2037 [C37]) to be completed by fall 2023.

Why Invest in the NEC?

Today's NEC is the product of investments made by various private companies and governments over the last two centuries, spurring various waves of growth and development. Starting in the 1830s, new towns and commercial districts clustered around stations as the first NEC railroad segments extended from Washington, DC to Baltimore, MD; Philadelphia, PA, to Trenton, NJ; New York City, to New Haven, CT; and Boston, MA to Providence, RI.

The final links in today's NEC were put in place in the early twentieth century when the Pennsylvania Railroad completed the original New York Penn Station, and East and North River tunnels (1910), and in a joint effort with New York, New Haven, and Hartford Railroad, the Hell Gate Bridge (1917). Fully electric service south of New Haven, CT to Washington, DC was in place by 1938. Fully electric service from Boston, MA to Washington, DC was established in 2000 with Federal investment for the introduction of the Amtrak Acela.

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There were over 800,000 trips per day in 2019 along the NEC, which includes the main line between Boston, MA and Washington, DC and the connecting corridors. Over 760,000 of these daily trips were on one of the eight commuter railroads, with the remaining 40,000 intercity trips hosted by Amtrak.² At this level of ridership, Amtrak carried more intercity travelers within the Northeast than all airlines combined in 2019. All this activity is meaningful; **if the NEC shut down for just a single day, it would cost the economy \$100 million in lost productivity due to additional congestion and other transportation impacts.**³

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Passenger crowding in the NJ TRANSIT Concourse at Penn Station New York (NY)

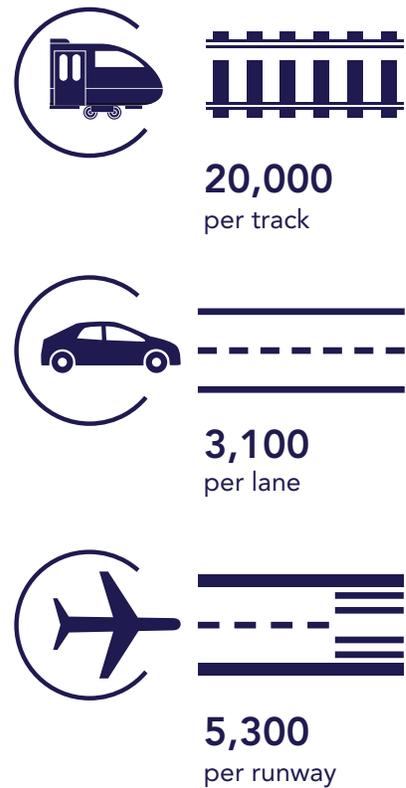
Today, 35 percent of residents and 45 percent of jobs in the Northeast are within five miles of an NEC commuter or intercity station. Of those residents, 23 percent are living in low-income households and a third are living in households without an automobile. The Northeast is projected to grow by an additional seven million new residents and five million new jobs over the next 30 years, putting even more demand on its increasingly overburdened transportation network.⁴

I-95, a 1,900-mile-long interstate highway which runs parallel to the NEC throughout most of the Northeast, is already one of the most congested interstates in the nation. It is predicted that I-95's crowding issues will only worsen in the future, with a projected 474 miles (or 25 percent) of the entire interstate highway operating at 27 mph or less during peak periods by 2030, up from 165 miles in 2010.⁵

Air travel in the region is capacity constrained due to the region's airports' small physical footprints and significant airspace congestion. Passengers using NEC's regional airports in 2019 were subjected to \$973 million in delay costs while costing airline operators \$37 million in operating expenses.⁶ Moving more regional travelers to rail will help the region's airports handle continuing growth in long-distance travel using their existing facilities.

C35, with its service frequency, reliability, and travel time benefits, is expected to cost \$117 billion over 15 years. This investment will improve an efficient high-capacity transportation mode for trips between the key destinations in the Northeast, providing travelers with direct access into the central business districts of the region's major cities where the highest concentration of traffic delays are found, and where traveling without a car has many advantages. For comparison, **one additional lane of I-95 from Boston, MA to Washington, DC in each direction could cost approximately \$75 billion, but provide less marginal capacity per dollar than rail investment.**⁷

Figure 1-1: Capacity by Mode (people per hour)



Source: WSDOT UHSGT Business Case Analysis, 2019



MBTA train at Providence Station (RI)

Rail is an energy efficient and low polluting mode of transportation. If all the NEC's pre-pandemic travelers were diverted from rail to highway and air, it would add 3.9 million metric tons of GHG per year, the equivalent of 2.9 million cars driving from New York City to Los Angeles, CA.⁸

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Rail-based commercial and residential development has cascading environmental and social benefits by supporting walkable land use patterns that enable overall lower automobile use. These factors all make the NEC, which already connects places where people live and want to go, uniquely situated to meet the region's future mobility needs.

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Rendering of Expanded Washington Union Station (DC)

Why CONNECT NEC 2035 Now?

We are in a moment of great uncertainty. Where is our economy going? How will people travel? Although the coronavirus pandemic dramatically reduced all travel throughout the U.S. and the world, the Commission expects rail travel to rebound just as it did following the ridership drops associated with other major events that disrupted the transportation industry like 9/11 and the 2008 recession. Rail travel will continue to be an important mode of travel for residents without access to a car and we must provide high-quality service and equitable accessibility for these customers.

C35 can be a mobilizing force in putting people back to work by building a rail system that can reabsorb travel demand and support new travel patterns that may grow as our economy returns to full strength. Sustained investment in the NEC will deliver improved mobility for millions of Americans, create jobs, open access to opportunity, support our fight against the growing threat of climate change, and continue to make the Northeast a global economic powerhouse.

C35 BENEFITS



IMPROVE MOBILITY AND CONNECTIONS

Provide more reliable, frequent, and faster NEC service while implementing new service patterns that provide express and one-seat rides



COMBAT CLIMATE CHANGE

Invest in improvements to the NEC that will have a positive impact on the environment through the reduction of greenhouse gas (GHG) emissions and more resilient infrastructure



CREATE ECONOMIC OPPORTUNITY

Generate skilled jobs, and support social equity and underserved communities



SUPPORT DESIRABLE CITIES AND COMMUNITIES

Improve access to current and future station area developments to enhance the value of our communities



People walking through Moynihan Train Hall (NY)

Planning Process

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Commission member agencies established an unprecedented collaborative and comprehensive planning process to build consensus around three strategies for this initial 15-year plan: service & capital, delivery, and financial. This chapter describes the purpose and methods for developing each strategy as well as additional areas of analysis for measuring the benefits of proposed investments.

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Service & Capital Strategy

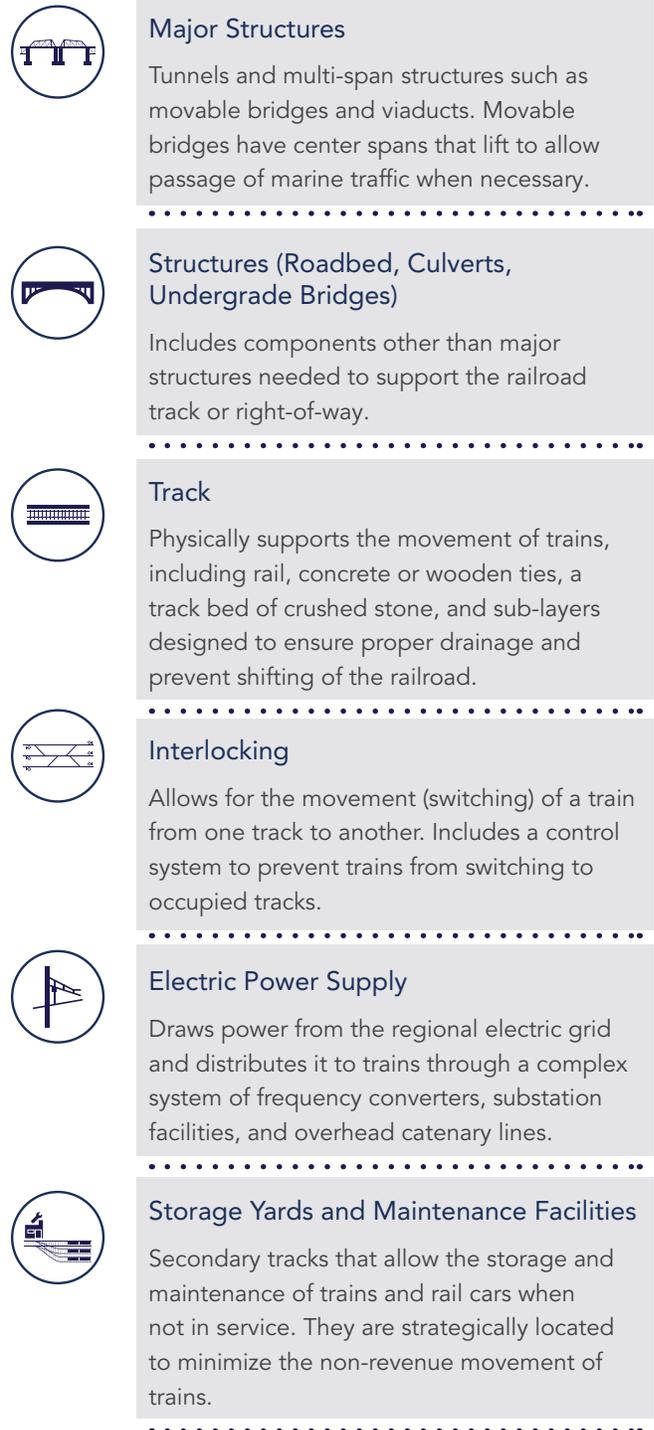
NEC FUTURE established a corridor-wide long-term vision for future service frequency and travel times.⁹ The starting point for C35 was to gather incremental, first-phase 2035 service objectives from each of the member agencies. Agencies also identified infrastructure investments needed to achieve their service objectives and to bring the NEC to a state of good repair.

Input from each agency was used to create an integrated 2035 operating plan that addressed corridor-wide objectives to improve reliability, increase service frequency, and improve speeds. Throughout the C35 analysis, member agencies balanced individual needs with advancing projects in every state and creating corridor-wide benefits. In some cases, service and demand assumptions were aspirational, in other cases, assumptions reflect anticipated service outlined in other public documents.

Infrastructure investments were compiled into a combined project list (see Appendix) comprised of special projects to enhance capacity and speed and replace major bridges and tunnels, as well as capital renewal efforts needed to bring the existing NEC to a state of good repair.

The integrated 2035 operating plan was tested against these infrastructure investments to confirm that service levels could be delivered by 2035.

Figure 2-1: Railroad Infrastructure Components



Source: C35 Analysis, 2021

Delivery Strategy

The delivery strategy assessed how the service & capital strategy could be delivered by 2035. The analysis focused on maximizing the productivity of track outages and minimizing service impacts to customers, and assumed unconstrained workforce and funding. The Commission developed an integrated project delivery and operations analysis tool that:

- Gathered and defined scope, schedules, and capital cost estimates of special projects and capital renewal efforts.
- Considered special projects together rather than individually and grouped them based on their geography, construction requirements, and operational interdependencies.
- Incorporated capital renewal efforts into special project groups where there was overlap, to increase implementation efficiency and reduce customer impact, particularly where special projects could replace or eliminate the need for underlying capital renewal.
- Estimated workforce, equipment requirements, capital cost, and track outages for special project groups and capital renewal efforts.
- Compared required peak period track outages with available track capacity to estimate service impacts. Significant service disruptions were mitigated with refinements to sequencing or by adding enabling projects to improve operating flexibility during and after construction.

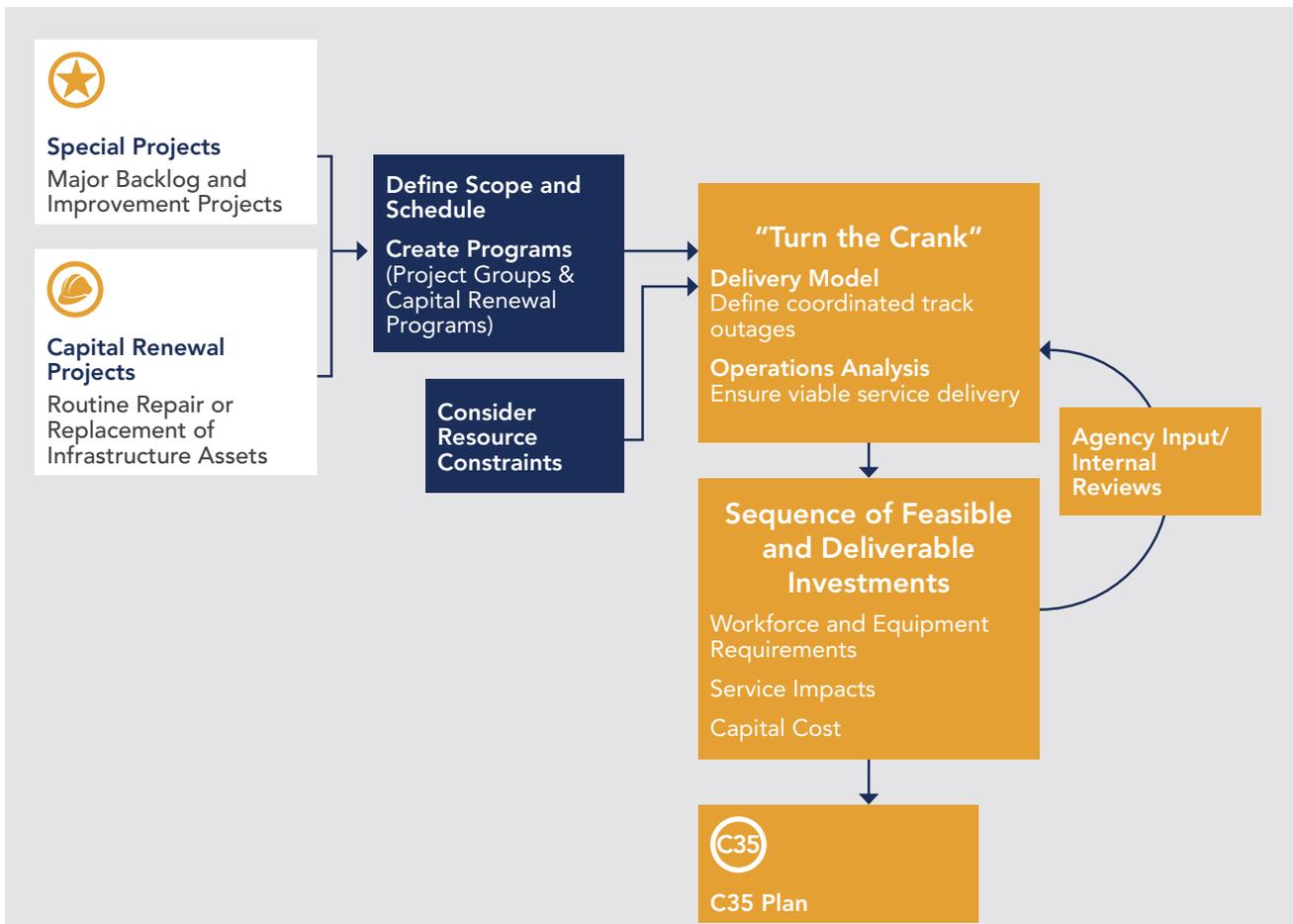
A delay analysis was performed to identify peak delay locations and how C35 projects could mitigate those delays and improve service reliability. Train delay data, calculated from Metro-North and Amtrak 2019 dispatch data for weekday revenue trains, was analyzed to estimate total annual minutes of train delay for locations along the NEC. The analysis was performed on an interlocking-to-interlocking basis by territory, consistent with the project delivery analysis, to identify capacity choke points or other major train delay locations. Relevant C35 special projects that could eliminate choke points and reduce delays were identified for each of these peak delay locations.

Estimated Workforce and Equipment Requirements

C35 railroad specific workforce and maintenance-of-way equipment requirements were estimated for special projects and capital renewal using the delivery analysis tool and a construction activities database. Equipment and workforce needs were estimated assuming activities could be scheduled and sequenced to make efficient use of equipment, workforce, and track outages. For example, if two construction activities on the same project, each requiring a crane, are planned in the same vicinity, the estimate assumes a single crane would be shared to perform both activities. Similarly, the estimate assumes that concurrent activities planned in the same section of track would share railroad workforce for protection and supervision.

The order-of-magnitude estimate of railroad-specific workforce was completed and results are presented in Chapter 3. However, the C35 team determined that additional refinement is needed to complete the equipment estimate and results are not included in this report. Specific equipment needs are significantly influenced by several factors such as how the equipment is utilized, ability to share major equipment throughout the corridor, whether equipment would be purchased or leased, or whether it is provided by a third-party contractor to a railroad. A comprehensive plan for establishing reasonable assumptions for these factors, including determining realistic equipment production metrics will be completed as part of C37. Workforce availability and feasible ramp-up rates will also be incorporated in C37.

Figure 2-2: Project Delivery Tool Flow Chart



Working with the Stakeholders – “Turn the Crank”

Commission member agencies participated in two rounds of analysis to review the feasibility of implementing special projects and capital renewal efforts to achieve corridor-wide service objectives. The first round of analysis developed a coordinated schedule to deliver the special project groups and capital renewal programs within operational constraints and produced estimated resource requirements (i.e., personnel workforce and equipment) and capital costs to deliver the work within the coordinated schedule. The second round of analysis adjusted the delivery tool to incorporate Commission member agency feedback and to smooth year-over-year resource requirements and minimize passenger impact from construction activity.

C35 TERMINOLOGY



Special projects

“Major backlog projects” (overhaul or replacement of major bridges and tunnels) and “improvement projects” (infrastructure above and beyond existing assets or replacing existing structures with markedly superior ones).

Special project groups

A grouping of geographically proximate and interrelated special projects, often inclusive of some capital renewal efforts.



Capital renewal

Routine state of good repair and replacement of existing basic infrastructure, such as track/roadbed, signals, catenary, and undergrade bridges. Some capital renewal work is accomplished within special projects.

Capital renewal programs

Capital renewal efforts delivered concurrently within capital renewal sections to optimize project delivery and minimize rider impact not associated with special projects.



C35 delivery analysis

Sequencing of special project groups and capital renewal programs to gain efficiencies in project delivery and optimize the use of available track outages or other railroad resources.



C35 is the first phase of the corridor’s long-term vision established in FRA’s NEC FUTURE plan and is focused on modernizing the NEC and bringing it to a state of good repair. NEC FUTURE service and performance objectives were considered throughout the project delivery analysis. The integrated project delivery approach was used to identify ways to make progress towards adding capacity, relieving chokepoints, and improving operating flexibility to incrementally work towards NEC FUTURE travel time and frequency targets.

Financial Strategy

The financial strategy identifies the sizable gap between historically available funding levels and the capital needs of the C35 plan and suggests an approach for closing it. This process began with a survey of existing funding programs and an evaluation of their suitability for implementing a plan at the scale of C35.

Existing funding programs, though insufficient to address SOGR backlog and capacity needs, have been critical in supporting the services the region has enjoyed in the roughly 50 years of NEC public ownership. However, the patchwork of existing funding sources for NEC projects and their unpredictable nature present core challenges to ramping up to the C35 investment levels required to tackle the SOGR backlog and build a foundation for growth. C35 developed principles regarding how a preferred federal-state funding partnership could be structured to support implementation of a more aggressive and highly coordinated plan. See Chapter 9 for funding strategy recommendations.





Passengers boarding a Metro-North train at Bridgeport Station (CT)

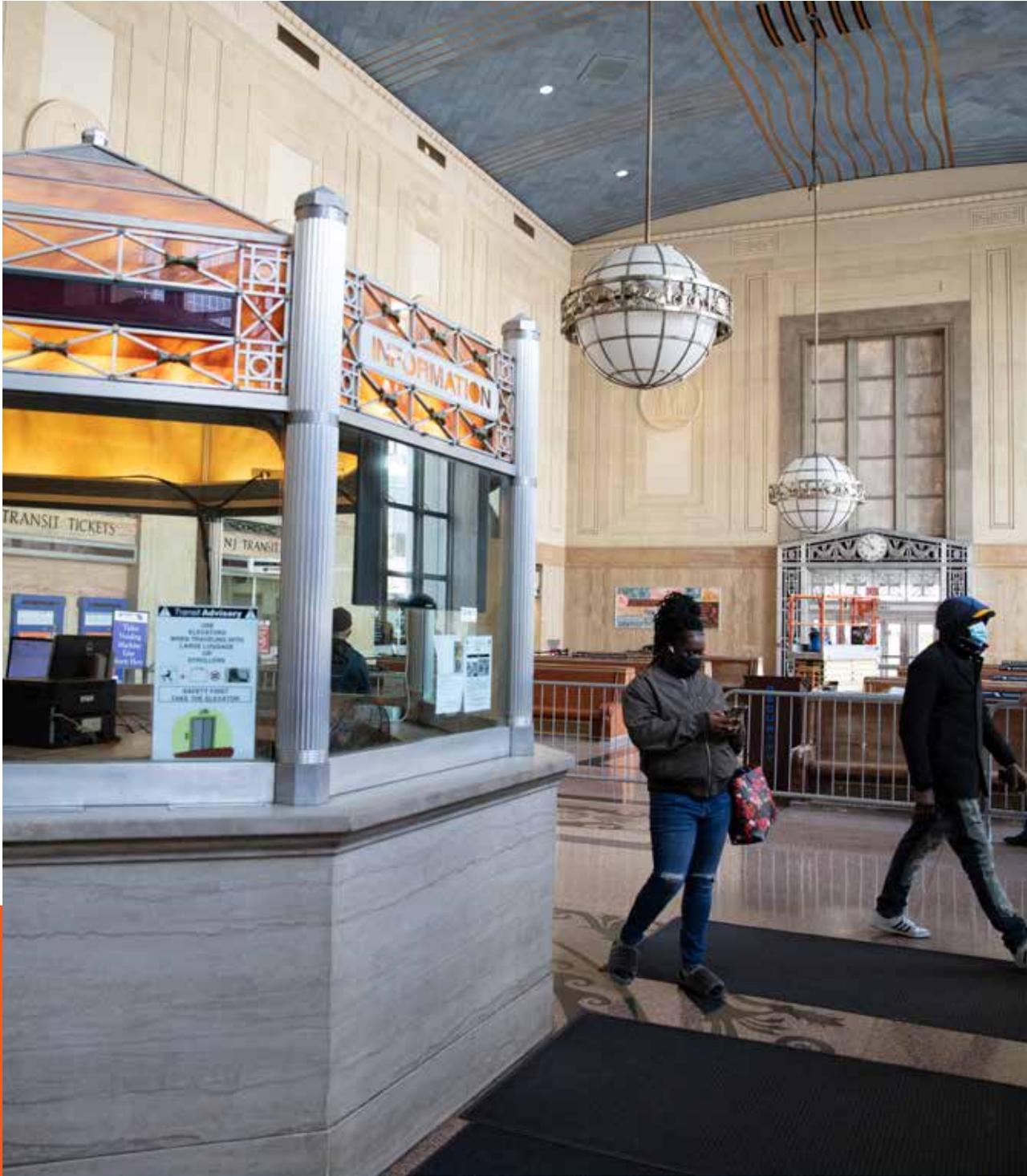
Benefits Analysis Methods

The delivery and operations analysis that shaped the plan were supplemented with additional methods and tools for forecasting ridership demand, estimating capital costs, and examining the plan’s potential economic impact.

ANALYSIS	METHODS	OUTCOMES
RIDERSHIP	Commuter and intercity ridership estimated using a customized elasticity-based ridership tool derived from behaviors embedded in existing ridership models, incorporating demand sensitivities to travel time, service frequency, and fare	<ul style="list-style-type: none"> • Mode shifts to rail from auto, air, and bus with proposed 2035 operating plan for individual territories and corridor-wide • Travel time savings • Change in both vehicle and passenger miles traveled
COST	Capital needs estimated using ground-up, asset-by-asset cost model in 2020 dollars	<ul style="list-style-type: none"> • Estimated capital costs in five-year time frames • Includes labor and materials
ECONOMIC	Economic benefits derived from the capital investment and service improvements, captured at territory, corridor-wide, and national scales	<ul style="list-style-type: none"> • Value of capital investment • Annual jobs and estimated earnings • Economic benefit of travel time savings and improved reliability to individual riders and to the regional economy

How the pandemic may influence future rail ridership

The pandemic and worldwide shut down of businesses resulted in an abrupt halt to travel everywhere. Public transportation was hit hard as social distancing was enforced and people with options chose not to travel or shifted away from metro, rail, air, and bus travel to auto. As a result, rail ridership throughout the Northeast dropped dramatically. We are now starting to see ridership rebound as people return to their offices and business and leisure travel resumes. The C35 ridership analysis was adjusted to allow time for ridership to recover to pre-pandemic levels by assuming that growth forecast to occur by 2030 would now not be realized until 2035.



People at the Newark Penn Station Information Kiosk (NJ)

3



Benefits of a Renewed NEC and a Thriving Northeast

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The implementation of C35 will renew the NEC and tackle the backlog of projects necessary to bring it to a state of good repair and improve overall rail system reliability. Targeted investments to eliminate chokepoints and add capacity will extend the reach of the rail system and make it more accessible with:

- Faster, more frequent, and reliable connections for both commuter and intercity travelers
 - New services in response to underserved and emerging travel markets
-



Metro-North train at New Haven Union Station (CT)

C35 will achieve meaningful, measurable progress in advancing the NEC FUTURE vision. The NEC in Connecticut and Westchester County will offer faster travel times for both commuter and intercity passengers, shaving up to 25 minutes off trips to New York City through speed upgrades and new express services. New Jersey commuters will have twice as much trans-Hudson service into a new, expanded Penn Station New York (PSNY).

Many customers on the NEC will experience faster travel. While Amtrak Acela service will have the largest reduction in per trip travel time, smaller reductions in travel time on commuter rail systems will impact significantly more people, given their much higher ridership levels. New infrastructure will improve reliability and on-time performance for all NEC operators.

Table 3-1: C35 Estimated Progress Toward the NEC FUTURE Vision

		Current	C35 Phase 1 Delivers	NEC FUTURE Target
Intercity Frequency (per peak hour peak direction)	DC-PHL	1-2	3	10
	PHL-NYC	2-3	4-5	10
	NYC-NHV	1-2	2	10
	NHV-BOS	1-2	2	6-8
Acela Travel Time (h:mm)	DC-NYC	2:55	2:29	2:10
	NYC-BOS	3:36	3:08	2:45
Design Speed (mph)	Existing Segments	150	160	160
	Dedicated High-Speed Segments	-	-	220

Source: C35 Analysis, 2021 based on NEC FUTURE, 2017

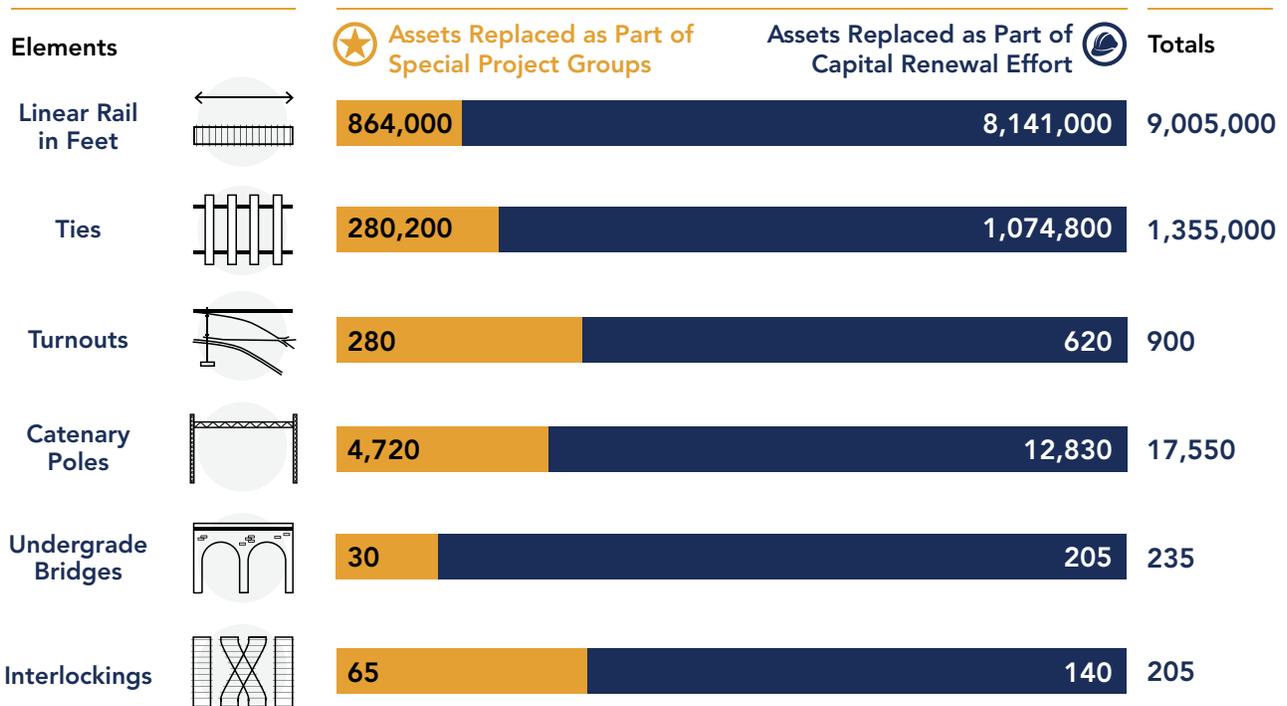


Passengers at Baltimore Penn Station (MD)

C35 by the Numbers

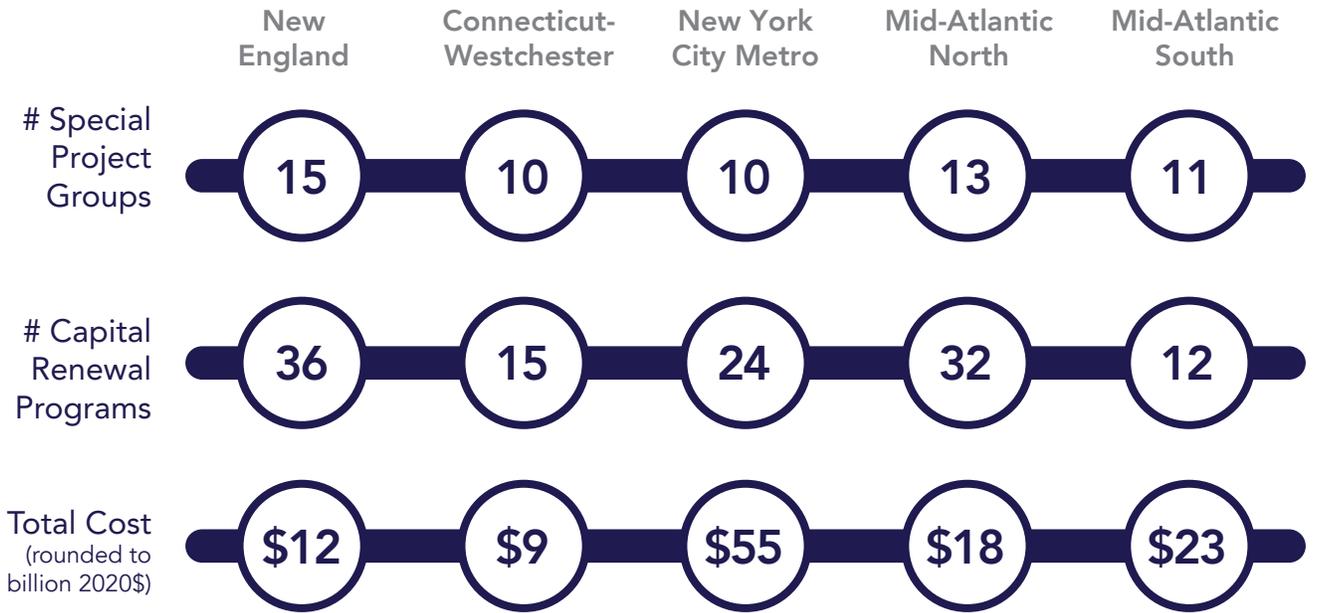
The 15-year plan includes over 150 projects within 59 special project groups, and 119 capital renewal programs. Special projects and capital renewal are grouped to create delivery efficiencies, minimize service impacts, and reduce community impacts by staying within the existing railroad rights-of-way. The C35 plan can be implemented while continuing to operate service, but it will require both intercity and commuter peak-period service reductions throughout the NEC to accommodate necessary track outages longer than a midday, overnight, or weekend period. These peak-period service reductions could last up to several months at a time over the 15-year time frame. As the C35 plan advances, member agencies will continue to refine the project delivery approach and identify ways to further mitigate or minimize service disruptions. Agencies will also work on strategies for communicating service impacts to customers to minimize their inconvenience.

Figure 3-1: Corridor-Wide Estimated Special Project and Capital Renewal Elements



Source: C35 Analysis, 2021

Figure 3-2: Corridor-Wide Groups/Programs and Estimated Capital Cost by Territory



59 Special Project Groups

119 Capital Renewal Programs

\$117 Total Cost (billion 2020\$)

Source: C35 Analysis, 2021

C35 infrastructure investments are foundational to improving and expanding future rail service on the NEC. Agency capital programs and operating budgets will need to be revisited to incorporate and support the future capital investment and rail services detailed in this report. Of note is the necessary investment in an expanded fleet, storage and maintenance facilities, operating costs for additional service, and workforce which was not included in the C35 analysis.

Improve Mobility and Connections



C35 will make significant improvements to NEC rail service for existing and new riders, on both commuter rail systems and Amtrak.

- Amtrak Acela service will be nearly 30 minutes faster from both New York City to Washington, DC and New York City to Boston, MA.
- In Massachusetts, Rhode Island, Connecticut/New York, Pennsylvania, Delaware, and Maryland, infrastructure modifications and new express service patterns will also speed up select commuter rail trips.
- Daily NEC trains will grow by a third for Amtrak and double for several commuter railroads.
- New stations will introduce service to underserved communities and expanded one-seat services will create new direct connections.

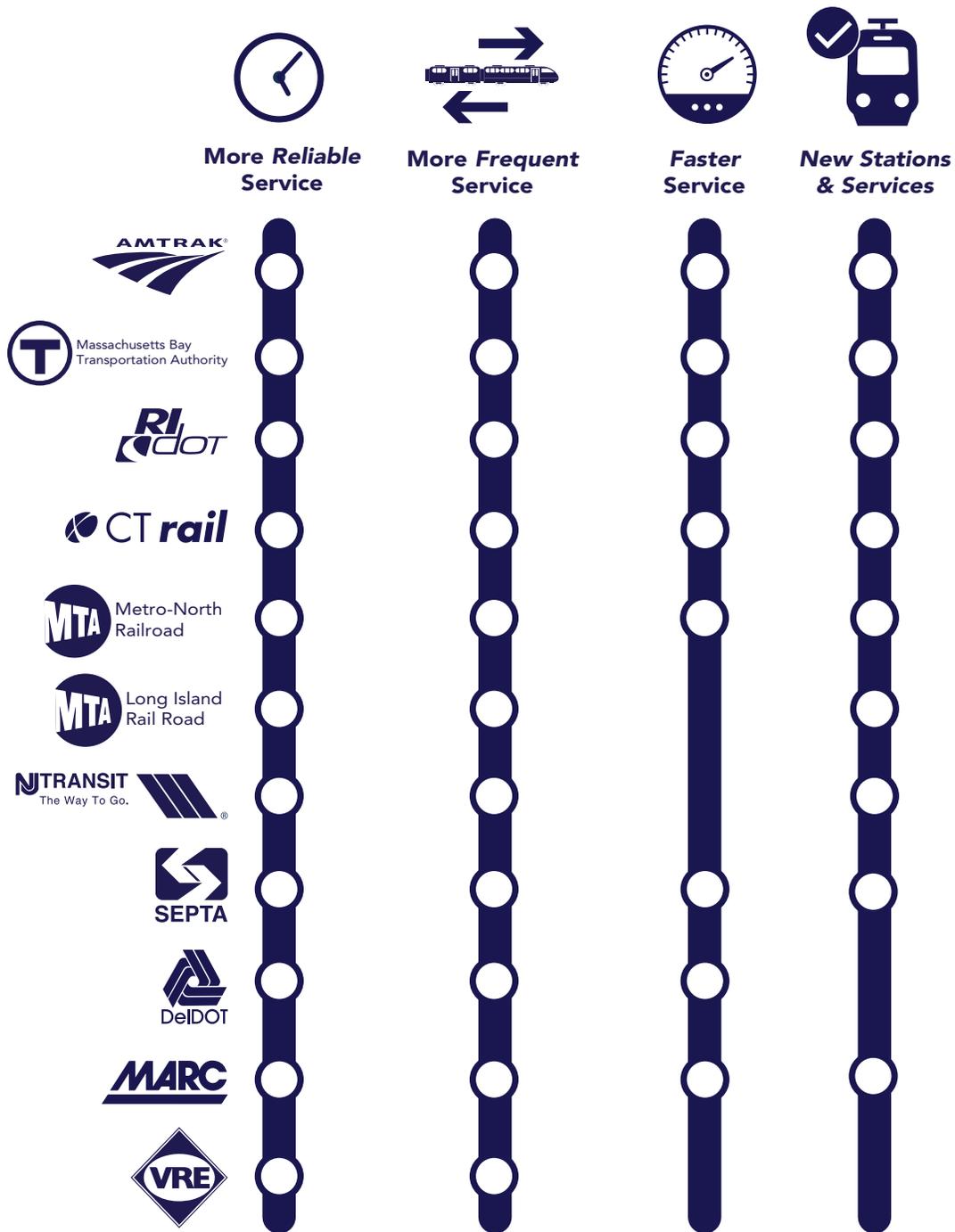
Better access and improved connections between cities along the NEC will attract more travelers to rail. With the C35 plan ridership is expected to grow by approximately 60 million annual trips by 2035 when compared to 2019.

What happens without C35?

Current investment levels in the NEC, about \$1 to \$1.5 billion annually over the last five years, will not continue to support the service quality (reliability, speed, frequency) we enjoy today. As a result, ridership would degrade by 2035. But we cannot predict exactly how and when our aging assets will break down and how that will impact service levels and ridership.

Maintaining today's service and ridership by 2035 will be more expensive. We do not know exactly how much more expensive for the same reason that we cannot predict how and when our aging assets will break down. But we do know what we can build by 2035 to ensure service quality improves, ridership grows, and the NEC continues to support a thriving regional and national economy.

Figure 3-3: CONNECT NEC 2035 Service Objectives Summary



Source: C35 Analysis, 2021

Reliable Service

Failures and limitations of today's aging or outdated infrastructure contribute to train delays. In FY2019, Amtrak NEC trains were delayed over 5,200 hours and 19 percent of trains were late.¹⁰ Riders on the NEC already suffer approximately \$1 billion annually in lost productivity due to service disruptions.¹¹

C35 will significantly invest in reducing the backlog of assets beyond their useful life and mitigating or eliminating existing chokepoints that exacerbate disruptions with cascading impacts across a mix of services. Signal system improvements, new interlockings, additional mainline tracks, and expanded station capacity will allow on-time trains to bypass delayed trains and better support trains with different stopping patterns.



Passengers waiting as a Metro-North train arrives at Bridgeport Station (CT)

A more reliable NEC means that passengers can expect their train to arrive on-time. This means existing and new passengers will consider the NEC a preferred method for traveling within the Northeast.

New Services and Stations

C35 will improve mobility and access through the introduction of service to new stations and between new station pairs. Projects in Rhode Island and New York will build stations in underserved communities bypassed by the current NEC. New commuter and intercity services in Massachusetts, Connecticut, New Jersey, and Pennsylvania will provide new one-seat rides both between market pairs on the NEC and between markets not currently directly connected to the NEC.



EXPRESS AND ONE-SEAT RIDE

Express and one-seat ride services expand the market area and create new travel options and opportunities throughout the Northeast. New one-seat ride express services connecting Hartford, CT/Springfield, MA and New London, CT to New York City will take advantage of speed increases and become flagship CTDOT services with significant travel time reductions.



OFF-PEAK AND REVERSE-PEAK

Off-peak and reverse-peak services fill existing service gaps for underserved markets. The 2035 operating plan includes more off-peak and reverse-peak service for each of the commuter railroads. These services allow NEC operators to better serve those who commute to work or travel outside the typical peak hours.



NEW STATIONS

New stations expand the reach of the existing commuter rail networks to underserved markets along the NEC. C35 includes four new commuter stations in the Bronx, NY with Metro-North Railroad's (Metro-North) new Penn Station Access project; a new MBTA commuter station in Pawtucket, RI; a new NJ TRANSIT station in North Brunswick, NJ; and a new MARC station in West Baltimore, MD.

Frequent Service

C35 will deliver more frequent service throughout the day for all commuter railroads and Amtrak. This additional service will boost peak-direction frequency, supplement existing or introduce new reverse-peak trains, and address service 'gaps' in certain territories during off-peak periods. Additional reverse-peak and off-peak services create opportunities to grow ridership in response to changing travel patterns that may emerge as we recover from the pandemic with more flexible work schedules or people looking to travel when trains are less crowded.



Amtrak New Acela crosses the Susquehanna River (MD) on its first 2020 test trip to Washington Union Station (DC)

Figure 3-4: Estimated Maximum Time Between Amtrak Trains (minutes)



Source: C35 Analysis, 2021

Faster Service

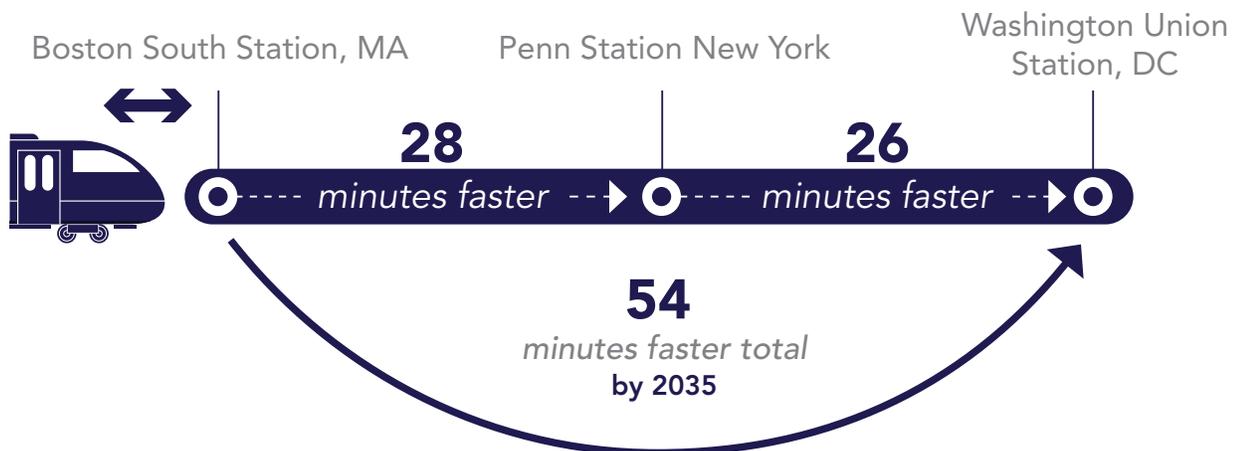
C35 will upgrade track and signals, smooth curves, and replace power supply assets that currently limit speeds between Boston, MA and Washington, DC. These improvements will allow for end-to-end travel time reductions of almost an hour. Curve and track speed improvements will increase the existing 32 route-miles of 150-mph operation to a future 132 route-miles capable of supporting 160-mph operation, an over 310 percent increase.

Infrastructure investments, like new or reconfigured interlockings and new mainline track, will support faster travel times between select commuter rail market pairs by enabling the introduction of new express services. Express commuter services will create smaller travel time reductions, but for larger numbers of riders.

Many investments that support higher speeds, such as replacement of power supply systems, have collateral reliability benefits for all NEC riders. More reliable services also create opportunities for reducing travel time by removing time added to schedules to account for anticipated delays. Future iterations of CONNECT NEC will examine how to incorporate this issue.

Corridor-wide, intercity and commuter rail passengers will save more than 6 million hours a year in travel time. The total value of these saved hours is nearly \$140 million annually.

Figure 3-5: C35 Estimated Acela Travel Time - Boston, MA to Washington, DC



Source: C35 Analysis, 2021

Advancing High-Performance Rail

C35 will make early progress towards meeting the NEC FUTURE performance objectives by reducing Boston-Washington travel time by nearly an hour and increasing intercity service by a third. The C35 effort has shown that these achievements are possible with investments primarily within the existing footprint of the NEC while its infrastructure continues to support over 1,850 daily commuter and 150 intercity trains.¹² Some localized projects will reduce track curves that currently limit train speeds. Other programs, like replacement of the aging electric power supply system between New Rochelle, NY and Washington, DC, will both enable faster train speeds and replace failure-prone infrastructure that disrupts service.

Even more ambitious travel time goals are feasible by 2035. The NEC FUTURE Record of Decision called for higher speed segments to be evaluated in select locations, such as between Baltimore, MD, and Wilmington, DE, and between New Haven, CT, and Providence, RI. While such initiatives are currently at the conceptual stage, Amtrak and certain states are developing strategies to advance the planning, design, environmental review, and community engagement necessary to develop these new segments and outline the necessary funding requirements.

C35 includes planning studies to analyze new dedicated NEC high-speed segments critical to achieving the NEC FUTURE objectives. If planning and project development is expedited, some of these segments could be operational by 2035. Bringing the NEC to a state of good repair, addressing capacity constraints, and extending 160 mph operation with catenary replacement are a necessary first step.

C35 will fix and improve the existing NEC as a foundation for future high-speed service and put in motion the development of new high-speed segments capable of delivering world-class service to the region.



Concept Drawing of Amtrak New Acela



Passengers boarding an Amtrak Acela train

Create Economic Opportunity

In the aftermath of the pandemic and its associated economic challenges, implementing as much as \$117 billion in capital investments through the 15-year C35 plan will generate over \$90 billion in earnings throughout the U.S. which will contribute to the growth of state and local economies. As new stations and rail services in the C35 plan are put into service, better transportation options will support continued economic growth for urban centers along the NEC and for communities poorly served or entirely bypassed by today's railroad.

Job Creation

C35 investment will generate nearly 1 million total new jobs in the Northeast over the 15-year plan. These new public and private sector construction-related direct, indirect, and induced jobs will in turn generate \$60 billion in earnings. An additional 700,000 jobs and \$34 billion in earnings will be generated in the U.S. beyond the Northeast in industries providing materials and equipment for the C35 plan.

The C35 plan is expected to support more than 6,000 specialized railroad construction jobs annually over the 15-year implementation time frame. This workforce requirement is well above existing railroad staff resources and will require a combination of hiring in-house workforces, contracting with the private sector, and innovative approaches working across the NEC and partnering with labor.

Since C35 is not constrained to current resource levels, workforce development is a critical early action necessary to deliver C35 and an opportunity for low-income and disadvantaged populations in the Northeast to gain new skills and become qualified for higher paying employment. Infrastructure occupations pay up to 30 percent more than the average wage. Such jobs are important opportunities for the two-thirds of U.S. workers who lack four-year college degrees. Member agencies are committed to working with federal, state, local, labor, and education partners to create these workforce development initiatives.



Putting Infrastructure Dollars to Work

C35 capital spending will generate direct, indirect, and induced jobs. Direct construction-related jobs are occupations that work directly on delivering the C35 plan, such as project planners, designers, engineers, and construction workers. Direct jobs include railroad construction jobs that require specific training and certification for work on the NEC. Indirect jobs are non-construction positions at suppliers of materials, such as steel, concrete, wood, and specialized railroad equipment. Induced jobs are created by the spending of monies provided as project salaries for items such as groceries, gas, entertainment, etc.

Within the category of direct construction-related jobs are specialized railroad construction jobs. These positions cover key safety activities such as employee protection and supervision on an active railroad, as well as specialized skills in constructing track, signal, and electric power systems. Many such functions are covered by railroad employees but can in some cases be performed by contractors or a combination of contractors and employees.

Equity and Access

The NEC serves diverse populations throughout the corridor. Ninety-five percent of riders use commuter services which create access to economic opportunity for a variety of high, medium, and lower income communities.

Commuter rail is especially effective in connecting higher-wage job centers to an array of residential communities. The benefits of these connections are broad: central business districts and employers gain access to a larger pool of potential employees, workers gain access to more affordable housing options, and residents gain access to higher-wage jobs. C35 will enhance and expand connections between job centers, healthcare facilities, and educational institutions along the NEC with hundreds of communities.

Of the over 18 million people who live within five miles of an NEC station, 23 percent live in low-income households and a third do not own an automobile. Fifty-seven percent belong to racial or ethnic minority groups.¹³ It is especially critical to make investments that will benefit these communities. C35 includes several new commuter stations in locations with high proportions of minority and low-income households. C35 will also introduce new reverse-peak and off-peak services, particularly suited to workers in industries with non-traditional hours.

The cost of passenger rail service can be a barrier to access for low-income communities. This can be an issue for both commuter and intercity fares but is more pronounced for Amtrak intercity fares which are market-driven and not structured to meet the needs of daily commuters. The C35 plan will open up more options for a market that is underserved. Improved equity in access to these new services requires a collaborative effort between federal, state, and local partners and specific arrangements between transit providers and localities.

Metro-North

Penn Station Access

This project will provide new direct Metro-North service to PSNY with four new stations in the East Bronx at Co-op City, Morris Park, Parkchester/Van Nest, and Hunts Point, where 90 percent of residents belong to a racial or ethnic minority and 25 percent of households are low-income. New service will provide these residents with access to jobs, education centers, and other opportunities in Midtown Manhattan, Westchester, and Connecticut. Future riders will save up to 50 minutes on their commute to Manhattan and up to 75 minutes on trips to Connecticut compared to transit options available today.



Rendering of proposed Metro-North Co-op City Station (NY)

Combat Climate Change

The Northeast's robust transit network provides a carbon-efficient transportation option for the region's travelers. The average transportation-related CO₂ emissions per capita in the Northeast are approximately 25 percent lower than the national average.¹⁴ The NEC is the backbone of this interconnected network of rail and bus services that provides an attractive alternative to car or air travel. C35 will make rail an even more appealing option for travelers and ensure the long-term viability of NEC service through investments in hardening its infrastructure.



Though transportation is the largest source of GHG emissions in the U.S., passenger rail generates significantly less than other modes and plays a critical role in supporting climate change reduction goals.

The NEC, where 93 percent of weekday trains are electric, already limits the region's GHG emissions today. If rail were no longer a viable transportation option and all of the NEC's current travelers were diverted to other modes it is estimated that associated GHG emissions in the region would be six times higher for those trips, rising from 0.8 million metric tons (MMT) CO₂ per year to 4.7 MMT CO₂ per year. The change is the same amount of carbon generated by 2.9 million cross-country trips by car between New York City and Los Angeles, CA.¹⁵



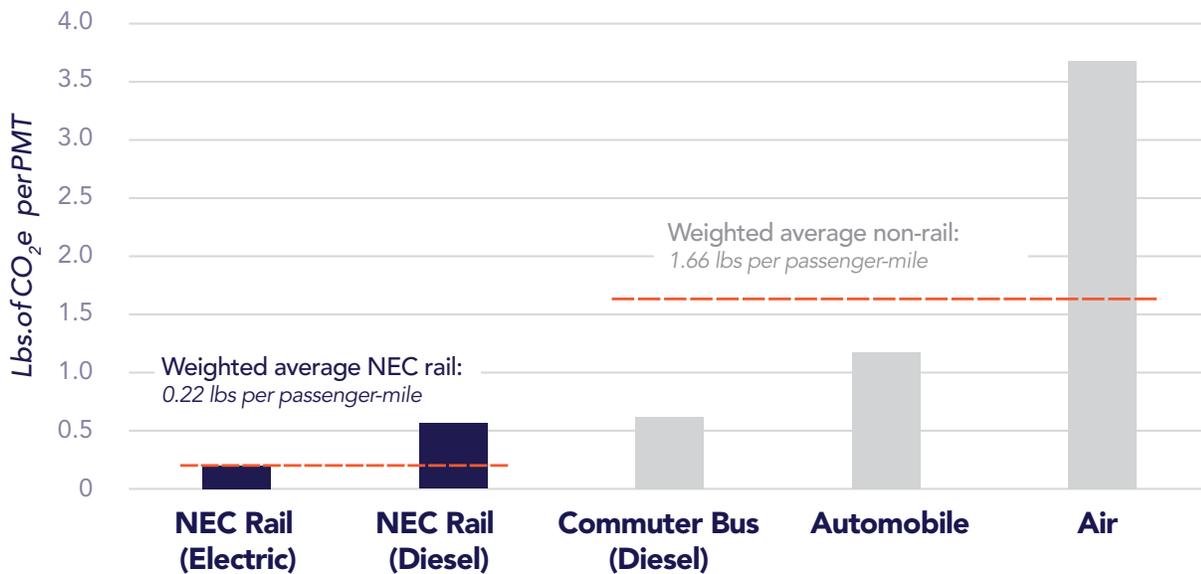
Downed trees after Hurricane Isaias in Metro-North Territory

Reduced Carbon Footprint

Without C35, the nearly 60 million annual additional commuter and intercity trips would need to be accommodated by less efficient modes such as auto, bus, or air, causing increased congestion and carbon emissions.

C35 will also support the region's dense and walkable land use patterns that further reduce carbon emissions. Vehicle miles traveled per capita in compact residential, retail, and commercial developments range from 20 to 40 percent less than environments where robust public transportation options are unavailable.¹⁸

Figure 3-6: CO₂ Emission per Passenger-Mile Traveled (NEC Rail vs. Non-Rail Modes)



Source: C35 Analysis, 2021

Amtrak Environment and Sustainability Practices

Since 2010, Amtrak has reduced emissions by 20 percent with a target to achieve 40 percent reduction by 2030 from 2010 baseline figures.¹⁶ Initiatives such as reducing locomotive idling, making energy efficiency upgrades in Amtrak-owned buildings, fuel conservation, introduction of new energy-efficient fleets, and increasing the amount of renewable energy in their purchased electricity contracts will help Amtrak achieve energy and emissions reduction targets. Amtrak customers can reduce up to 83 percent of their GHG emissions compared to driving and up to 73 percent compared to flying.¹⁷ Additionally, Amtrak has partnered with Carbonfund.org, allowing passengers to offset the carbon emissions footprint generated by their individual rail travel.

Resilient Infrastructure

C35 special projects and capital renewal together make the NEC more resilient to the type of severe weather conditions the region is already facing and that are expected to be a threat into the future. Planned upgrades to culverts, drainage systems, and undergrade bridges will reduce vulnerability to flooding and major bridge replacements and tunnel designs will incorporate features to withstand severe weather conditions and flooding. Throughout the NEC, installing constant tension catenary allows wires to remain the same tension despite shifting temperatures, making them less likely to snap in cold weather or sag and get pulled down by passing trains in hot weather. In many locations, signal and substation assets can be raised above floodplains to prevent periodic damage that would disrupt train service.



Amtrak crews at A Interlocking in Penn Station New York (NY)

Examples of a More Resilient NEC

- Replace the overhead catenary power supply system south of New Rochelle, NY, much of which dates back to the 1930s, to reduce the frequency with which wires snap in extreme temperatures
- Improve the Bell to Landlith interlocking in Pennsylvania to include new “portal” structures to hold catenary which are stronger than a singular pole and can last 100 years
- Implement the NJTRANSITGRID project to provide backup to the regional power network, and several projects which provide hardened infrastructure and/or move it to less flood-prone locations, including Gateway NJ TRANSIT Storage Yard and Delco Lead
- Add redundancy and resiliency through the Gateway and Penn Station Access projects which provide alternative routes in case of an outage in the North River Tunnels or Grand Central Terminal

Support Desirable Cities and Communities

C35 will enhance access to locations within the Northeast that are growing and projected to grow in the future. The Northeast is home to four of the nation’s eleven largest metropolitan areas. These cities have NEC stations in or near their historic city centers with vibrant, walkable business districts and residential neighborhoods. As shown in Table 3-2, over the past decade, both population and employment within a half-mile of NEC rail stations have grown at faster rates than their metropolitan average.¹⁹



Table 3-2: Percent Change in Population and Jobs Within a Half-Mile of Key NEC Stations, 2011-2019

Station	1/2-mile Buffer	
	Population	Jobs
Boston South Station	26%	20%
Penn Station New York	16%	37%
Philadelphia 30th Street Station	10%	31%
Washington Union Station	37%	26%
Total	20%	31%

Source: U.S. Census Bureau

Mid-sized cities along the NEC benefit from good connections to these larger metropolitan areas and the Northeast economy. C35 will improve travel times and increase service frequency to places like Springfield, MA; Providence, RI; New Haven, CT; Hartford, CT; Newark, NJ; Harrisburg, PA; and Wilmington, DE, making them increasingly attractive locations for growth with relatively low costs of living and doing business, paired with convenient access to the region’s largest markets.

The C35 plan will enhance the connections between affordable housing and the higher-value jobs in major markets. As shown in Table 3-3, metropolitan areas with the highest paying jobs can be brought within commuting distance of areas with more affordable housing costs.

Table 3-3: Average Income and Property Value Comparison for Employment Centers and Nearby Markets

Major Job Center	Wages	Median Home Value (Owner-Occupied Units)	Housing Markets with Commuting Distance	Average Annual Wages	Median Home Value (Owner-Occupied Units)
New York County, NY (Manhattan)	\$127,525	\$987,700	Philadelphia County, PA	\$69,140	\$163,000
			Middlesex County, NJ	\$66,395	\$344,100
Washington, DC	\$98,050	\$601,500	Anne Arundel County, MD	\$61,260	\$361,200
			City of Baltimore, MD	\$68,550	\$160,100
Suffolk County, MA (includes Boston, Chelsea, Revere and Winthrop, MA)	\$103,720	\$496,500	Providence County, RI	\$56,580	\$233,500

Source: Annual Average Wages: Bureau of Labor Statistics, QCEW, Average Annual Pay in Total Covered Total, all industries for All establishment sizes, 2019

Station Area Development

Transit station areas are increasingly being seen as desirable places for development. Transit-oriented development (TOD) is a development style that promotes mixed-use development in close proximity to a transit station. NJ TRANSIT defines TOD as station area development supporting sustainable places in which people can live, work, and play all in the same community, without requiring the use of a car.²⁰ C35 provides the reliable, frequent access necessary to support and sustain TOD development. TOD can play a critical role in providing a range of housing options that meet the needs of young professionals, students, families, and seniors.

For example, Union Station is an important asset for New Haven, CT, not only as a transportation hub, but also as a welcome center and economic catalyst. In the half-mile surrounding New Haven Union Station, a new TOD program is encouraging several mixed-use developments featuring commercial and residential space. The city and state are pursuing such policies to re-link New Haven Union Station and the Hill neighborhood to Downtown.²¹



Rendering of Hill to Downtown District in New Haven (CT)

In Washington, DC, the Burnham Place development at Washington Union Station will anchor a new urban neighborhood with a mix of housing, office, retail, hotels, as well as parks and plazas. Burnham Place will fill a gap in the urban fabric of the city created by the station's track and platforms. The proposed three-million square-foot development will be built above Union Station's rail yard, providing direct access into a newly expanded and improved station facility.²²

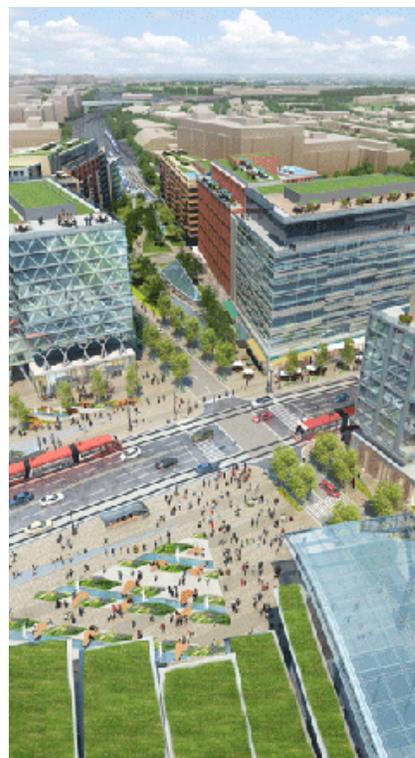
Innovation Districts

Innovation districts are where anchor institutions and companies co-locate with clusters of start-ups, business incubators, and accelerators, particularly in the education, research, healthcare, and technology sectors. Unlike the suburban office parks of the late 20th century, innovation districts are physically compact, walkable, mixed-use, and transit accessible. As the transit backbone for an entire mega-region, the NEC is a catalyst for expanding and planned innovation districts in Newark, DE; Philadelphia, PA; Providence, RI; and Boston, MA.

Construction is currently underway for a new train station, the Newark Regional Transportation Center, adjacent to the University of Delaware STAR Campus. The STAR Campus in Newark, DE will include over one million square feet of real estate and features lab, office, clinical, incubation, and co-working spaces within less than an hour train ride to downtown Philadelphia, PA and Baltimore, MD.²³

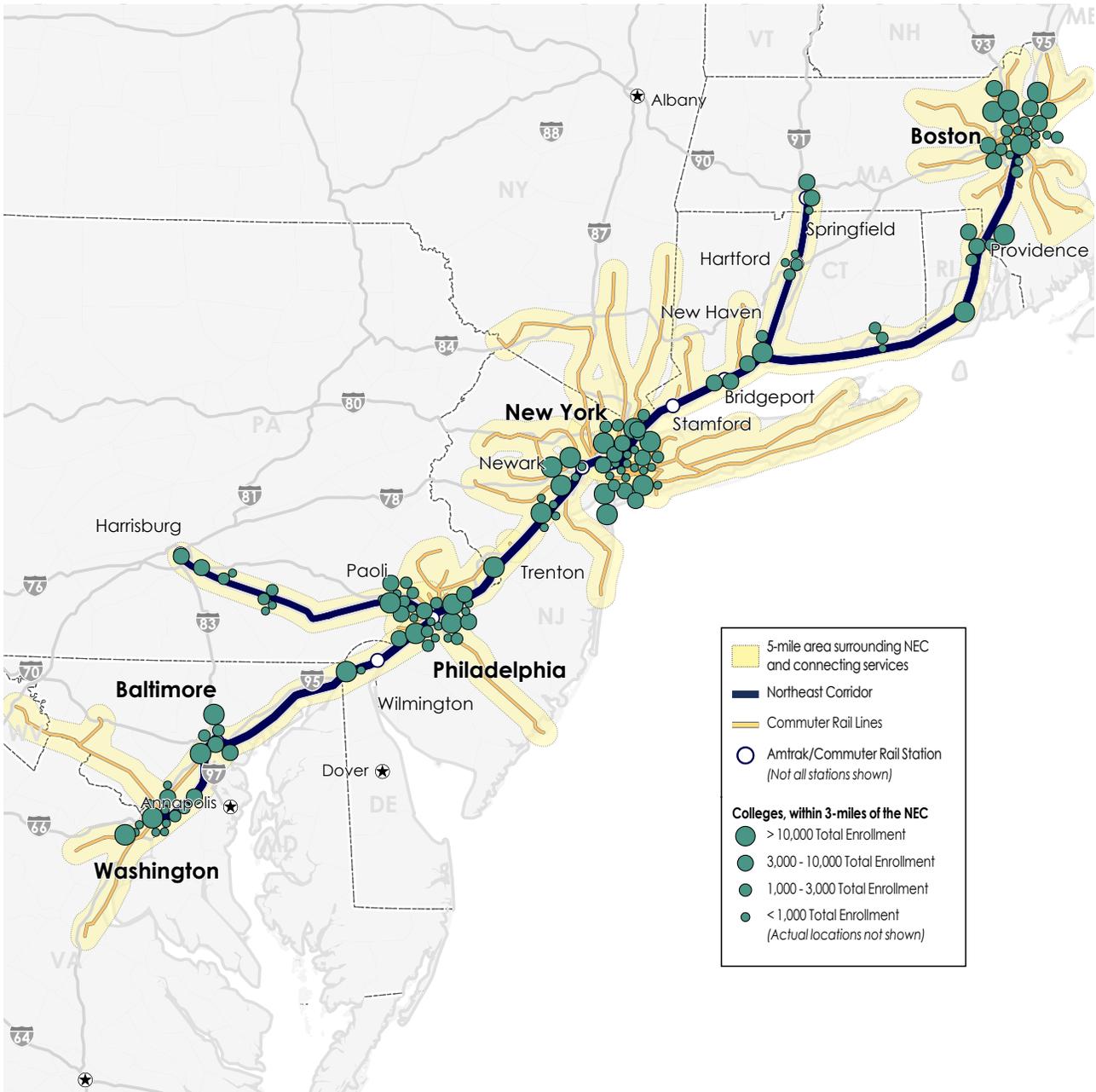
The Providence Innovation and Design District is being developed on a 26-acre site connected to the Amtrak/MBTA Providence train station. The Providence Innovation District is home to Brown University's Warren Alpert Medical School and the Rhode Island Nursing Education Center.²⁴

Located near Boston's South Station, the 1,000-acre Seaport District is a hub for technology, creative firms, life sciences, and green technology.²⁵ The Seaport District is a hub for start-ups and has also attracted relocations from a broad range of established companies including Alexion Pharmaceuticals, General Electric, and MassMutual, among others.²⁶



Burnham Place looking west along H Street in Washington, DC

Figure 3-7: Map of Colleges along the NEC



Source: C35 Analysis, 2021

The Territories of the NEC

The NEC is comprised of five territories:

New England (NE)

Boundaries:

- Boston, MA to New Haven, CT (NEC Main Line)
- Springfield, MA to New Haven, CT (NEC Connecting Corridor)

Agencies:

- Massachusetts Bay Transportation Authority (MBTA)
- Massachusetts Department of Transportation (MassDOT)
- Rhode Island Department of Transportation (RIDOT)
- Connecticut Department of Transportation (CTDOT)/CTrail
- Amtrak

Mid-Atlantic North (MAN)

Boundaries:

- Morrisville, PA to Perryville, MD (NEC Main Line)
- Harrisburg, PA to Philadelphia, PA (NEC Connecting Corridor)

Agencies:

- Southeastern Pennsylvania Transportation Authority (SEPTA)
- Pennsylvania Department of Transportation (PennDOT)
- New Jersey Transit (NJ TRANSIT)
- Delaware Department of Transportation (DelDOT)
- Amtrak

Connecticut-Westchester (CTW)

Boundaries:

- New Haven, CT to New Rochelle, NY

Agencies:

- MTA Metro-North Railroad (Metro-North)
- CTDOT/CTrail
- Amtrak

Mid-Atlantic South (MAS)

Boundaries:

- Perryville, MD to Washington, DC

Agencies:

- Maryland Department of Transportation (MDOT), Maryland Transit Administration (MTA)/Maryland Area Regional Commuter (MARC)
- Virginia Railway Express (VRE)
- Amtrak
- The District of Columbia Department of Transportation (DDOT)

New York City Metro (NYM)

Boundaries:

- New Rochelle, NY to Morrisville, PA

Agencies:

- New Jersey Transit (NJ TRANSIT)
- MTA Long Island Rail Road (LIRR)
- MTA Metro-North Railroad (Metro-North) (future)
- Southeastern Pennsylvania Transportation Authority (SEPTA)
- Amtrak

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C35 is an unprecedented effort to coordinate and deliver the special projects and capital renewal in each Commission member agency's jurisdiction. Each territory has multiple capital projects, grouped into the following categories:

★ Special Project Groups

A grouping of special projects geographically combined with capital renewal efforts in the same area.

🛠️ Capital Renewal Programs

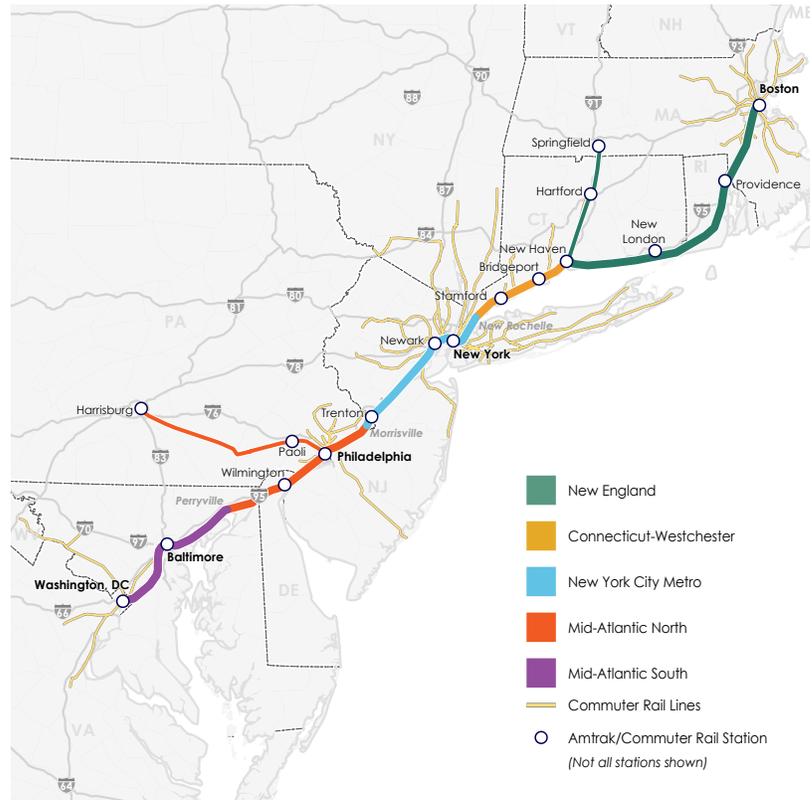
Capital renewal efforts were combined within capital renewal sections to optimize project delivery and minimize rider impact.

📊 C35 Delivery Analysis

Packaging of special project groups and capital renewal programs to gain efficiencies in project delivery and optimize the use of available track outages and other railroad resources. All C35 improvements are focused on improved frequency, reliability, safety, speed, and operational flexibility.

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Figure T-1: C35 Territory Map



Source: C35 Analysis, 2021

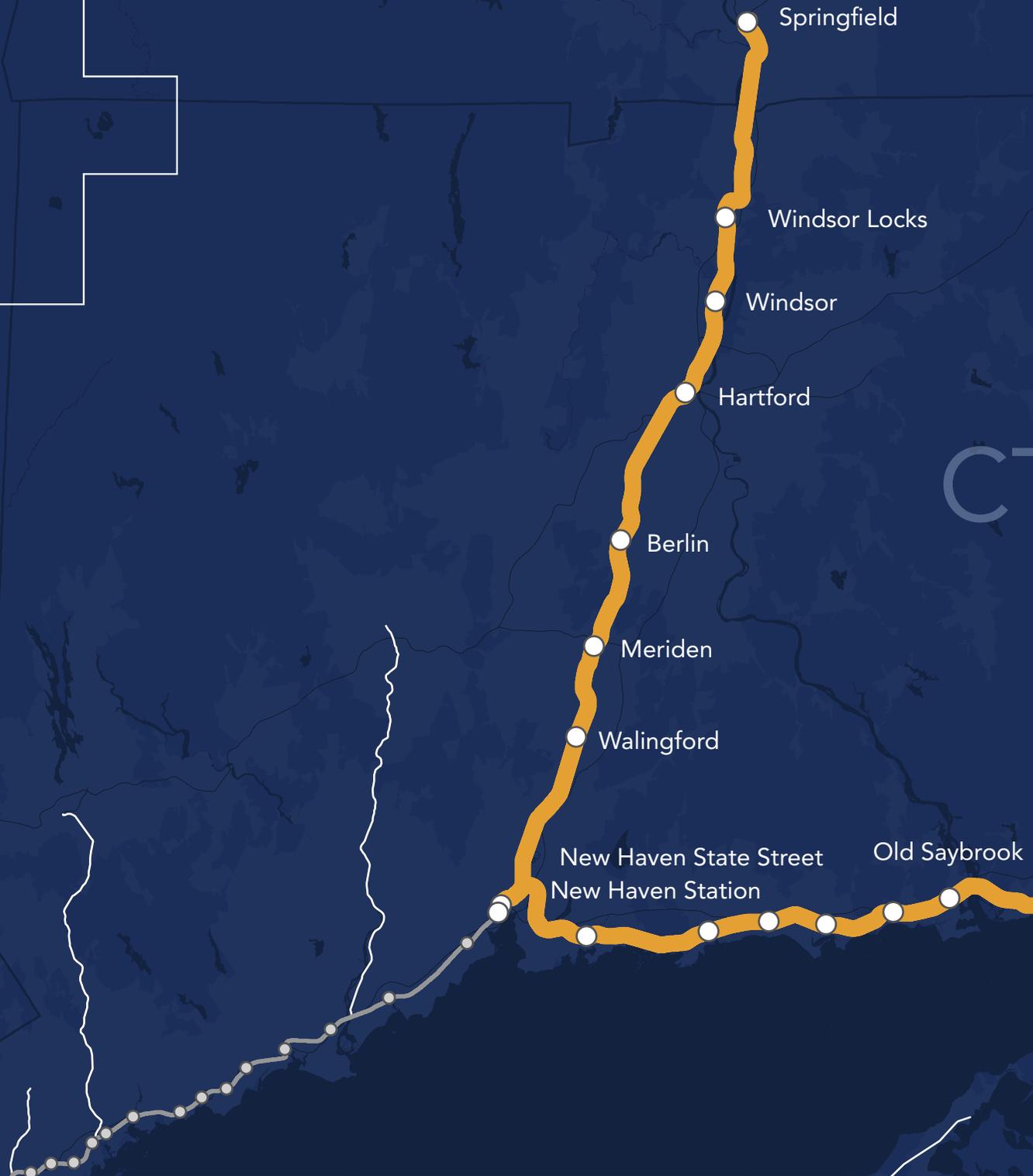
Special project groups and capital renewal programs were analyzed year-over-year to ensure that the railroad can be successfully renewed without unreasonable service interruptions. The C35 projects for all territories are included in the Appendix.

4

NY

CHAPTER 4

New England





Boston South Station

Back Bay

MA

RI

Providence Station

Kingston

Westerly

New London

Mystic

— NEC

— Commuter Rail Lines



MBTA train entering Providence Station (RI)

Overview

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The New England (NE) territory is the northernmost territory of the NEC, stretching between Boston, MA and New Haven, CT. It also includes the Hartford Line from New Haven, CT to Springfield, MA. Boston's South Station is the northern terminus of the NEC. The station serves over 60,000 trips per day and is a key intermodal hub connecting Amtrak, Massachusetts Bay Transportation Authority (MBTA) commuter rail and MBTA rapid transit, and regional bus services in the nearby South Station Bus Terminal Building.²⁷

The portion of the NEC main line spanning from Boston South Station to the Massachusetts/Rhode Island border (Attleboro line) is owned and managed by the state of Massachusetts, with projects coordinated by MBTA and Amtrak. The NEC between the MA/RI border and New Haven, CT is owned and managed by Amtrak with projects coordinated by Amtrak, RIDOT, CTDOT, and MBTA. This section includes Shore Line East (SLE) with commuter services operated by *CTrail*. The connecting corridor between Springfield, MA and New Haven, CT is owned and managed by Amtrak, with projects coordinated by CTDOT and Amtrak. This section includes the Hartford Line with services operated by *CTrail*.

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A CTrail Hartford Line train at Berlin Station following the ribbon cutting ceremony (CT)

The NE territory, the longest of the five at 156 miles, is challenged by lower capacity infrastructure than the other four territories. With the exception of a short three-track segment near Boston, the entire NE territory is limited to two tracks or, in the case of two Hartford Line locations, a single track. This reduces operating flexibility and reliability when compared with the long four-track sections of the other four NEC territories. NE has very few locations where faster trains can overtake slower trains without blocking all traffic traveling in the opposing direction.

The implementation of the C35 plan in NE will provide C35's only new intercity service stop on the NEC: Amtrak service to Rhode Island's TF Green Airport. C35 will convert commuter rail service between Boston, Providence, and points west from diesel trains to high-performance electric trains, reducing commute times by up to 16 minutes. An additional third track at Route 128 Station will enhance reliability while relieving one of the critical rail chokepoints in NE.



NEC outside of Boston South Station (MA)

NE Project Highlights

The NE territory is the northern anchor of the NEC and connects points south with the metropolitan areas of Boston, MA; Providence, RI; and Hartford, CT. The Boston-Cambridge-Newton metro region is home to almost 5 million residents, over 2.5 million jobs, and draws over 21 million tourist trips per year.²⁸ Farther south, the Providence-Warwick area has over 1.6 million residents and over 500,000 jobs, many of which are concentrated in the education and health services industries.²⁹ In Connecticut, the Hartford-East Hartford-Middletown area, with over 1.2 million residents and over 500,000 jobs, is recognized for its established insurance economy and emerging technology and advanced manufacturing industries.³⁰



NE Special Project Highlights

- **Massachusetts Third Track (Readville to Canton):** This project supports additional service in the NE territory by adding a third track between Readville and Canton Junction stations. Eliminating the two-track configuration in the area will mitigate an existing capacity bottleneck for Amtrak and MBTA services.
- **Pawtucket/Central Falls Station:** The new Pawtucket/Central Falls Station will provide communities located between Providence, RI and Attleboro, MA with access to commuter rail service. This station will provide relief to overcrowded stations in Providence and South Attleboro, while attracting new riders from adjacent residential redevelopment areas that will take advantage of proximity to transit for access to jobs, educational opportunities, and medical options in Boston, MA and Providence, RI.
- **Fitter Interlocking:** This project will include the construction of a new universal interlocking on SLE in Clinton, CT that will divide a 16-mile interlocking-to-interlocking segment (Guilford and View Interlockings) into two shorter segments, improving reliability by allowing single track operation over shorter segments during maintenance with less operational disruption.
- **SLE Grade Crossing Elimination Projects:** Four of the eleven remaining grade crossings on the NEC will be eliminated, minimizing the risk of train-vehicle collisions and delays caused by grade crossing warning device malfunctions.
- **New Haven to Providence Capacity Planning Study:** Study of investment options to improve capacity and service performance between New Haven, CT and Providence, RI.

Figure 4-1: NE Special Project Groups and Benefits



NE Special Project Groups

(See Appendix for full list of projects)

- | | |
|--------------------------|---------------------------|
| 1 Boston | 9 Fitter |
| 2 Canton | 10 Hartford |
| 3 Attleboro | 11 NE Planning |
| 4 South Attleboro | 12 Warwick |
| 5 Pawtucket | 13 MBTA Yards |
| 6 Mystic | 14 Shore Line East |
| 7 New London | 15 Boston-Canton |
| 8 Brook | |

NE 2035 Benefits



More Frequent Service

- 89% increase in MBTA commuter rail service
- Doubling of SLE and CTrail/Hartford Line service in peak and off-peak



New Services

- New MBTA service between Pawtucket/Central Falls and Boston, MA
- One-seat ride service from Hartford and New London to NYC
- New Amtrak service to T.F. Green Airport



Faster Service

- 16 minute faster commuter service between Boston and Wickford Junction
- Amtrak travelers will save 28 minutes between Boston and NYC

Source: C35 Analysis, 2021

NE Capital Renewal Highlights

The capital renewal programs in the NE territory are largely focused on track (turnouts), structures (signal bridges and culverts), electric power supply (transmission wire), communications, and signals (automatic block signaling (ABS) and interlockings). C35 capital renewal programs include replacement of 100 percent of interlockings and 40 undergrade bridges.

Figure 4-2: NE Estimated Assets Replaced in Territory

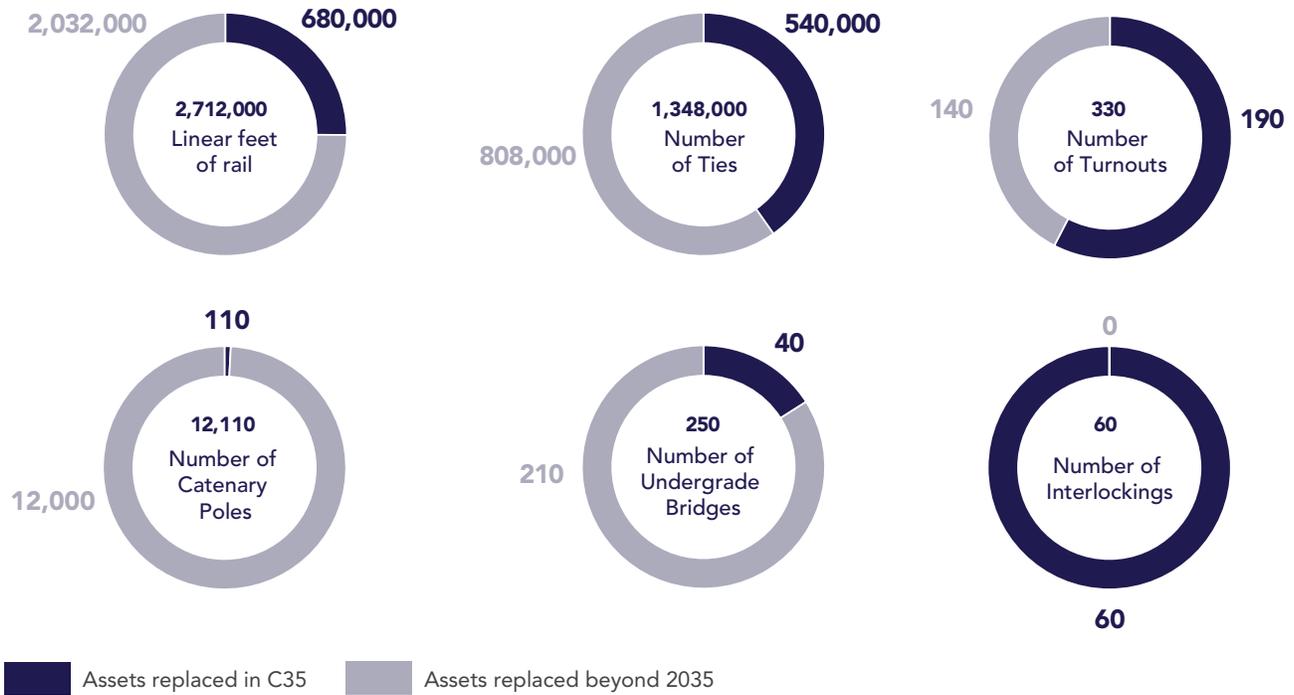
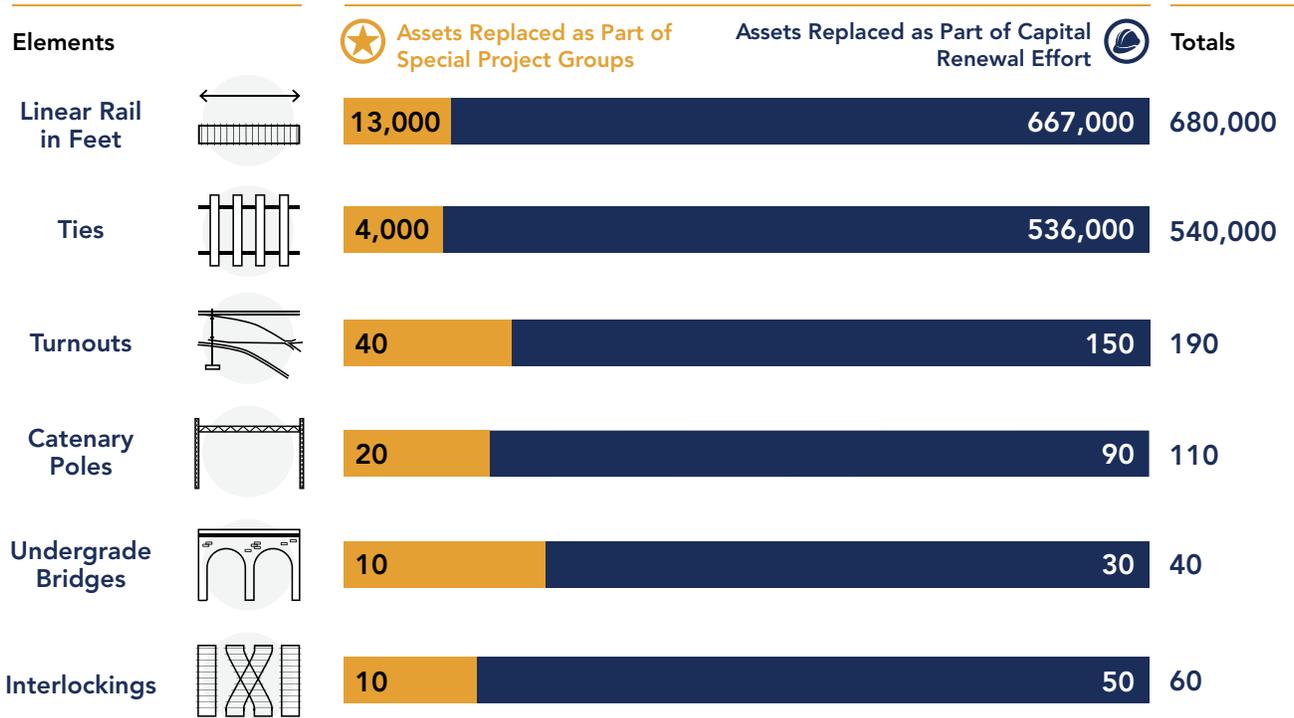


Figure notes:

1. Number in center of circle represents total assets
2. Numbers rounded

Source: C35 Analysis, 2021

Figure 4-3: NE Estimated Assets Replaced in Special Project Groups and Capital Renewal Programs



Source: C35 Analysis, 2021

Schedule of Investments

The C35 plan sequenced 15 special project groups and 36 capital renewal programs in NE (26 on the NEC mainline, ten on the Hartford Line), and evaluated temporary construction-related service adjustments and permanent service benefits. Special projects and capital renewal, such as the Massachusetts Third Track (Readville to Canton) and Canton Junction Station Improvements, were analyzed collectively and sequenced to maximize productivity of track outages, minimize service disruption, and create overall project delivery efficiencies in NE. The C35 plan does require some peak-period service reductions for MBTA, CTrail, and Amtrak to allow for necessary track outages longer than a midday, overnight, or weekend period.

The roadmap for future project delivery provides an initial schedule timeline for efficient construction of special projects and capital renewal over the 15-year period.

Figure 4-4: NE Estimated Initial Timeline Capital Renewal and Special Project Groups

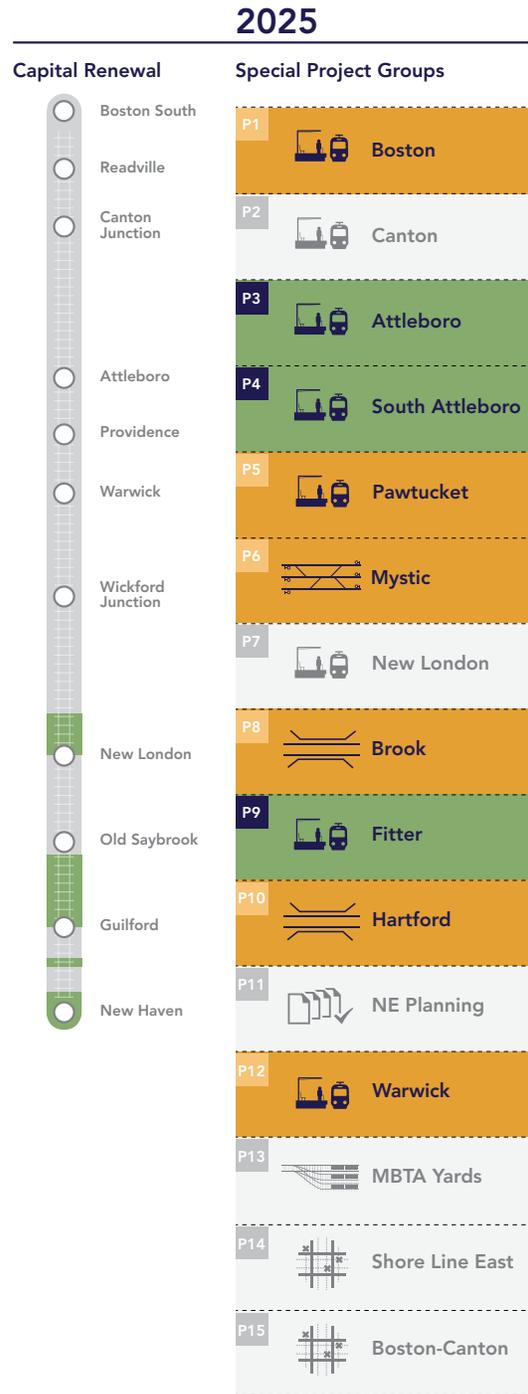
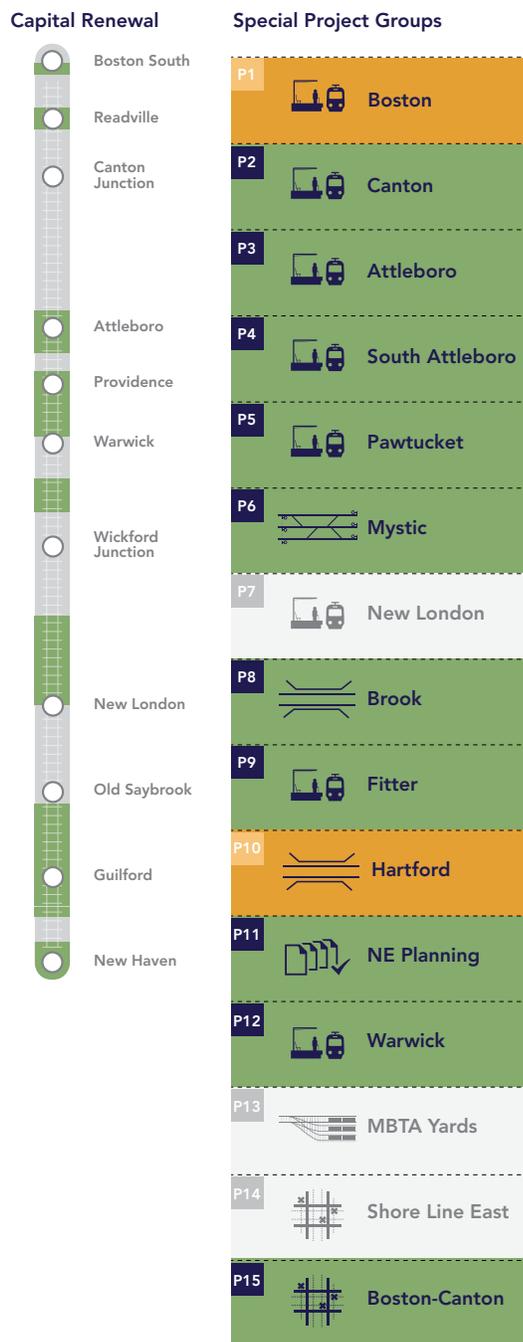


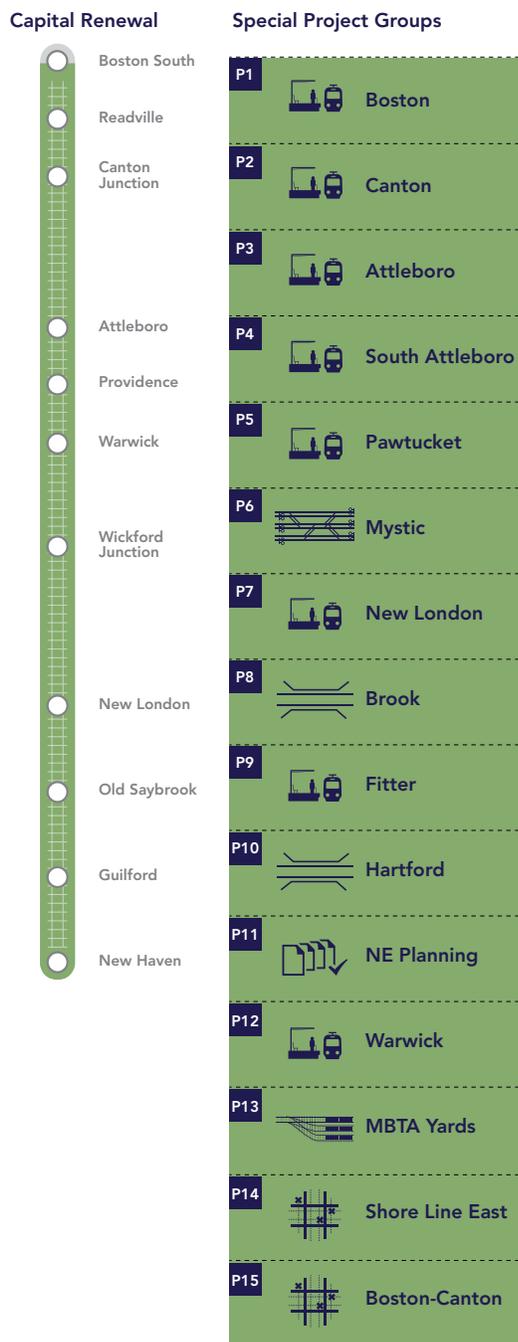
Figure note: Initial analysis results to be updated in C37
 Source: C35 Analysis, 2021



2030

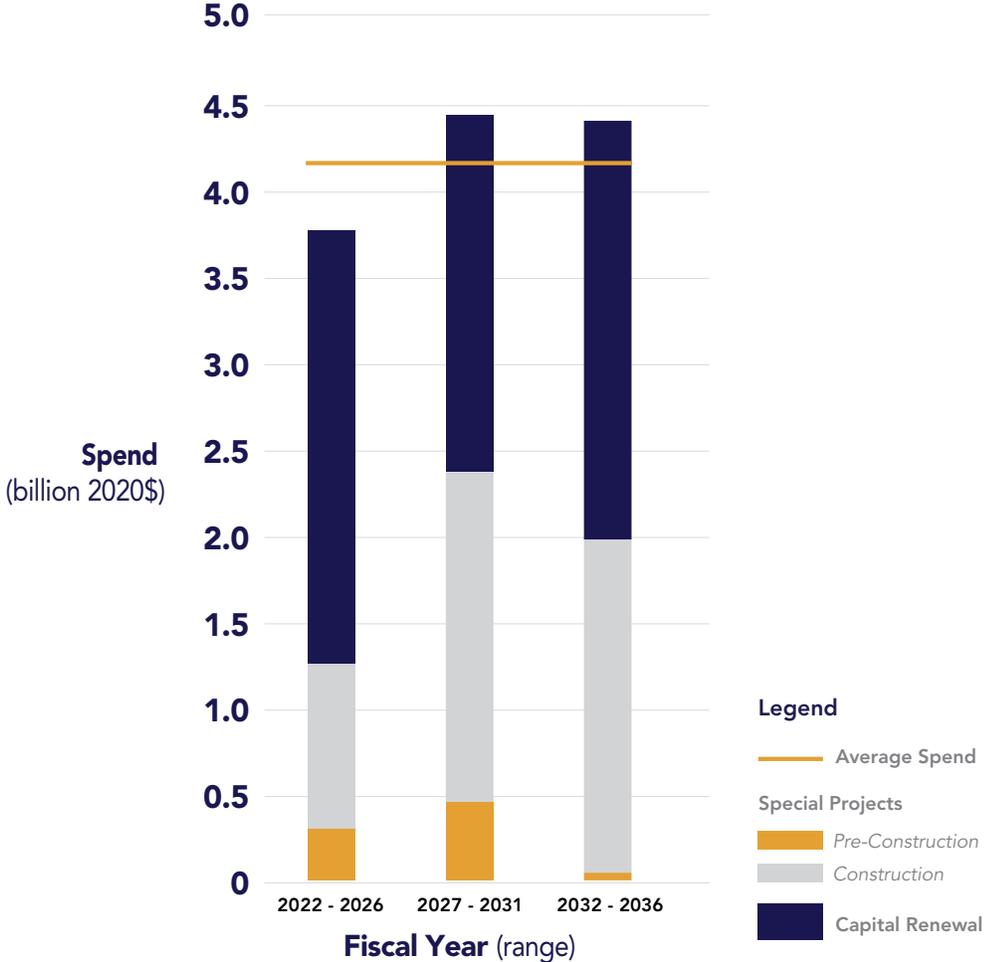


2035



If the C35 project delivery sequence is followed, investment in this territory will be as much as \$12.5 billion total over 15 years.

Figure 4-5: NE Estimated Total Capital Costs – 5-Year Increments



Source: C35 Analysis, 2021

Improve Mobility and Connections

Reliable Service



In FY 2019 MBTA trains were delayed over 2,100 hours and 11 percent trains were late.³¹ Significant upgrades will be made at the Tower 1 Interlocking, which is the point where trains are distributed among the platforms at Boston’s South Station. During peak periods, a five-minute shutdown in service at Tower 1 Interlocking can generate residual delays impacting thousands of train passengers.³² This project will replace the existing signal system at Tower 1 Interlocking and increase track maximum allowable speeds to 15mph (from 10mph), thereby improving on-time performance.

CTrail trains were delayed over 300 hours and 9 percent of trains were late in FY2019.³³ C35 investments will improve SLE service reliability through grade crossing elimination and mitigation of other known sources of delay. The New England Grade Crossing Elimination Program will remove four of the eleven remaining highway-rail at-grade crossings on the NEC.

Adding track capacity, such as completing a second track on the Hartford Line between New Haven, CT and Springfield, MA and a third track between Readville and Canton, MA, will address some of the largest sources of train delay in the territory. Adding parallel tracks allows trains to pass one another when serving a station or when a train is disabled so they do not impede corridor operations. An example of this is the recently-completed Kingston Third Track project, a partnership between Amtrak and RIDOT using federal American Reinvestment and Recovery Act (ARRA) funds, that allows the Amtrak Acela to bypass Northeast Regional service.

Figure 4-6: NE Estimated Delay Relief Improvements

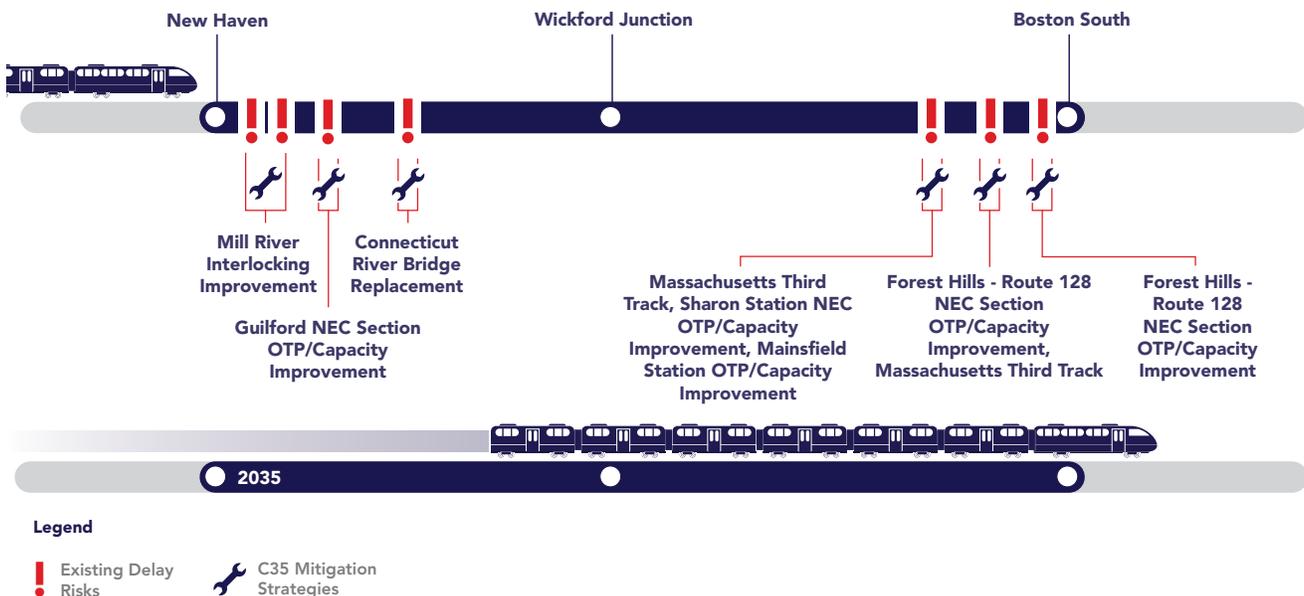


Figure note: Connecting corridors not included

Source: C35 Analysis, 2021

New Services

The C35 operating plan includes MBTA service to new Pawtucket/Central Falls station. Additional track and platform capacity at Warwick/T.F. Green Airport Station will enable the introduction of new Amtrak Northeast Regional service.

Upgrades to the Hartford Line and SLE will allow for the introduction of new express commuter rail services. A new super express service will run between Hartford, CT and New York City, while another new express train will run between New London, CT and New York City. Both services will offer a direct, one-seat ride service, making all stops on the Hartford Line and SLE before running express between New Haven, CT and New York City.

C35 will enhance full South Coast Rail service between Boston and southeastern Massachusetts, restoring rail service to Taunton, Fall River, and New Bedford, the only major cities within 50 miles of Boston not served by passenger rail. While initial service will operate via Middleborough and the existing Old Colony Line, full South Coast Rail service, to be implemented by 2035, depends on using the NEC between Canton Junction, Route 128, and Boston.

Figure 4-7: NE 2035 Estimated Daily Revenue Round Trips

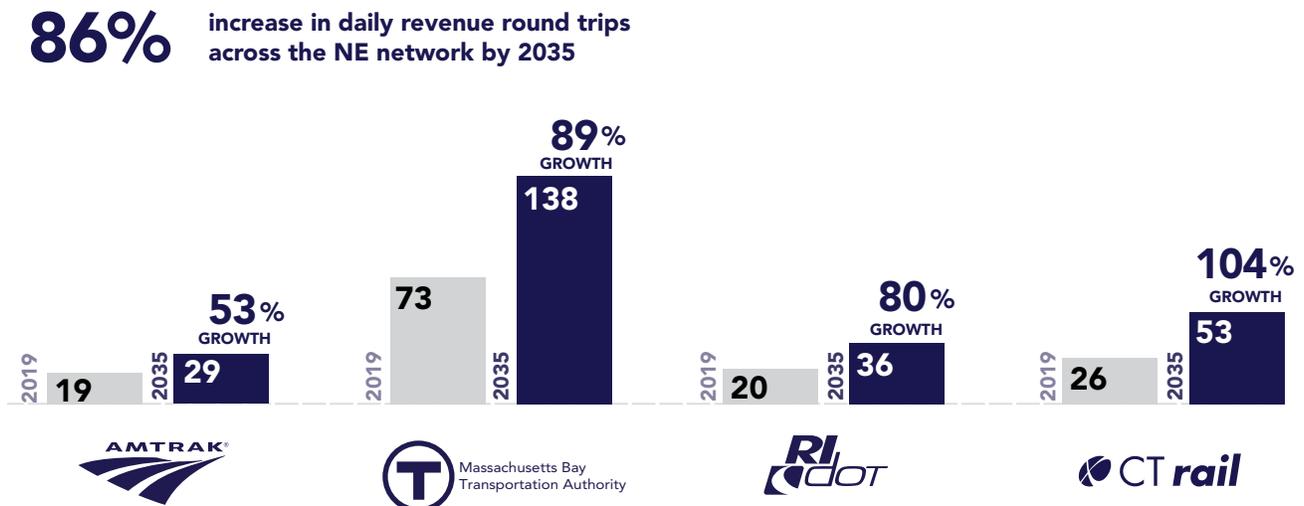


Figure Note: MBTA includes RIDOT, and RIDOT includes MBTA

Source: C35 Analysis, 2021

Frequent Service

C35 special projects and capital renewal enable more frequent service across NE. The average time between trains for MBTA passengers traveling from Boston will be reduced from 16 to 9 minutes in the morning peak period (averaged for all NEC stations). There are also improvements to the average time between trains for MBTA passengers in the off-peak periods. The CTrail SLE and Hartford Line rail services will more than double in the morning peak period, and see a doubling of off-peak service. Overall, commuter and intercity service will grow by 86 percent.

Figure 4-8: NE Estimated AM Reverse-Peak Maximum Time Between Trains Averaged Across All NEC Stations (minutes)



Figure note: Actual times will vary by destination.

Source: C35 Analysis, 2021

Faster Service

C35 improvements, including special projects like the Boston South Station Tower 1 Interlocking, the Attleboro Area On-Time Performance/Capacity Improvement (Part 1), curve speed improvements, and additional electrified track and conversion to electric trains will reduce existing skip-stop MBTA commuter rail travel times between Boston, MA and Providence, RI by 11 minutes and between Boston, MA and Wickford Junction, RI by 16 minutes.

Faster CTrail SLE commuter rail service will save passengers five minutes of travel time between New London and New Haven. The Connecticut River bridge replacement, the elimination of grade crossings, and interlocking improvements will contribute to reducing Amtrak Acela travel time from Boston, MA to New Haven, CT by six minutes and from Boston, MA to New York City by 28 minutes (estimated 13 percent less than current travel time).

Figure 4-9: NE Estimated Travel Time Improvements



Source: C35 Analysis, 2021



CTrail Hartford Line train at Hartford Union Station (CT)

Station Improvements

The new Pawtucket/Central Falls Station will provide Rhode Island's densest urban communities between Providence and Attleboro access to commuter rail service. This station will relieve overcrowded stations in Providence and South Attleboro (recently closed due to failing infrastructure), while attracting new riders from adjacent residential redevelopment areas with improved access to jobs, educational opportunities, and medical care in Boston and Providence. The new station will include a hub for local bus service and a new park-and-ride.

Connecticut station improvements will improve ADA passenger access, station capacity, and on-time performance for trains operating on CT*rail's* SLE. Upgrades at Providence, Attleboro, South Attleboro, and Canton Junction MBTA stations will also provide improved ADA accessibility and a better customer experience for passengers.

The South Station Expansion project will improve service reliability and enable growth in Amtrak intercity and commuter rail service through updates to rail infrastructure and related layover capacity. It will also enhance the customer experience with more circulation space for passengers at South Station, promote increased development in a key area of Boston, and enable the improvement of public space outside the station.



Rendering of South Station Expansion (MA)

Create Economic Opportunity

Quality rail connections are a key part of an overall transit network that supports the economic health of metropolitan areas and connects them to the regional economy. MBTA generates significant economic benefits valued at \$11.4 billion per year by reducing travel times, travel costs, crashes, and harmful emissions. The MBTA's annual budget is approximately \$2 billion dollars per year, meaning that the economic benefits provided by the MBTA are over 5 times greater than its costs.³⁴ Intercity rail connections are important as well, enabling increased access to talent markets and capital. Improving rail connections in the NE territory will provide an opportunity to attract additional investment and support continued economic growth.



Job Creation

C35 investment will generate over 110,000 total new jobs (direct construction-related, indirect [non-construction], and induced) in NE over the 15-year plan, an average of 7,300 jobs per year. These jobs will in turn generate over \$6.8 billion in earnings throughout the territory over the 15-year period.

Delivering the C35 plan will require an estimated average of 1,200 specialized railroad construction jobs each year, well in excess of current staffing levels. Workforce development initiatives are necessary to make sure opportunity is afforded to residents within the NE territory to fill the skilled workforce needs of the C35 plan.

Equity and Access

The NEC serves diverse populations in NE. While C35 will improve rail for higher income Acela riders with speedier intercity service, an estimated 80 percent of riders in NE use MBTA and CTrail services which create access to economic opportunity for a variety of high, medium, and lower income communities.

A new infill commuter rail station and bus hub in Pawtucket, RI will transform the surrounding communities, providing access to jobs, educational opportunities, and medical providers along the corridor and spurring new local development. The new station will serve a historically disadvantaged community.³⁵ Figures from 2017 indicate that 15 percent of the MBTA's commuter rail ridership is from minority groups, a number that could grow with increased access to new markets like Pawtucket, where 75 percent of residents living within ¼-mile of the new station are from minority groups and

45 percent are low-income. Within three miles of the station, 40 percent of residents are from minority groups and 23 percent are low-income.³⁶

The C35 plan includes infrastructure improvements to support converting the MBTA's Providence Line from diesel to higher-performance electric trains, reducing emissions and supporting improved air quality for local residents within a ¼ mile of the corridor, almost 50 percent of whom are from minority groups and nearly 25 percent of whom are from lower income groups.³⁷ These investments also benefit Amtrak and MBTA riders when waiting for trains in station areas.



The skyline in Hartford (CT)

Hartford's Economy and C35 Investment

Hartford faces opportunities and challenges as its insurance industry evolves. Top-tier transportation connections are critical to diversifying the Hartford economy and growing its emerging technology and advanced manufacturing industries. Increasing economic opportunity in the city of Hartford is especially important, given that the city's poverty rate of 31 percent is four times the rate of the adjacent communities.³⁸

City officials believe that the Hartford Line is integral to attracting the next generation of talent by fostering a transit-oriented community that appeals to younger workers while also providing a much lower cost of living compared with larger cities. A survey of nine downtown developments found that this approach has already paid dividends as 50 percent of residents are under 30, and most them are new to Hartford.³⁹ C35 improvements increasing the service levels of both commuter rail and Amtrak through the NE territory, particularly through the double-tracking of the Hartford Line will help to attract the talent that is key to retaining and growing the insurance, technology, and advanced manufacturing industries.

Combat Climate Change

Reduced Carbon Footprint

C35 improvements support many of the environmental goals identified by entities in the NE territory. In 2014, Rhode Island passed the Resilient Rhode Island Act. The act set specific GHG emission reduction targets below 1990 levels of 10 percent by 2020; 45 percent by 2035; and 80 percent by 2050. It also established the Executive Climate Change Coordination Council to develop strategies, programs, and actions to meet the GHG reduction targets.⁴⁰

The Commonwealth of Massachusetts recently enacted legislation that codifies into law the Baker-Polito Administration's commitment to achieve Net Zero emissions in 2050 and furthers the Commonwealth's nation leading efforts to combat climate change and protect vulnerable communities. The legislation updates the GHG emissions limits in the Global Warming Solutions Act of 2008, committing the Commonwealth to Net-Zero emissions by 2050 and interim targets of 50 percent reduction by 2030 and no less than 75 percent reduction by 2040.⁴¹ The Act set legally enforceable goals of reducing GHG emissions. Additionally, the Commonwealth Executive Office of Energy and Environmental Affairs prepared the Climate Change Adaptation Report that establishes strategic and long-term solutions for addressing climate change. This report identifies the vulnerability of the transportation network and outlines the importance of maintaining, replacing, and protecting transportation infrastructure to minimize flooding risks or other damage that may occur from climate-related events. It also discusses the importance of reducing vehicle miles traveled (VMT) to lower GHG.

The C35 improvements support electrification of all MBTA Providence Line service and could minimize pollutants and improve air quality for Amtrak and MBTA employees and passengers.





The platform at Back Bay Station (MA)

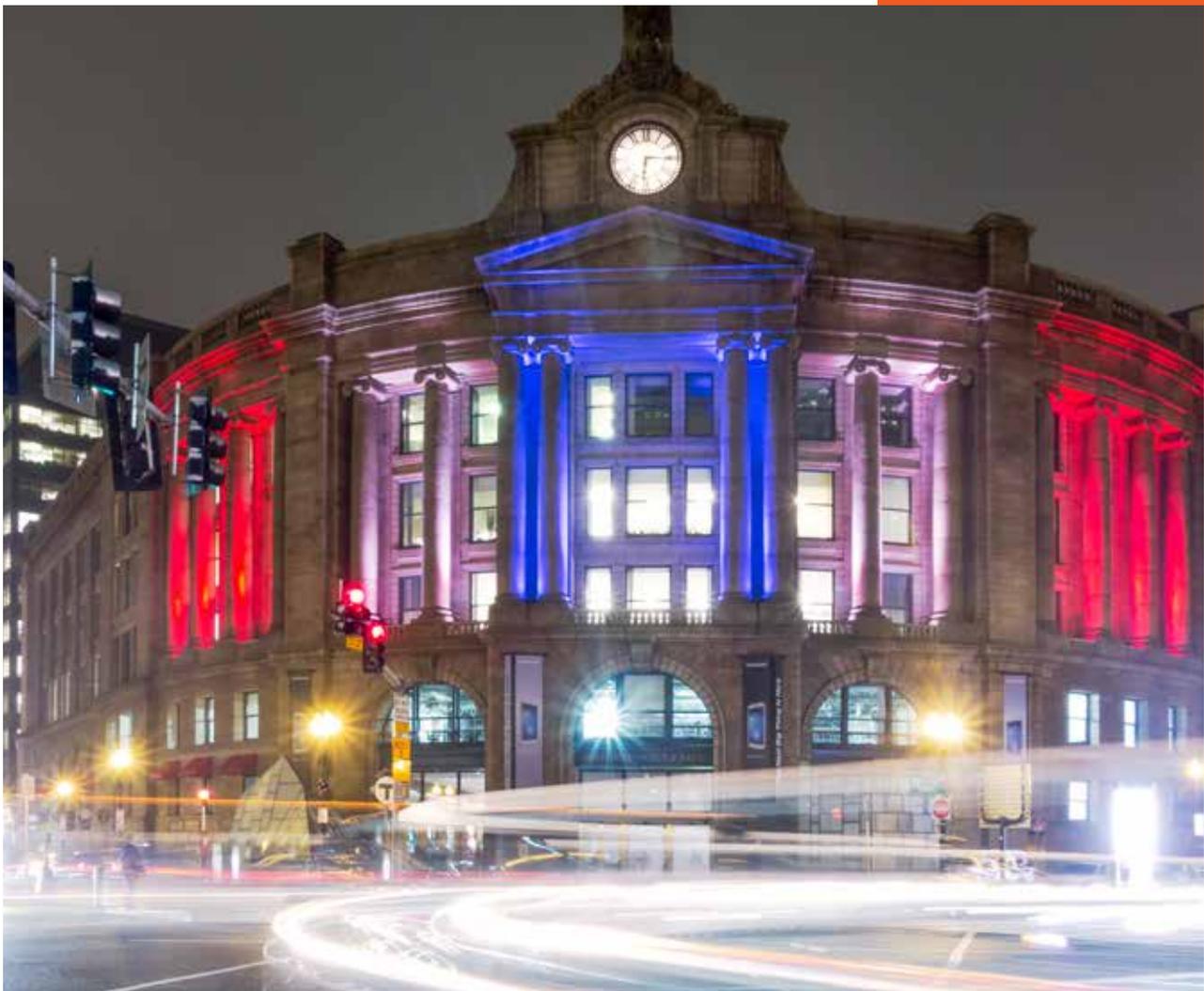
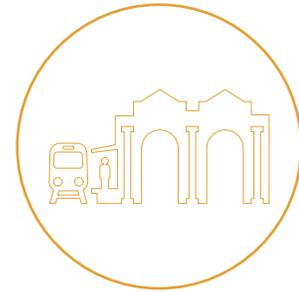
Resilient Infrastructure

As the NEC continues north out of Connecticut, the NE territory generally has lower risks of inundation from sea level rise and storm surge flooding over the other territories, based on analysis conducted for NEC FUTURE.⁴² However, the NE territory is subject to inundation risks in Middlesex and New London Counties in Connecticut, and risk associated with flooding are particularly of concern in Hampden County, MA. Infrastructure improvements in this territory could reduce risks of inundation of rail assets. An example of a special project that will address flooding and extreme weather events (storms, heat stress, etc.) is the Boston South Station Tower 1 Interlocking. This project will make Tower 1 Interlocking more resilient to the effects of climate change by addressing known drainage and settlement issues, upgrading the existing signaling system, and providing additional redundancy to protect against potential failures.

Support Desirable Cities and Communities

Station Area Development

Station areas in the NE territory are experiencing significant development. The South Station project will add almost 2 million square feet of mixed-use space (once all phases of redevelopment are complete).⁴³ WSDDevelopment is planning on adding 7.6 million square feet of mixed-use space in Boston's Seaport District, specifically in Seaport Square. This investment is in addition to over a million square feet of commercial and residential space added to the area since the early 2000s.⁴⁴



Boston South Station lit up at night (MA)

Today, commuters traveling to Boston or Providence from the Pawtucket/Central Falls area lack access to direct public transportation connections. Local commuters must travel to the Attleboro or South Attleboro Stations to catch an MBTA commuter rail train. In addition to attracting an estimated 520 daily boardings, the new Pawtucket/Central Falls Station will also generate significant transit-oriented development. In particular, this station will create direct transit access to a two-million-square-foot historic mill complex that Pawtucket and Central Falls have been working to redevelop. Additional changes to the transportation landscape, including the bus hub component of the new Pawtucket/Central Falls Station as well as the creation of a Transit Emphasis Corridor with dedicated bus and bike lanes, will facilitate easy connections between the train station and the surrounding communities via public and active transportation.⁴⁵



Rendering of completed Pawtucket/Central Falls Transit Center (RI)

Innovation Districts

Boston's Seaport District was branded as the "Boston Innovation District" in 2010 by former Mayor Thomas Menino, at a time when the area was largely parking lots. Located near Boston's South Station, the 1,000-acre Seaport District has today matured into the vision established by Mayor Menino - a hub for technology, life sciences, and creative industry firms. By 2013, more than 200 companies and 4,000 jobs had located in the District.⁴⁶ Today, the Seaport District has not only become a hub for start-ups but has also attracted relocations of a broad range of established companies including Alexion Pharmaceuticals, General Electric, and MassMutual, among others.⁴⁷ Amazon has announced that it will bring 3,000 new jobs to the Seaport District by 2024.⁴⁸

Local transit connections via South Station are important for employee access to the Seaport District, as well as access to nearby Cambridge and its higher education institutions and bioscience and technology companies. Rick Dimino, President and CEO of A Better City, views transit connectivity both within the Boston region and intercity connectivity (particularly to access New York capital and talent markets) as critical components of the growth of the life sciences and technology sectors in the Boston metropolitan area.⁴⁹

The City of Providence and its surrounding communities have transitioned from a manufacturing-based economy 30 years ago, to one that has diversified into technology, higher education, and the creative industries. The commuter and intercity rail links to Boston, MA, and NEC access to New York City, provides access to talent and capital that allows technology and bioscience companies to locate and grow in Providence.⁵⁰ Charlie Kroll, founder of Providence-based technology company Andera, noted that during his time as founder and CEO the lack of fast and affordable rail service between Boston and Providence inhibited the company's ability to attract talent. Better connections between Providence and other cities along the NEC can facilitate the mobility of talent in the region.⁵¹

Providence is investing heavily in its downtown area and its Innovation & Design District, developing 26 acres of land once occupied by an Interstate highway and investing in public transit, cycling and walking facilities connecting to Providence Station. The redevelopment will add new commercial and retail space and urban realm improvements. It has already attracted a variety of tenants in the education, health, and technology sector because of its proximity to Providence Station and connections to health and science hubs along the NEC. Several new residential complexes and hotels have been developed or are under development as well, providing residents and visitors alike with direct access to Amtrak and MBTA service.⁵³



Innovation District Park in Providence, RI

“Having the NEC connect Providence to New York and Boston is a competitive advantage when attracting, young talented workers. The ability to move up and down the East Coast with ease is wonderful for business and for cultural exchange between cities.”⁵²

—Aidan Petrie, Co-founder and Chief Innovation Officer, Emeritus for Ximedica, a medical device company located in Providence, Rhode Island

CHAPTER 5

Connecticut-Westchester

NY

NJ

Stamford

New Rochelle



CT

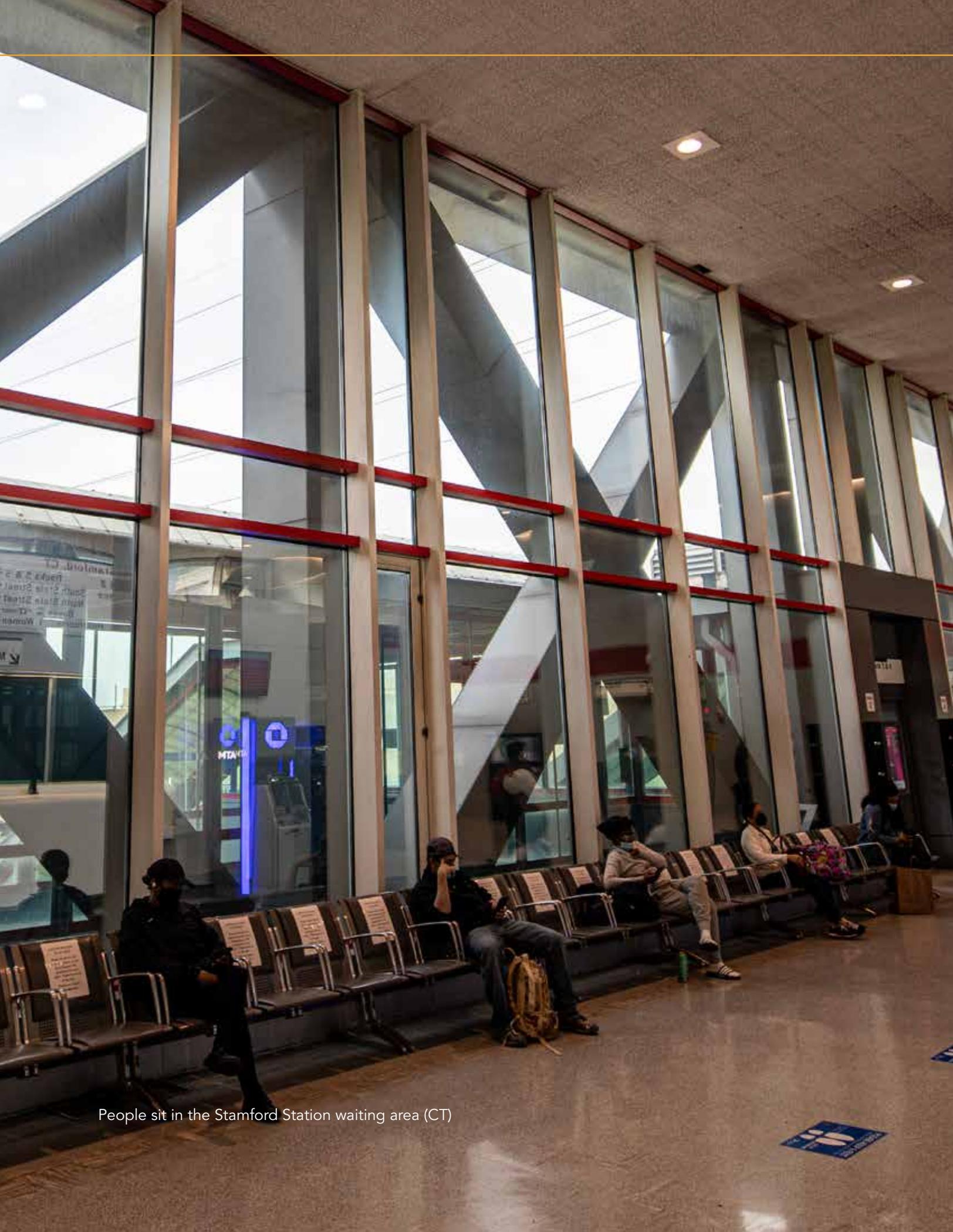


Bridgeport

New Haven State Street
New Haven Station

— NEC

— Commuter Rail Lines



People sit in the Stamford Station waiting area (CT)

Overview

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The Connecticut-Westchester (CTW) territory extends from New Haven, CT to New Rochelle, NY. The CTW territory is complex in its ownership and operations. Connecticut owns and manages the right-of-way from New Haven to Greenwich, CT, the CT-NY state border. The Metropolitan Transportation Authority (MTA) Metro-North Railroad (Metro-North) owns and manages the right-of-way from Port Chester, the NY state border to New Rochelle, NY. Metro-North operates commuter rail service between New York City and New Haven, CT in agreement with Connecticut’s Department of Transportation (CTDOT). Infrastructure improvements, capital renewal, and service delivery require close coordination between Metro-North, CTDOT, and Amtrak.

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Amtrak Northeast Regional train near Bridgeport (CT)

CTW has dense commuter and Amtrak service with strong travel demand markets, but is challenged by reliability issues caused by century old high-maintenance movable bridges. While the catenary was replaced with a modern constant tension design, many of the supporting structures not replaced have now reached the end of their useful lives. The signal system also requires renewal and shorter blocks to support closer train spacing.

C35 includes speed, capacity, and reliability improvements that will make it possible to implement one-seat ride service to New York City from three lines currently requiring transfers (Hartford, SLE, and Waterbury). Both commuter and intercity passengers will enjoy faster travel times, shaving up to 25 minutes off trips to New York City through speed upgrades and new express services. Up to approximately 75 minutes is saved by future Penn Station Access riders on trips to Connecticut compared to current transit options. To achieve these goals, key investments in the C35 NYM territory are also necessary.



Metro-North train near Norwalk (CT)

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New Haven to New Rochelle NEC Capacity and Trip Time Planning Study

C35 includes study of additional future CTW travel time and capacity improvements, particularly in the greater Bridgeport, CT area which sees some of the slowest speeds (30 mph) on the NEC. Bridgeport, Connecticut's largest city, is interested in a new station to gain access to Amtrak express trains and to anchor future TOD. Potential realignments of the NEC will be investigated in this area in order to increase operating speeds and facilitate the construction of a modern regional rail station. A potential solution is a tunnel which would minimize impacts and eliminate the Peck Moveable Bridge, miles of viaduct, and other major structures that would otherwise need to be maintained or replaced.

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CTW Project Highlights

The C35 plan includes New Haven Line speed and capacity improvements and added track capacity between Devon and Woodmont interlockings at Milford Station (the last remaining 3-track segment of the line) will allow for increased service frequency for both commuter and intercity travelers and more balanced service throughout the day. Replacement of aging moveable bridges will improve travel times and reduce train delays. Fast and convenient commuter and intercity rail connections are essential for the continued growth and competitiveness of Connecticut's diverse finance, medical, education, technology, and bioscience economy. C35 improvements are foundational to achieving CTDOT's service goals to add regular service to PSNY, reduce trip times on the New Haven Line to Grand Central Terminal (GCT), and improve connections for the entire Connecticut rail network with more one-seat ride service and a more balanced service throughout the day.

The CTW territory benefits from improvements to the adjacent New England (NE) and New York City Metro (NYM) territories. Improvements in NE allow for more frequent service on the Hartford Line and Shore Line East (SLE), including new one-seat ride service to New York City. Improvements in the NYM territory support new commuter service to PSNY.

"Connecticut's economic competitiveness depends in large part on its connection to Boston and New York."

– Senator Chris Murphy⁵⁴



CTW Special Project Highlights

- **Moveable Bridge Replacement:** Aging moveable bridges pose a risk of long-term major disruptions. Walk, Devon, Saugatuck, and Cos Cob moveable bridges which, require constant maintenance, are functionally outdated, and well beyond their useful life, will be replaced.
- **Devon (CP261) to Woodmont (CP 266) 4th Track Project (near Milford Station):** Restores the full four-track configuration of the New Haven Line for its entire NEC limits, upgrading a 5-mile section that has only three mainline tracks. The additional track eliminates a chokepoint and provides greater operational flexibility.
- **Signal System Replacement:** Signal system upgrades between New Rochelle, NY and New Haven, CT allow for more frequent trains and improves scheduling of local and express trains to reduce trip times.
- **New Rochelle Turnback Track/Yard:** Allows turning trains from New York City to change direction off of the mainline, reducing congestion and increasing reliability. This additional capacity will improve Metro-North and Amtrak on-time performance and Metro-North scheduling flexibility.

Figure 5-1: CTW Special Project Groups and Benefits



CTW Special Project Groups

(See Appendix for full list of projects)

- 1 New Haven
- 2 Devon
- 3 Saugatuck
- 4 Walk
- 5 Stamford
- 6 Noroton
- 7 New Haven Line Planning
- 8 New Haven Line Improvements
- 9 Greenwich
- 10 Bridgeport

CTW 2035 Benefits



More Frequent Service

- Amtrak maximum time between trains to NYC reduced from 60 to 30 minutes
- Frequent regional express service connecting New Haven, Bridgeport, Stamford and NYC



Faster Service

- Amtrak Acela service 22 minutes faster between New Haven and NYC
- 25 minute faster commuter service from New Haven to NYC



New Services

- New commuter service from the Bronx to NYC and Westchester/CT
- One-seat ride service on SLE, Hartford, and Waterbury Lines to NYC



Upgrade and Replace Aging Assets

- Devon, Saugatuck, Walk, and Cos Cob moveable bridges replaced

Source: C35 Analysis, 2021

CTW Capital Renewal Highlights

Capital renewal efforts in the CTW territory include upgrades to track (rail and ties) and many other critical right-of-way assets. Within this territory the original fixed termination catenary dating back to 1907 has been replaced with a constant tension system that does not sag or contract in temperature extremes. However, limited catenary structures supporting the wire were replaced during this upgrade program due to condition, realignment of the wire runs, interlockings, and requirements of the constant tension system. C35 capital renewal programs include replacement of 100 percent of the existing catenary poles and associated structures dating back to the original installation. Capital renewal in CTW also includes replacement of 20 undergrade bridges and 20 interlockings.

Figure 5-2: CTW Estimated Assets Replaced in Territory

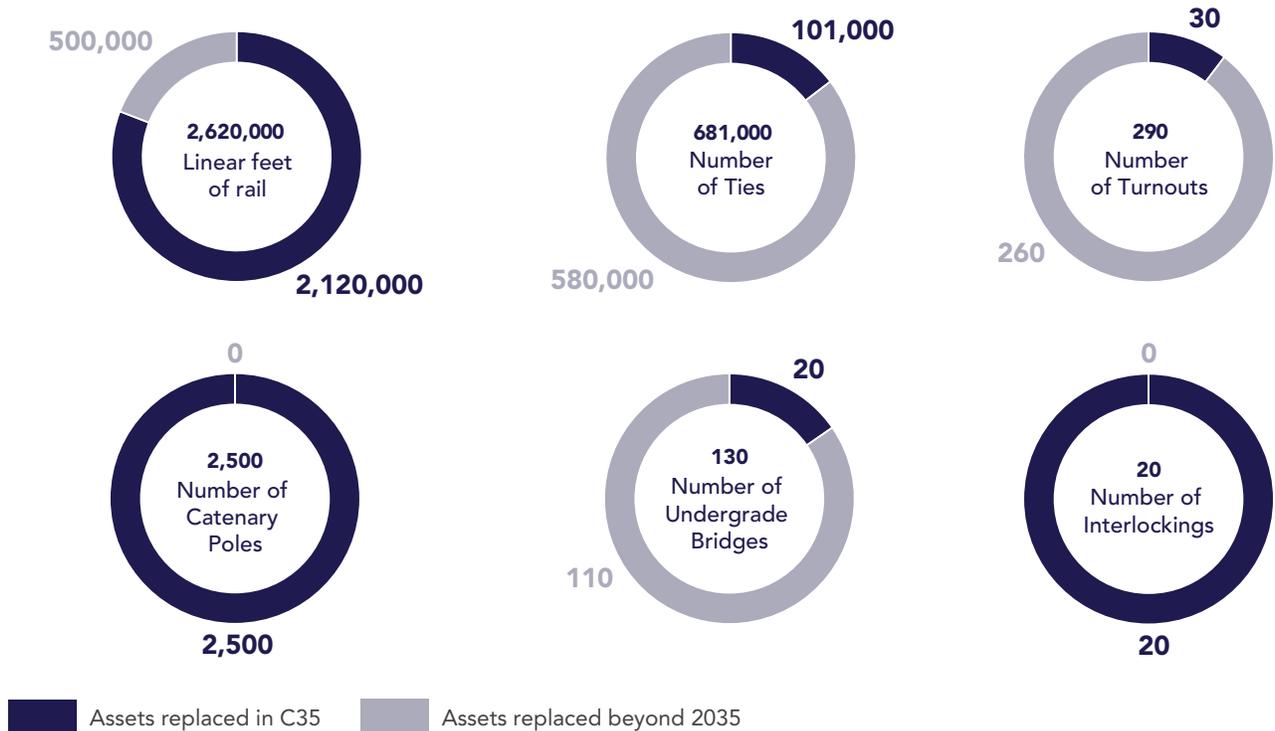
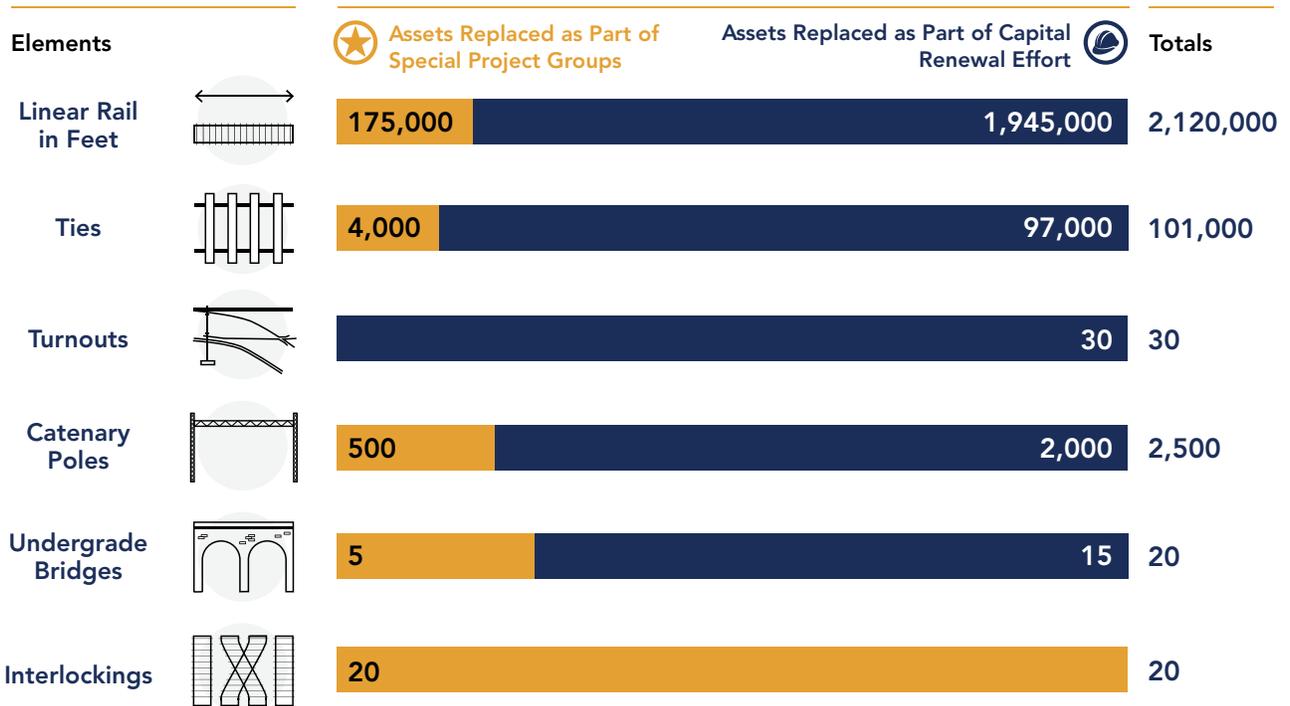


Figure notes:

1. Number in center of circle represents total assets
2. Numbers rounded

Source: C35 Analysis, 2021

Figure 5-3: CTW Estimated Assets Replaced in Special Project Groups and Capital Renewal Programs



Source: C35 Analysis, 2021

Schedule of Investments

The C35 plan sequenced 10 special project groups and 15 capital renewal programs in CTW, and evaluated temporary construction-related service adjustments and permanent service benefits. Special projects and capital renewal, such as the Cos Cob Bridge Replacement and the New Haven Line Signal System Replacement from New Rochelle to Stamford, were analyzed collectively and sequenced to maximize productivity of track outages, minimize service disruption, and create overall project delivery efficiencies in CTW. The C35 plan does require some peak-period service reductions for Metro-North, CTrail, and Amtrak to allow for necessary track outages longer than a midday, overnight, or weekend period.

The roadmap for future project delivery provides an initial schedule timeline for efficient construction of special projects and capital renewal over the 15-year period.

Figure 5-4: CTW Estimated Initial Timeline Capital Renewal and Special Project Groups

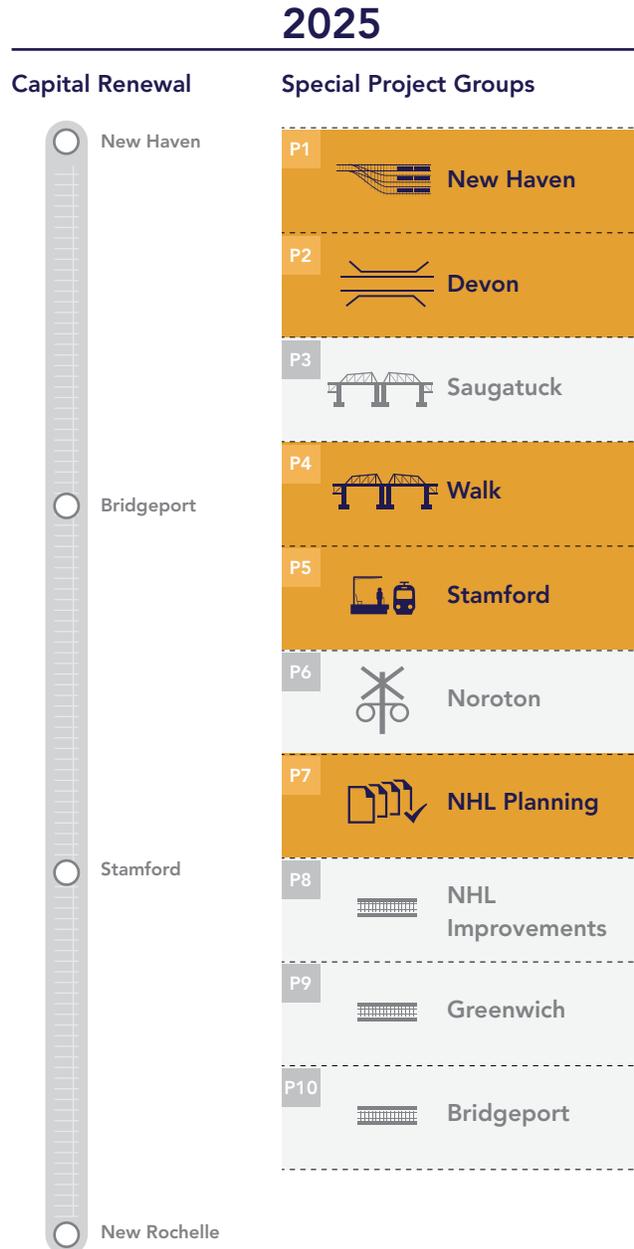


Figure note: Initial analysis results to be updated in C37

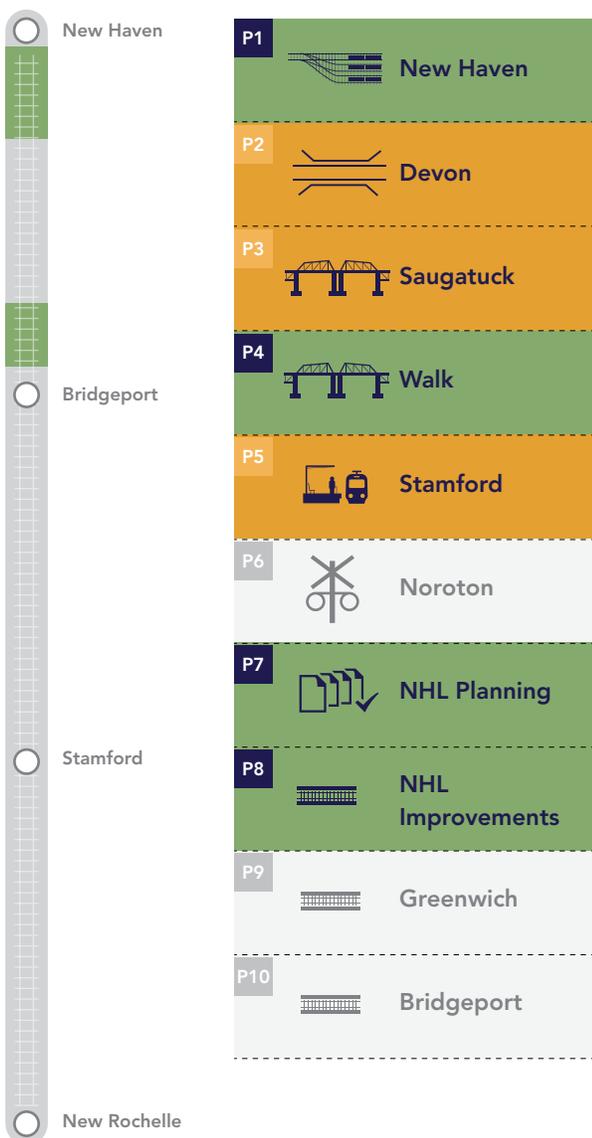
Source: C35 Analysis, 2021



2030

Capital Renewal

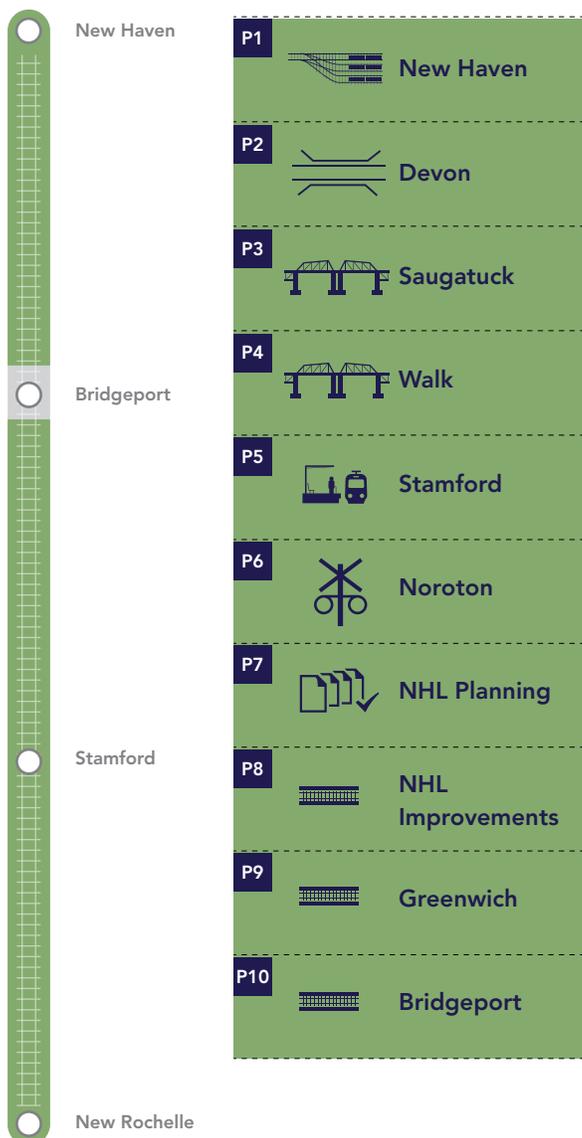
Special Project Groups



2035

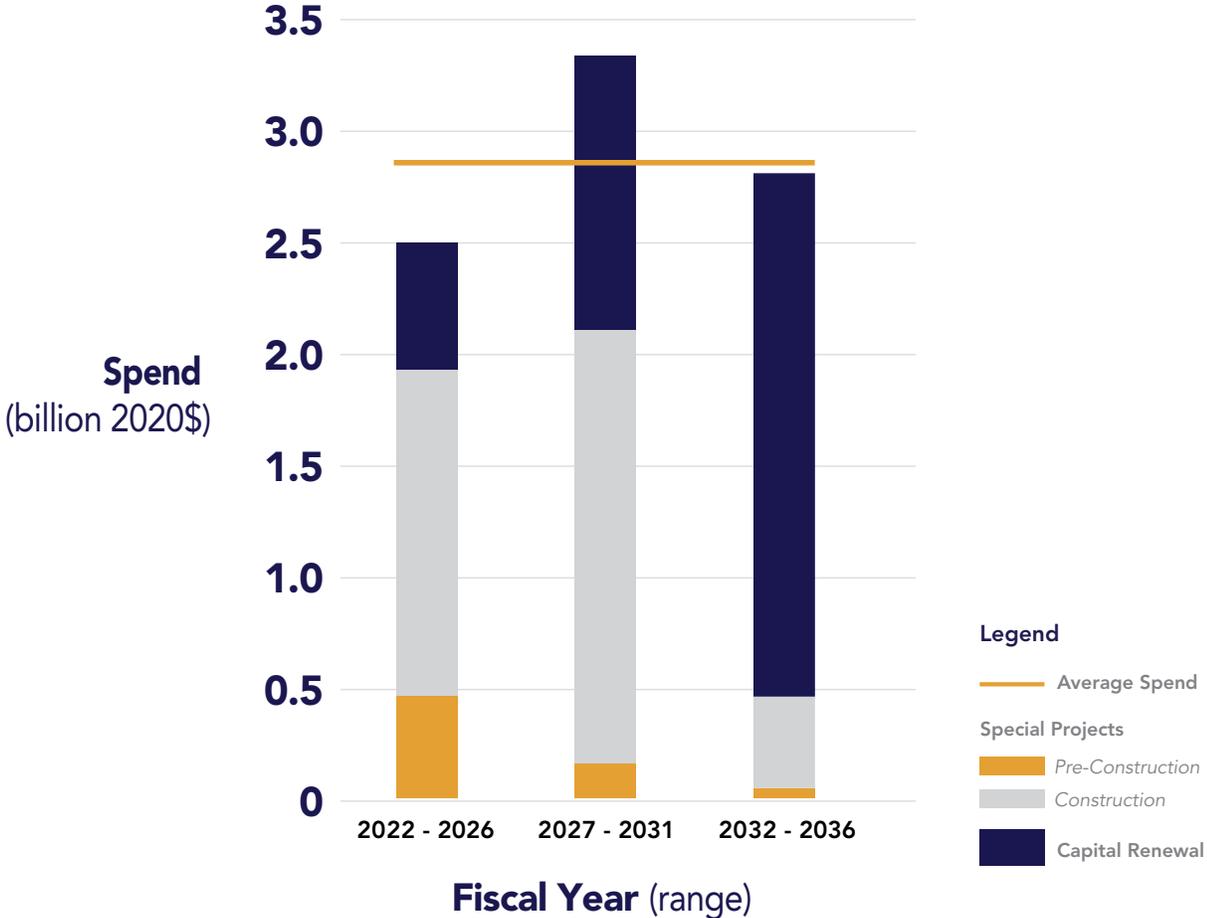
Capital Renewal

Special Project Groups



If the C35 project delivery sequence is followed, investment in this territory will be as much as \$9 billion total over 15 years.

Figure 5-5: CTW Estimated Total Capital Costs – 5 Year Increments



Source: C35 Analysis, 2021

Improve Mobility and Connections

Reliable Service

In FY2019, Metro-North trains were delayed over 1,500 hours and eight percent of trains were late.⁵⁵ Special projects included in the C35 plan will mitigate delays attributed to bottlenecks at six locations between New Rochelle, NY and New Haven, CT. Upgrades to the signal system, new interlockings, track capacity, and replacement of four aging moveable bridges (Cos Cob, Walk, Devon, and Saugatuck) support schedule improvements for the operation of a mix of express and local services. These projects will improve the quality and reliability of over 130,000 trips each weekday in Connecticut and New York.⁵⁶



Figure 5-6: CTW Estimated Delay Relief Improvements

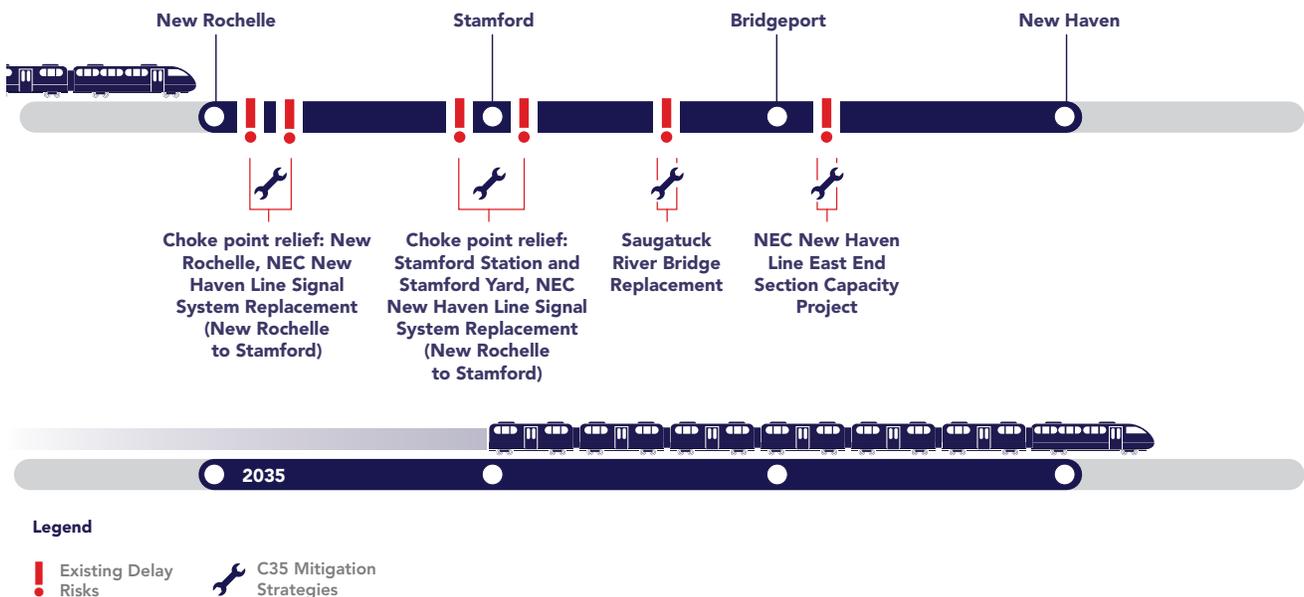


Figure note: Connecting corridors not included

Source: C35 Analysis, 2021

New Services

The C35 operating plan includes new one-seat ride, reverse direction, and off-peak service in the CTW territory. New one-seat ride service to New York from the non-electrified Waterbury Line, coupled with New England territory one-seat ride service from Springfield/Hartford and New London to New York City mean that all Connecticut rail stations will have direct service to New York for the first time. These new services will benefit the entire CTW territory with improved connections between mid-size cities in Connecticut.

Metro-North's Penn Station Access will also provide new commuter service from the East Bronx to PSNY and to Westchester and Southern Connecticut for direct access to jobs, education, healthcare, and other opportunities. Service targeted to begin in 2025 will include three trains per hour in the peak and two trains per hour in the off-peak in each direction.

Frequent Service

The C35 plan supports dramatic increases in commuter service frequency on the NEC between New Haven, CT and New York City. Commuter service increases will fill existing service gaps, particularly for travel in the reverse-peak direction and in off-peak periods. Combination of new regional express services (Metro-North, CT*rail*, and Amtrak) provide at least hourly daily service throughout the territory, and at least half-hourly service in the largest markets.

The maximum time between trains for commuters in Bridgeport, CT during the morning peak period will be reduced from 13 to 11 minutes. For Amtrak passengers during the same period, time between trains traveling toward New Haven will be reduced from 60 to 30 minutes.

Connecticut and Westchester commuters will benefit from new service to PSNY with the NYM territory Penn Station Access project. Service to Manhattan (both GCT and PSNY) will be increased by nearly 60 percent (from 145 daily round trips to 231). With C35 investments, gaps in Amtrak service will be filled so that travelers have consistent hourly Regional and Acela service all day long.

Figure 5-7: CTW Estimated AM Peak Maximum Time Between Trains (minutes)



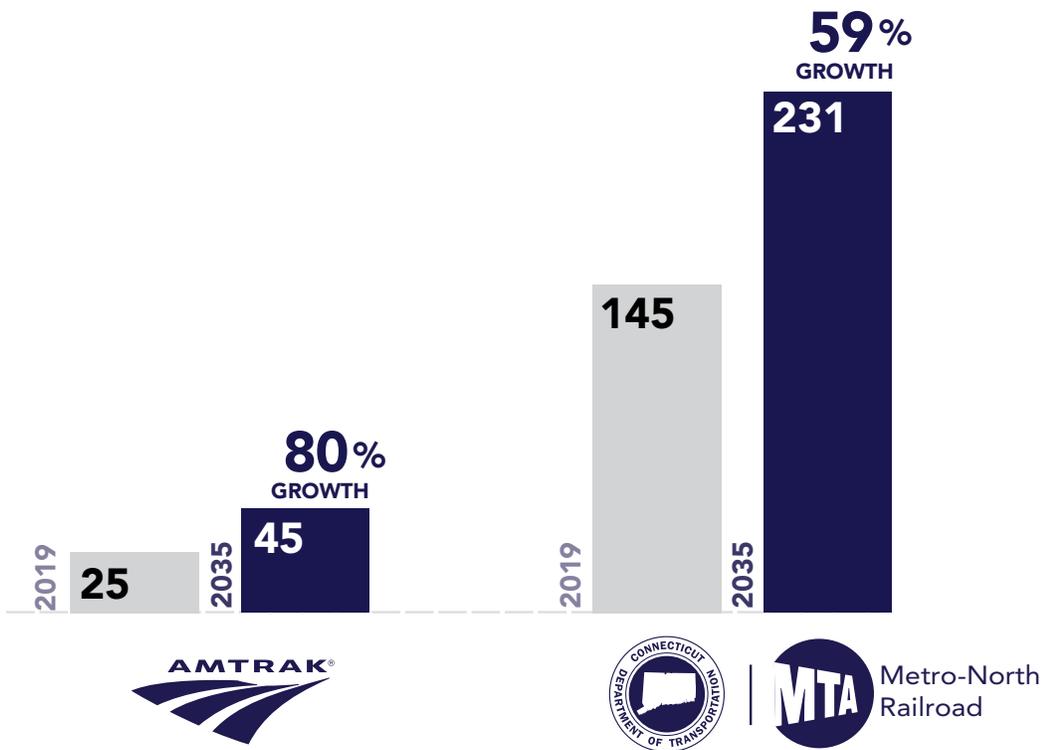
Figure note: Actual times will vary by destination.

Source: C35 Analysis, 2021

C35 investments in upgraded signal systems, new interlockings, improvements to yards and facilities, and restoration of a four-track railroad between Devon and Woodmont at Milford Station allows for 40 additional daily round trips (61 percent growth) in the Stamford to New Haven, CT segment of the larger CTW territory. A new Bridgeport area turnback track will also allow for an increase in connecting service on the Waterbury Line between Waterbury, CT and Bridgeport, CT. Achieving the proposed increases in service frequency will require coordination between CTDOT/CTrail, Metro-North, and Amtrak to balance the ambitious service increases proposed for this territory.

Figure 5-8: CTW Estimated Daily Revenue Round Trips

62% increase in daily revenue round trips across the CTW network by 2035



Source: C35 Analysis, 2021

Faster Service

As a result of C35 improvements, Amtrak's Acela service will be approximately 28 minutes faster between Boston, MA and New York City, with 22 minutes of those savings between New Haven, CT and New York City (23 percent less than current travel time). The C35 plan supports higher curve and moveable bridge speeds to reduce trip times. CTDOT proposed 'super express' service in this territory will save travelers up to 25 minutes between New Haven, CT and New York City.

If the C35 plan is implemented, CTW will benefit from a more reliable railroad with fewer service disruptions and delays. This can translate to even faster commuter travel times, and schedules could be modified to eliminate extra time built in to recover from recurring or typical delays. The C35 analysis did not yet incorporate this improvement and future analyses will revisit commuter operating schedules and potential travel time savings.

Station Improvements

The Stamford Transportation Center has the highest volume of commuters of any train station between New York City and Boston, MA and is important for the continued economic vitality of lower Fairfield County, CT. Improvements at Stamford Station include repairs to station platforms and waiting areas and making the station ADA accessible. The future program also includes the construction of a pedestrian bridge at Stamford Station as well as a new parking garage. A more accessible and convenient station is a key element for proposed plans for residential and commercial development in the area surrounding the station.

Figure 5-9: Estimated Travel Time Improvements between New Haven and New York



Source: C35 Analysis, 2021

Create Economic Opportunity

Job Creation

C35 investment will generate more than 62,000 total new jobs (direct construction-related, indirect [non-construction] and induced) in CTW over the 15-year plan, an average of 4,100 jobs per year. These jobs will in turn generate \$4 billion in earnings throughout the territory over the 15-year period.

Delivering the C35 plan will require an estimated average of 600 specialized railroad construction jobs each year, well in excess of current staffing levels. Workforce development initiatives are necessary to make sure opportunity is afforded to residents within the CTW territory to fill the skilled workforce needs of the C35 plan.

Equity and Access

The NEC serves diverse populations in CTW. While C35 will improve rail for higher income Acela riders with speedier intercity service, an estimated 90 percent of riders in CTW use Metro-North services which create access to economic opportunity for a variety of high, medium, and lower income communities.

Forty-three percent of people living within three miles of an NEC or connecting corridor station in this territory are minorities, 17 percent of households are low-income, and 12 percent are without a car. 64 percent of people living within three miles of NEC stations in New Haven are minorities, and 31 percent are low-income. This compares with a third of Connecticut residents who are minorities. Across the unemployed population in Connecticut, transportation is by far the most commonly reported barrier to getting a job; 84 percent of CTWorks (training and employment centers) registrants identify transportation as a barrier to work. 10 percent of workers who say they often have a car available are unemployed, whereas the unemployment rate among workers who say they do not often have access to a car is 35 percent.⁵⁷



Combat Climate Change

Reduced Carbon Footprint

Connecticut legislators have introduced Senate Bill 884 and House Bill 6441 that directly address GHG emissions and climate change. Senate Bill 884 aims to reduce transportation-related carbon emissions (February 2021). The goal is to reduce GHG from motor vehicles, which accounts for 38 percent of all GHG emissions in Connecticut. House Bill 6441 addresses the need for climate change adaptation. It encourages implementation of resiliency plans in vulnerable communities. C35 supports this legislation by providing more rail service, capacity, and reliability that could attract riders thereby contributing to a reduction in GHG.



Resilient Infrastructure

Throughout this territory, the railroad runs adjacent to the Long Island Sound shoreline. Fairfield and New Haven Counties were identified as areas at risk for inundation from sea level rise, storm surge, and riverine flooding. The NEC FUTURE ROD calls for additional study of the CTW territory to identify additional infrastructure to achieve identified service and performance objectives. Through a combination of hardened infrastructure, adaptation measures, and consideration of new routes that shift the rail line away from the shoreline, C35 and other investments would create more resilient infrastructure. One of the C35 special projects in this territory, New Haven Line Speed Improvements, will address SOGR bridge replacements. These bridge replacements would incorporate the latest design standards and adaptation measures to minimize flooding risks associated with riverine flooding. In addition, the capital renewal program includes culvert repair and replacement of damaged culverts to lessen the risk of flooding from storm surge.

Support Desirable Cities and Communities

Station Area Development

Downtown New Haven is in the midst of an economic and cultural renaissance. Access to New York City and Boston, MA via the NEC is an important component of its success.

The City of New Haven is engaging in a significant amount of planning and development in the area surrounding Union Station. The station itself, which caters to more than 700,000 Amtrak customers and more than 1 million Metro-North riders each year, is the subject of the “Moving Union Station Forward” Plan, which proposes renovating the original building and adding new parking and passenger amenities. In the half mile surrounding the station, a new transit-oriented development program is encouraging several mixed-use developments featuring commercial and residential space. New Haven is also increasing access to Union Station via the Downtown Crossing project, which will convert Route 34 from an expressway into an active mobility corridor with low-speed car traffic. Combined, these new developments and infrastructure projects are reshaping Union Station into a modern economic and transportation hub with better connections between the station and downtown.⁵⁸



Rendering from “Moving New Haven Forward” plan (CT)

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C35 improvements on the NEC have cascading benefits to cities and communities along connecting lines. Connecticut is investing in upgrading the one-track Waterbury Line that connects to the NEC in Bridgeport, CT. New signals and sidings will allow operation of two-way train service. The rail line only has eight outgoing trains per weekday, and seven incoming trains. Improvements to the Waterbury Line and plans for dramatic increases in shuttle service and one-seat ride service to New York City would be a catalyst for development along the rail line providing affordable housing options with good connections to jobs in Bridgeport, CT, Stamford, CT, and New York City.

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Innovation Districts

CTNext, which supports innovation and entrepreneurship in Connecticut, has partnered with the state to fund 'Innovation Places' - locations within the state that are driving economic development through innovation⁵⁹. In 2017, Stamford received this designation, along with a \$2 million grant. The funding and support has enabled the city to hold Stamford Innovation Week, providing networking and learning opportunities for attendees, and a partnership between the University of Connecticut and Innovate Stamford to connect students to local companies.⁶⁰ The Program Manager of Innovate Stamford, Sam Gordon, noted that these companies stated that their biggest challenge to growth was access to a larger talent pool, something that better, faster connections along the NEC could help achieve.

Continued growth within the medical, education, and bioscience industries will generate additional high-skilled jobs and open up career opportunities. That growth depends on quality rail connections provided on the NEC. Key research institutions, including New Haven's Yale University, provide the foundation for an innovative and entrepreneurial ecosystem throughout the state, including numerous highly successful homegrown startups such as Arvinas, Biohaven Pharmaceuticals, and Sema4. The Connecticut Economic Resource Center calculates that each job in the bioscience sector supports an additional 2.9 jobs throughout the larger economy.

The non-profit NXTHVN, founded in 2019, supports artists, art professionals, and local entrepreneurs and the growth of New Haven's creative community. Titus Kaphar, co-founder and President, describes NXTHVN as "a new national arts model that empowers emerging artists and curators of color through education and access." NXTHVN's studio and creative center is located just outside of downtown New Haven not far from Union Station in the predominately African American, economically disadvantaged Dixwell neighborhood. Cultivating cultural entrepreneurship and social innovation in Dixwell is a key component of NXTHVN's mission.⁶¹



Rendering of NXTHVN multi-use space (CT)



CHAPTER 6

New York City Metro

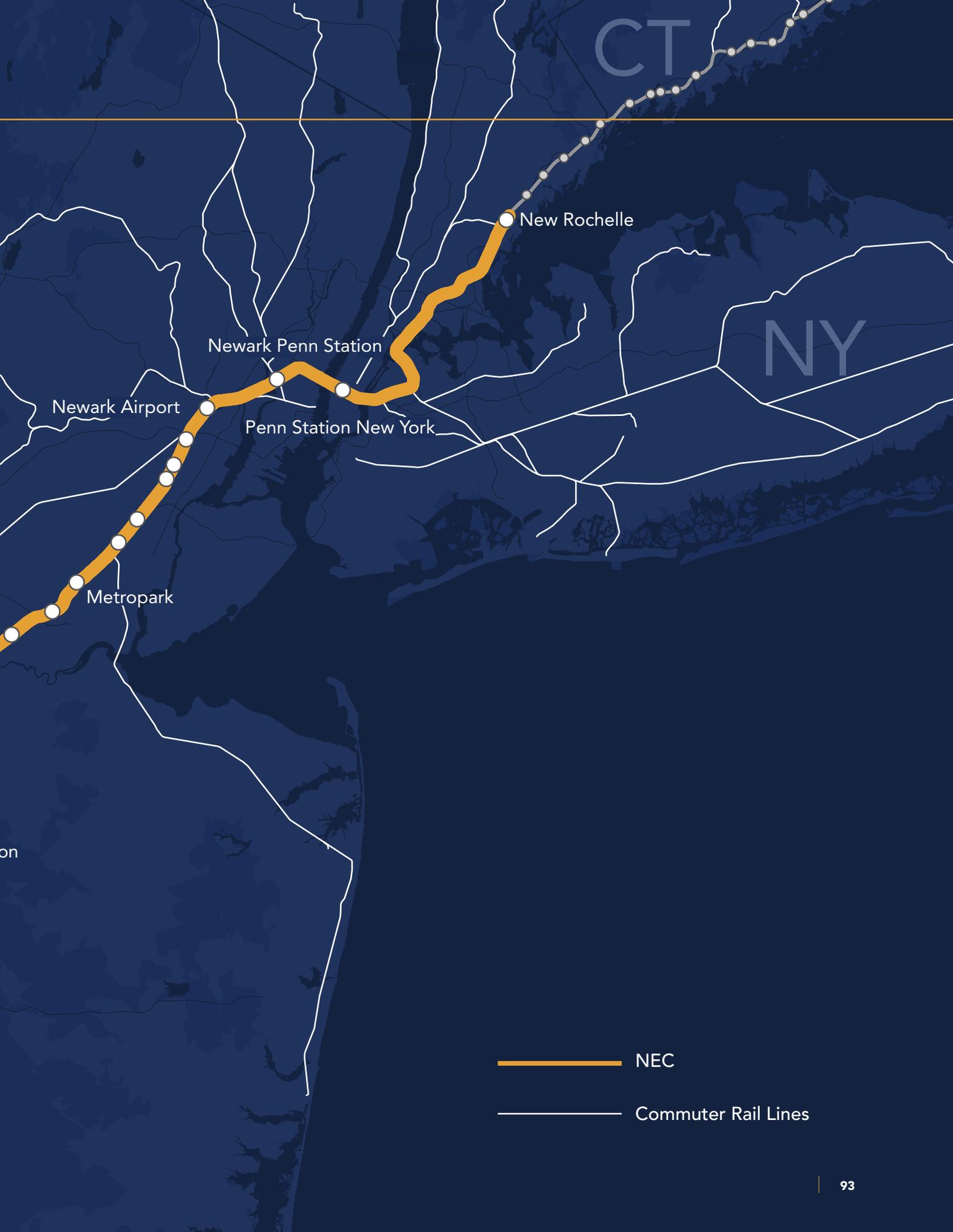
NJ

PA

New Brunswick

Princeton Junction

Trenton



CT

NY

— NEC

— Commuter Rail Lines



NJ TRANSIT



DANGER
DO NOT
BOARD
MOVING
TRAIN

NJ TRANSIT Conductor watching over passengers

Overview

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The New York City Metro (NYM) territory is central to the NEC with the highest volumes of trains and passengers. It extends from Morris Interlocking in Pennsylvania, which is just south of the Trenton, NJ station, to New Rochelle, NY. Amtrak owns and manages the right-of-way between Morris Interlocking and New Rochelle, NY with projects coordinated by MTA, NJ TRANSIT, and Amtrak. Amtrak, NJ TRANSIT, SEPTA, and the MTA Long Island Rail Road (LIRR) operate service in this territory. Metro-North will provide service in this territory upon completion of the Penn Station Access project.

At the core of the NYM territory, Penn Station New York (PSNY) is the busiest railroad station in the U.S. and North America, serving nearly 460,000 rail passengers per weekday, 98 percent of those on LIRR and NJ TRANSIT. PSNY is a through-station with 21 tracks; four of which are stub-end tracks on the south end of the station requiring trains to turn in the station and exit through the two North River tunnels under the Hudson River. Through trains continue under the four East River tunnels with LIRR continuing to Long Island, Amtrak via the Hell Gate Bridge to New Rochelle, NY, and NJ TRANSIT to Sunnyside Yard.

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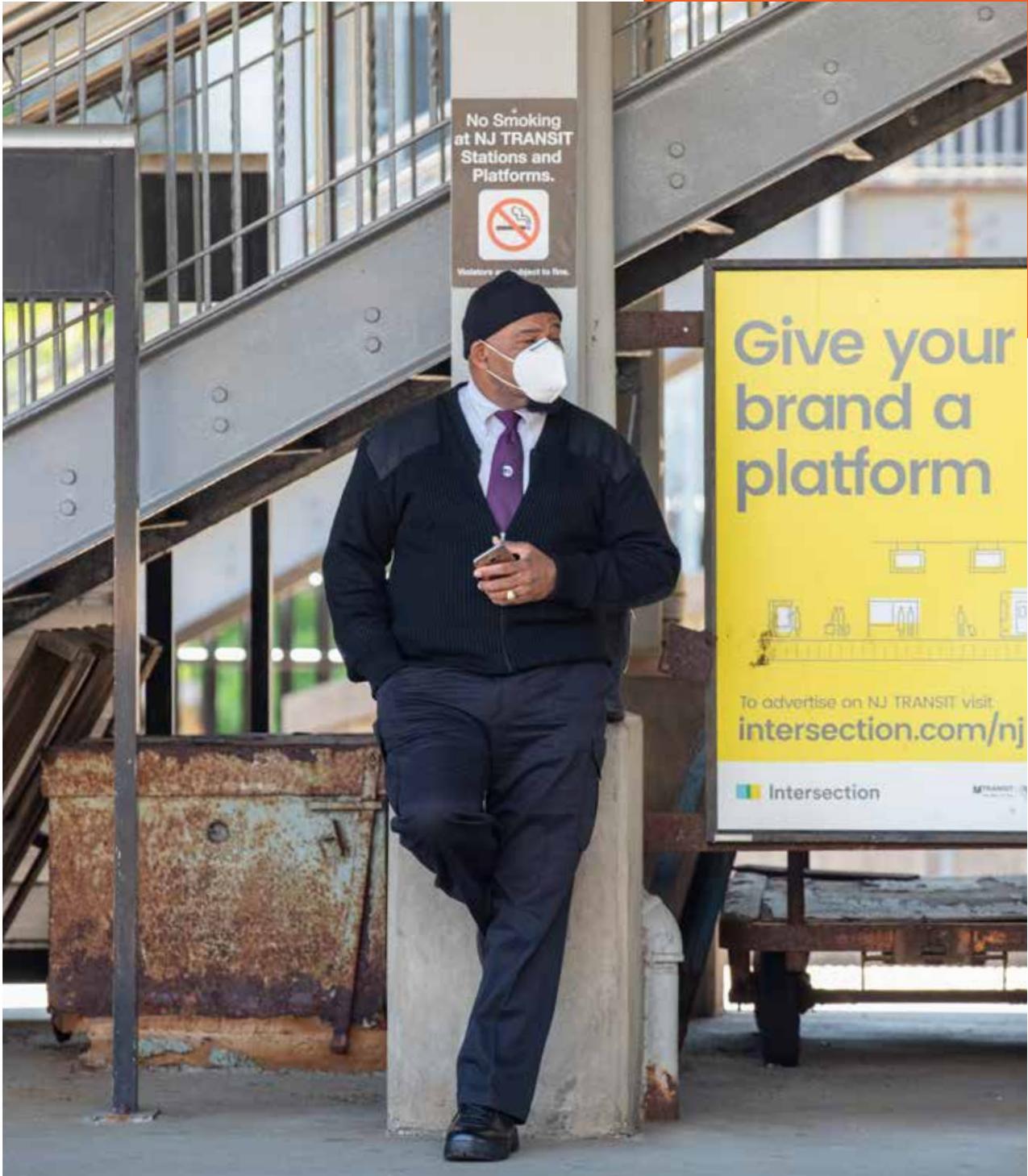


Penn Station New York West End Concourse (NY)

NYM service has the densest train volumes anywhere on the NEC, with NJ TRANSIT and Amtrak trains running every 2.5 minutes between New Jersey and New York for multiple hours each morning and evening. Capacity constraints under the Hudson River, within PSNY, and under the East River create bottlenecks that impact daily commuters into PSNY and intercity travelers throughout the NEC. Equally important is the urgent need to repair the more-than-100-year-old North River and East River tunnels and their approaches. NYM includes the only 6-track segments of the NEC, representing capital renewal challenges due to traffic levels and space-constrained project sites. However, these challenges present an opportunity to improve hundreds of thousands of trips per day.

C35 investments in the NYM territory will provide the infrastructure needed to sustain and grow intercity and commuter rail service, add new services, and improve access to existing and new markets. The C35 plan leverages regional rail initiatives including the recently completed Moynihan Train Hall and MTA's investment in East Side Access, a mega-project that provides LIRR service to Grand Central Terminal and opens up track capacity in PSNY for a new Metro-North Penn Station Access service into PSNY. This project includes four of the five new C35 NYM passenger stations, served by new commuter rail service to both New York and Connecticut. The NYM projects will double trans-Hudson tunnel capacity and make resiliency improvements to both the Hudson and East River Tunnels.

NYM is home to economic and cultural centers near PSNY. This includes Broadway, Madison Square Garden, and Times Square. The PSNY-area improvements included in the C35 plan will benefit NJ TRANSIT, LIRR, Amtrak, and future Metro-North riders.



Conductor waiting for a train at Trenton Transit Center (NJ)

NYM Project Highlights

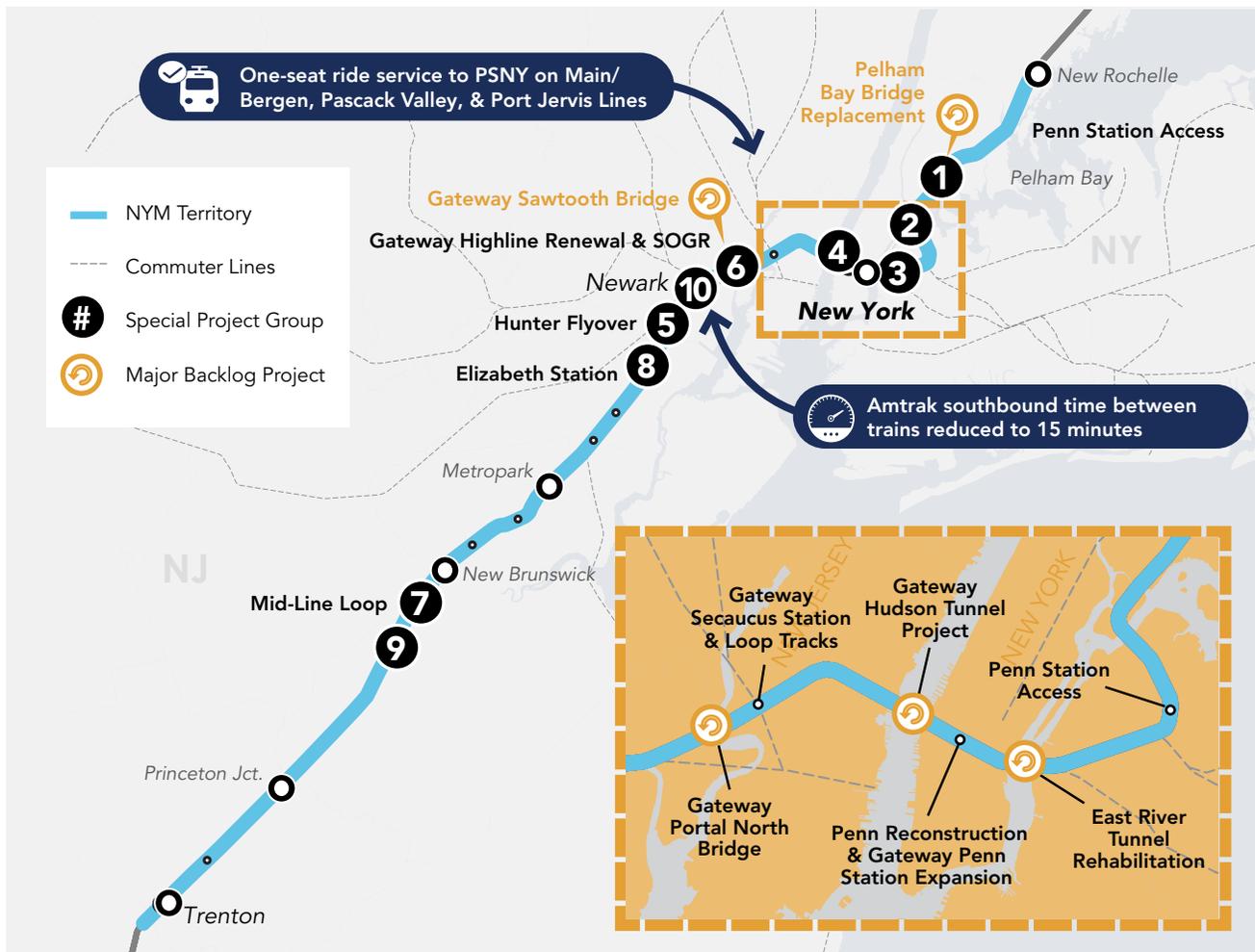
The C35 plan includes transformational investment in the NYM territory with benefits that extend to the entire NEC. These investments will address capacity constraints into and through New York City with major new infrastructure such as a new Gateway Portal Bridge, Gateway Hudson Tunnel, Penn Reconstruction, and Gateway Penn Station Expansion. These and other C35 improvements are necessary to support continued economic growth of the New York City metropolitan area with improved connections to the Bronx and Long Island as well as residential and employment centers in Connecticut and New Jersey. Demand into PSNY exceeds NJ TRANSIT peak-hour capacity and C35 investments will accommodate a doubling of NJ TRANSIT peak-hour service. With Metro-North's Penn Station Access service, residents of the Bronx will save up to 50 minutes on trips to Manhattan. Amtrak Acela passengers could save eight minutes north to New Rochelle, NY and almost a half-hour to both Washington, DC and Boston.



NYM Special Project Highlights

- **Pelham Bay Bridge Replacement:** Replaces a century-old movable bridge which crosses the Hutchinson River in the Bronx, NY with a new low-level or mid-level movable, or a high-level fixed bridge with clearance for marine traffic.
- **Penn Station Access:** Provides new Metro-North New Haven Line service to PSNY and construct four new stations in the Bronx. Brings Amtrak's Hell Gate Line to a state of good repair.
- **Penn Reconstruction & Gateway Penn Station Expansion:** Reconstructs the existing PSNY to transform the outdated and over-capacity station, relieve overcrowding, and be part of an integrated complex with Moynihan Train Hall and Penn Expansion. Expansion provides additional track and platform capacity to support growth in rail service possible with the new Gateway Hudson Tunnels.
- **Gateway Hudson Tunnel:** Constructs a new two-track tunnel beneath the Hudson River and rehabilitates and modernizes the existing two-track North River Tunnel.
- **Gateway Sawtooth Bridge:** Replaces a pair of railroad bridges between Newark and Secaucus, NJ located in the Meadowlands with new structures to support a four-track segment with improved track speeds.
- **Hunter Flyover:** Constructs a flyover south of Newark Penn Station to eliminate at-grade crossings, thereby reducing conflict between trains, increasing capacity for NJ TRANSIT and Amtrak, and enabling NJ TRANSIT to improve Raritan Valley Line service.
- **Mid-Line Loop:** Eliminates at-grade movements that create conflicts, increasing capacity, and improving reliability. This will enable the New Jersey High-Speed Rail Program's goal of 160-mph speeds on Acela, as well as support enhanced NJ TRANSIT service.
- **Gateway Secaucus Station and Loop Tracks:** Expand Secaucus Station platform system and add loop tracks at Secaucus Junction. Allows for a one-seat ride to Manhattan from New Jersey's Hudson and Bergen counties and New York's Rockland and Orange counties via Metro-North service operated by NJ TRANSIT.

Figure 6-1: NYM Special Project Groups and Benefits



NYM Special Project Groups

(See Appendix for full list of projects)

- 1 Bronx
- 2 Harold
- 3 Penn Station
- 4 Gateway East
- 5 Newark
- 6 Gateway West
- 7 Adams
- 8 Elizabeth
- 9 New Brunswick
- 10 TRANSITGRID

NYM 2035 Benefits



More Frequent Service

- More than double NJ TRANSIT trans-Hudson peak hour service
- Amtrak 54% increase in service
- Amtrak southbound time between trains reduced from 30 to 15 minutes



New Services

- New Metro-North services to the Bronx, Westchester County, and Connecticut
- New one-seat ride service from Main, Bergen County, Pascack Valley, and Port Jervis Lines



Upgrade and Replace Aging Assets

- All major backlog projects complete

Source: C35 Analysis, 2021

NYM Capital Renewal Highlights

The capital renewal programs in the NYM territory include 24 capital renewal programs organized into three operationally independent regions to minimize service impacts: a north region from New Rochelle, NY to PSNY; a central region between PSNY and Metropark in Iselin, NJ; and a south region from Metropark to Morris Interlocking just south of Trenton, NJ. Capital renewal efforts include major upgrades to track (including turnouts, rail, and ties), electric power supply assets (overhead catenary, supporting structures, substations, transmission lines poles), undergrade bridges, and multiple interlockings. Four of the 24 capital renewal programs will be initiated but not completed within the 2035 time frame. These capital renewal programs include major infrastructure improvements such as replacement of approximately two miles of the superstructure along the approaches of the Hell Gate Viaduct and undergrade bridges in Newark and Union, NJ.

Figure 6-2: NYM Estimated Assets Replaced in Territory

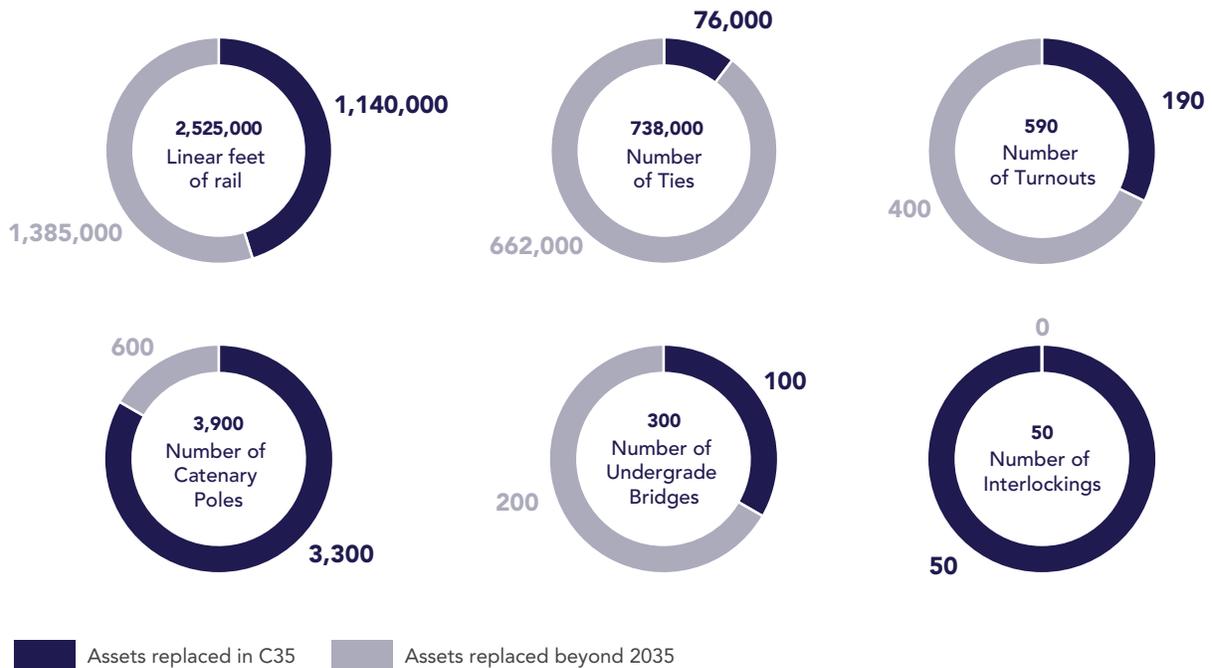
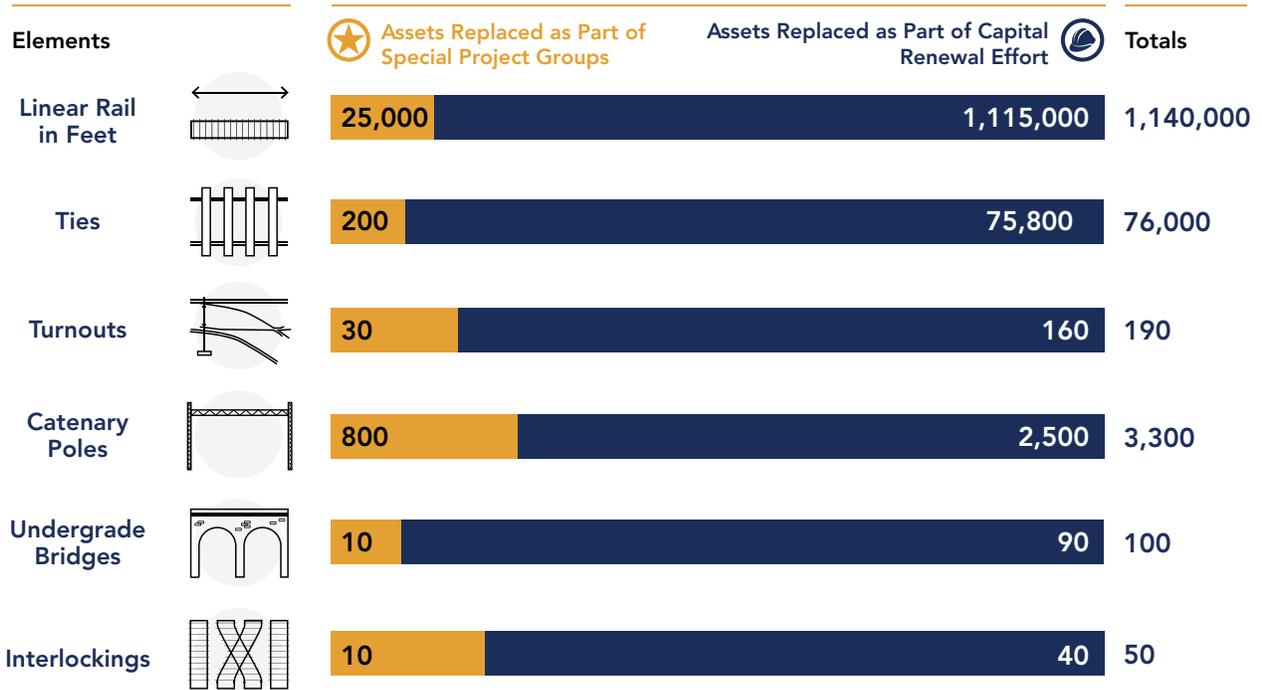


Figure notes:

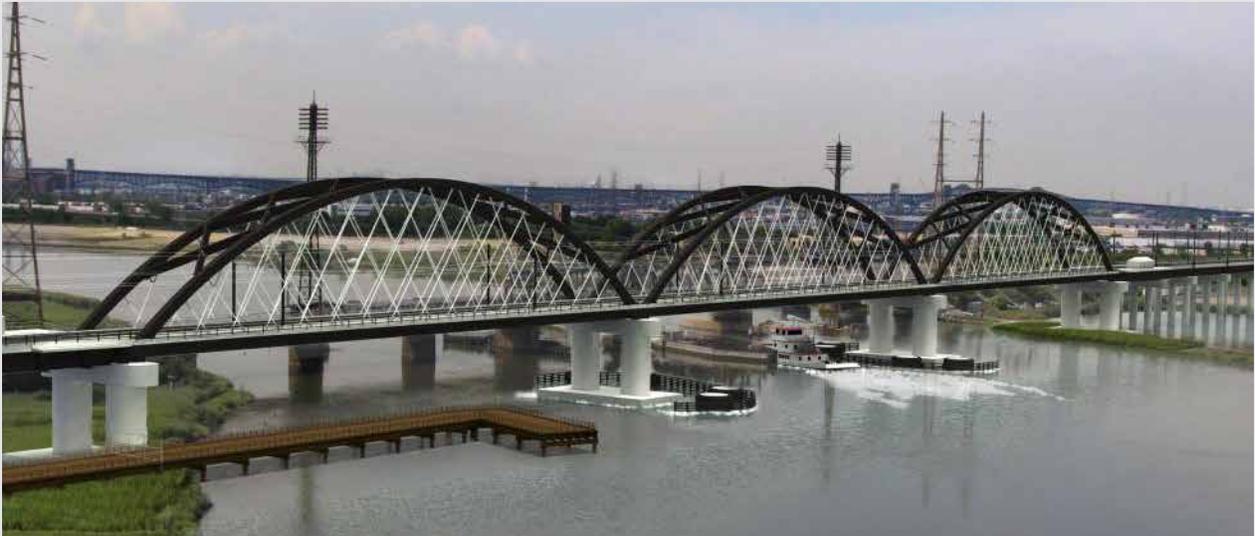
1. Number in center of circle represents total assets
2. Numbers rounded

Source: C35 Analysis, 2021

Figure 6-3: NYM Estimated Assets Replaced in Special Project Groups and Capital Renewal Programs



Source: C35 Analysis, 2021

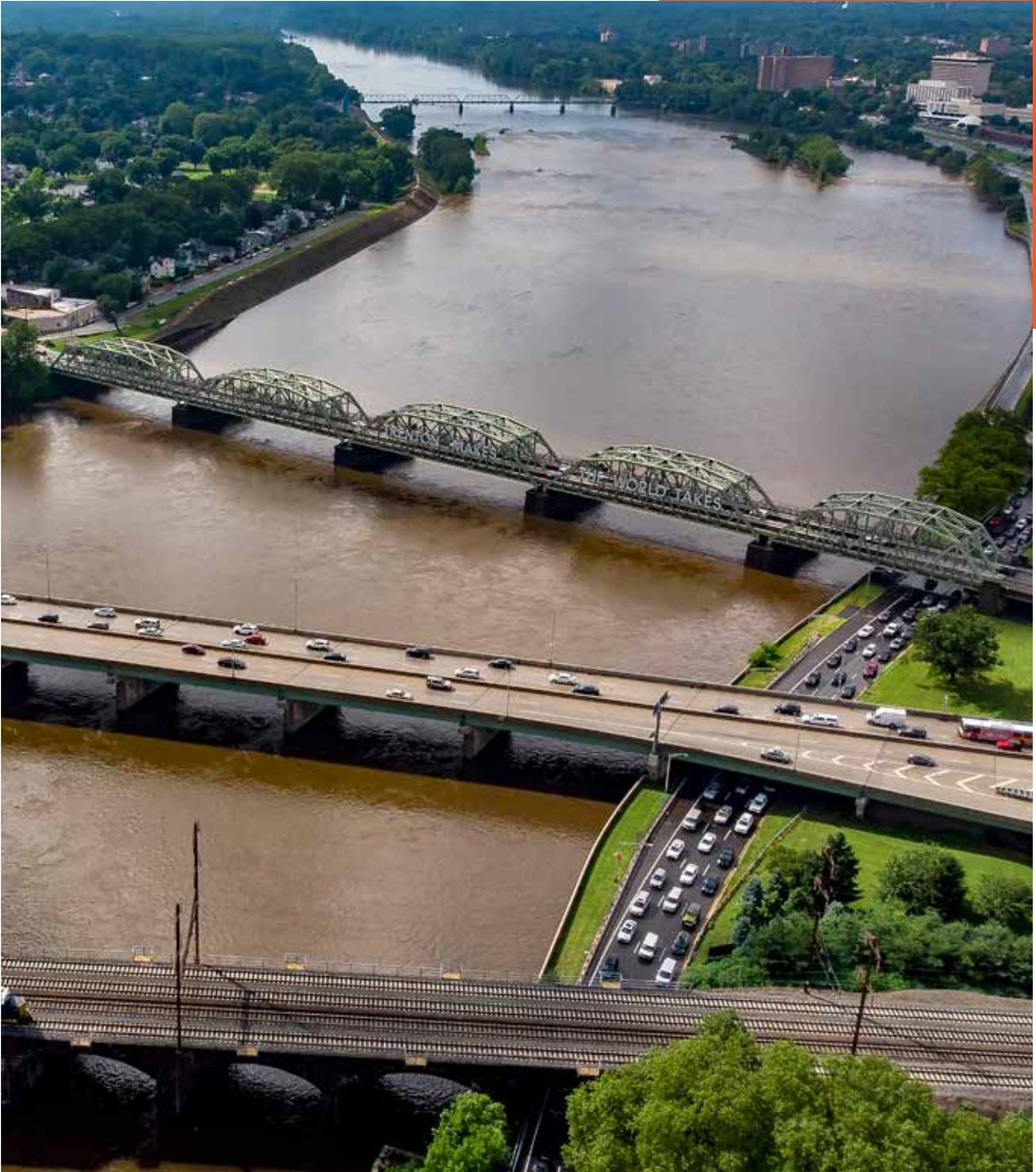


Rendering of Gateway Portal North Bridge (NJ)

 *SPOTLIGHT*

Gateway projects will increase capacity and operational flexibility of the NEC, resulting in more reliable and frequent commuter and intercity service. Capacity constraints at PSNY and the trans-Hudson crossing are bottlenecks for through services to Boston, MA or Washington, DC. As such, Gateway improvements will benefit the entire NEC. Gateway projects include:

- Highline Renewal & State of Good Repair
- Hudson Tunnel
- Secaucus Station and Loop Tracks
- Portal North Bridge
- Portal South Bridge
- Sawtooth Bridge
- Dock Bridge Rehabilitation
- NJ TRANSIT Storage Yard
- Harrison Fourth Track Phase 1
- Penn Station Expansion



Northeast Corridor over the Delaware River (PA/NJ)

Schedule of Investments

The C35 plan sequenced 10 special project groups and 24 capital renewal programs in NYM, and evaluated temporary construction-related service adjustments and permanent service benefits. Special projects and capital renewal, such as the Gateway Dock Bridge Rehabilitation and Westbound Waterfront Connection, were analyzed collectively and sequenced to maximize productivity of track outages, minimize service disruption, and create overall project delivery efficiencies in NYM. The C35 plan does require some peak-period service reductions for NJ TRANSIT and Amtrak to allow for necessary track outages longer than a midday, overnight, or weekend period.

The roadmap for future project delivery provides an initial schedule timeline for efficient construction of special projects and capital renewal over the 15-year period.

Figure 6-4: NYM Estimated Initial Timeline Capital Renewal and Special Project Groups

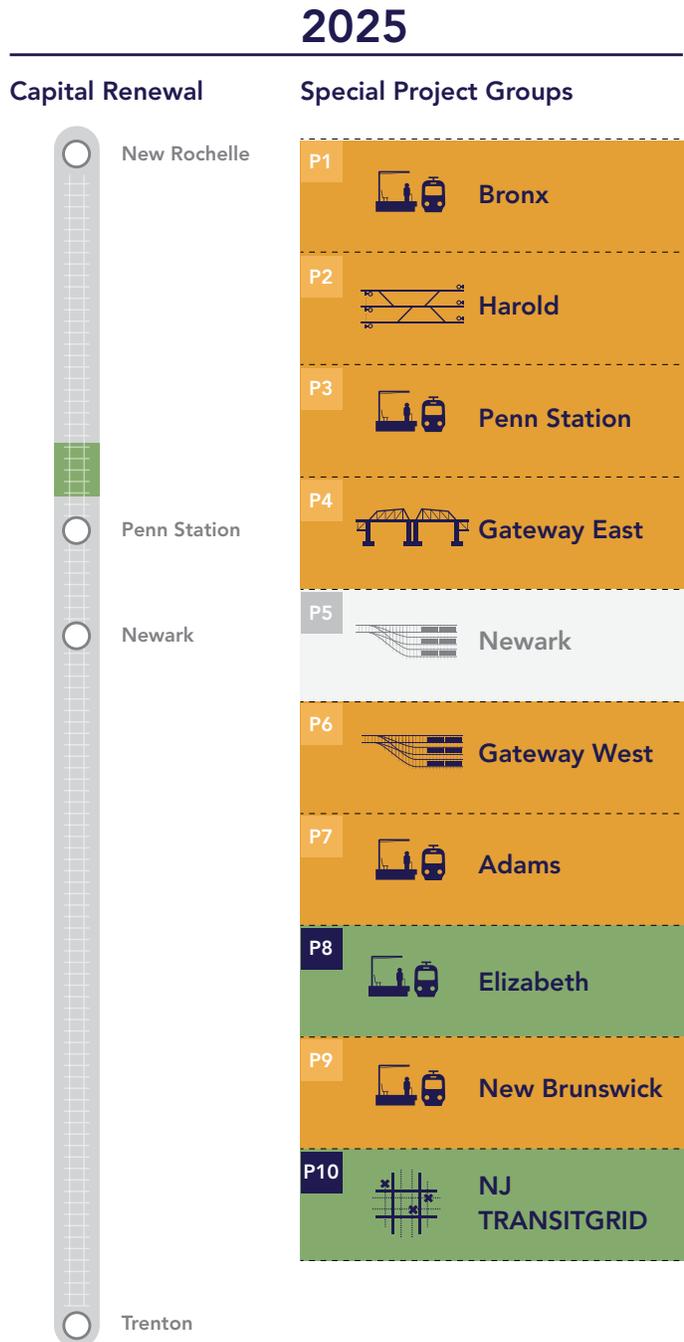


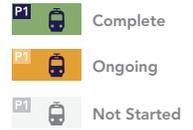
Figure note: Initial analysis results to be updated in C37

Source: C35 Analysis, 2021

Capital Renewal



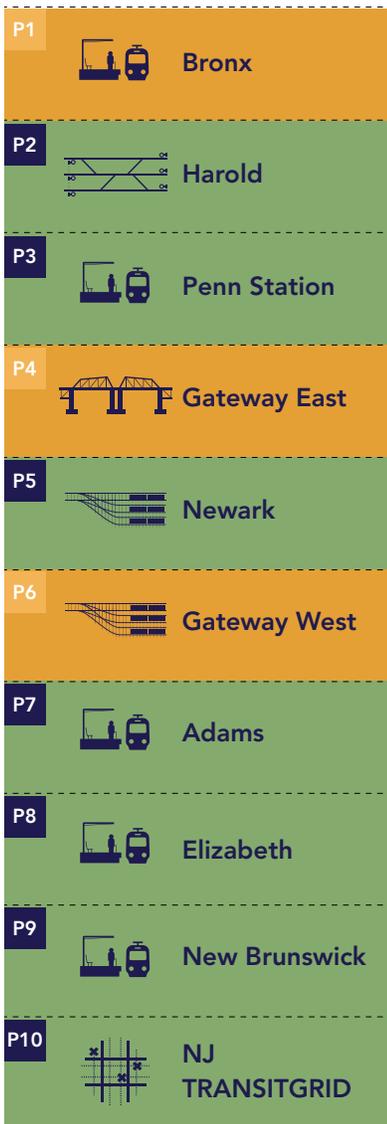
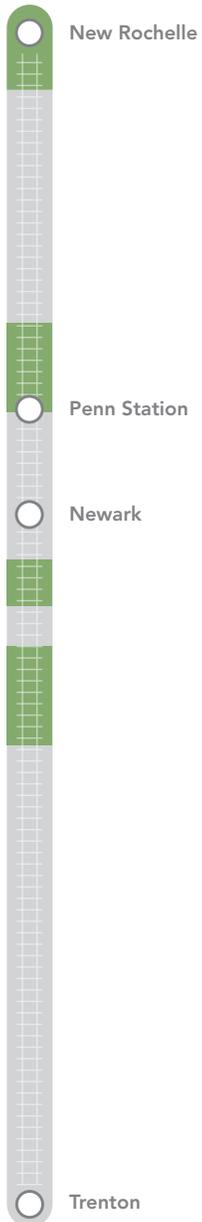
Special Project Groups



2030

Capital Renewal

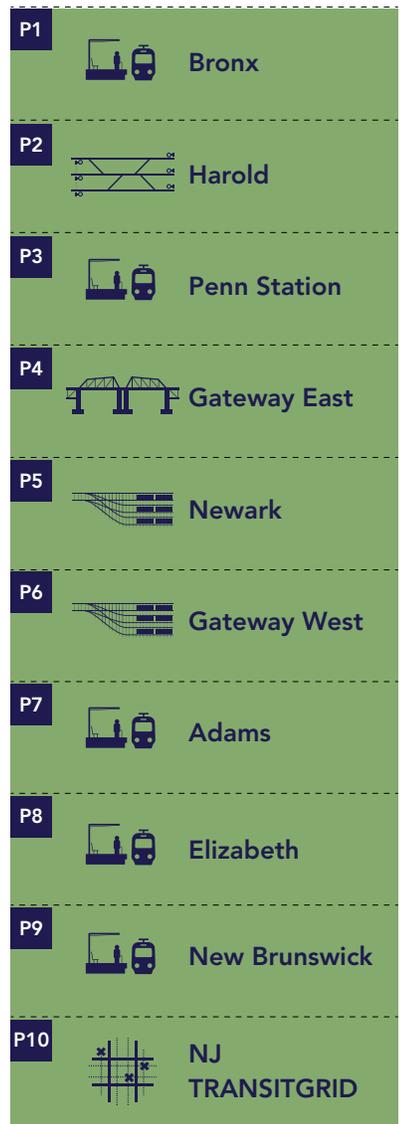
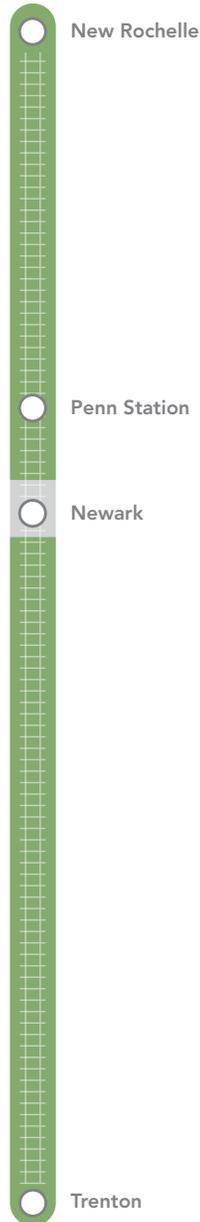
Special Project Groups



2035

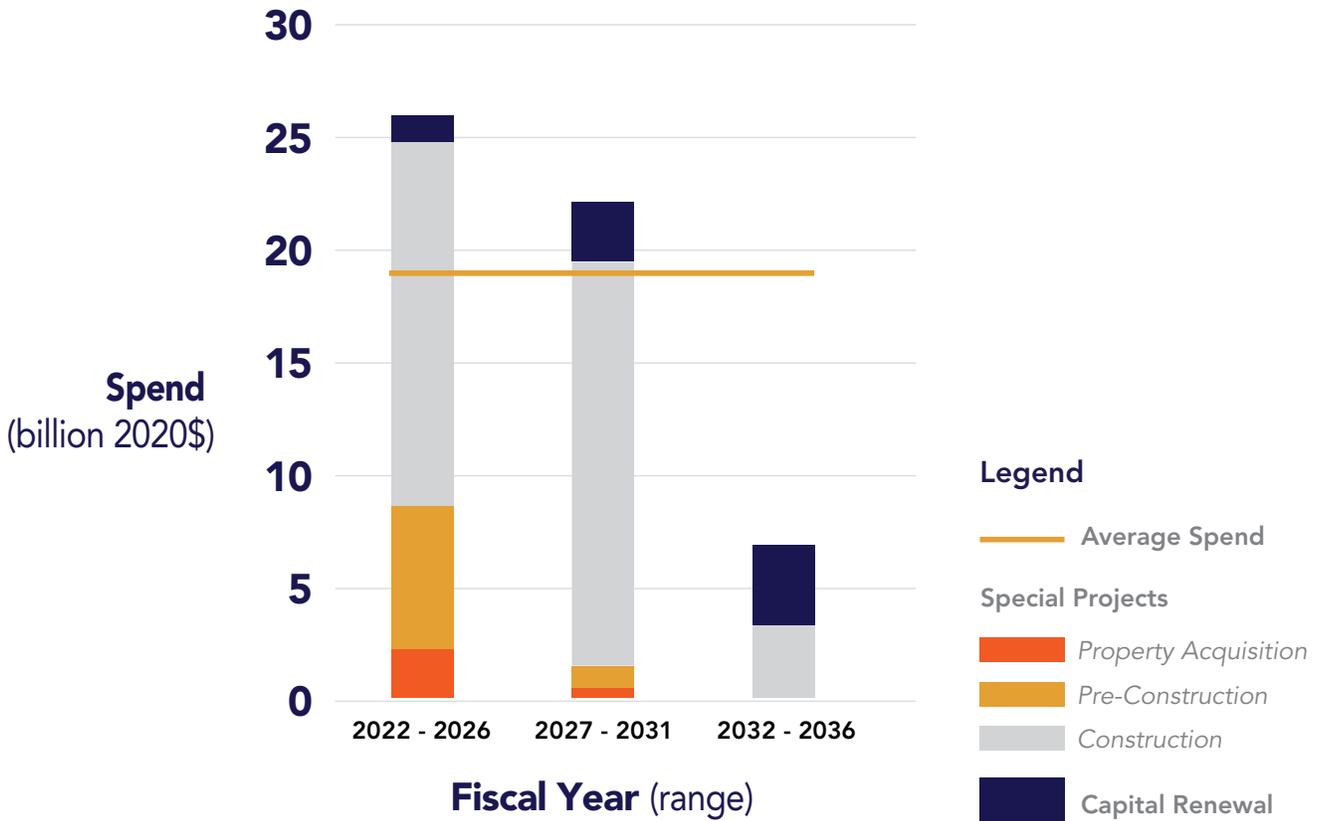
Capital Renewal

Special Project Groups

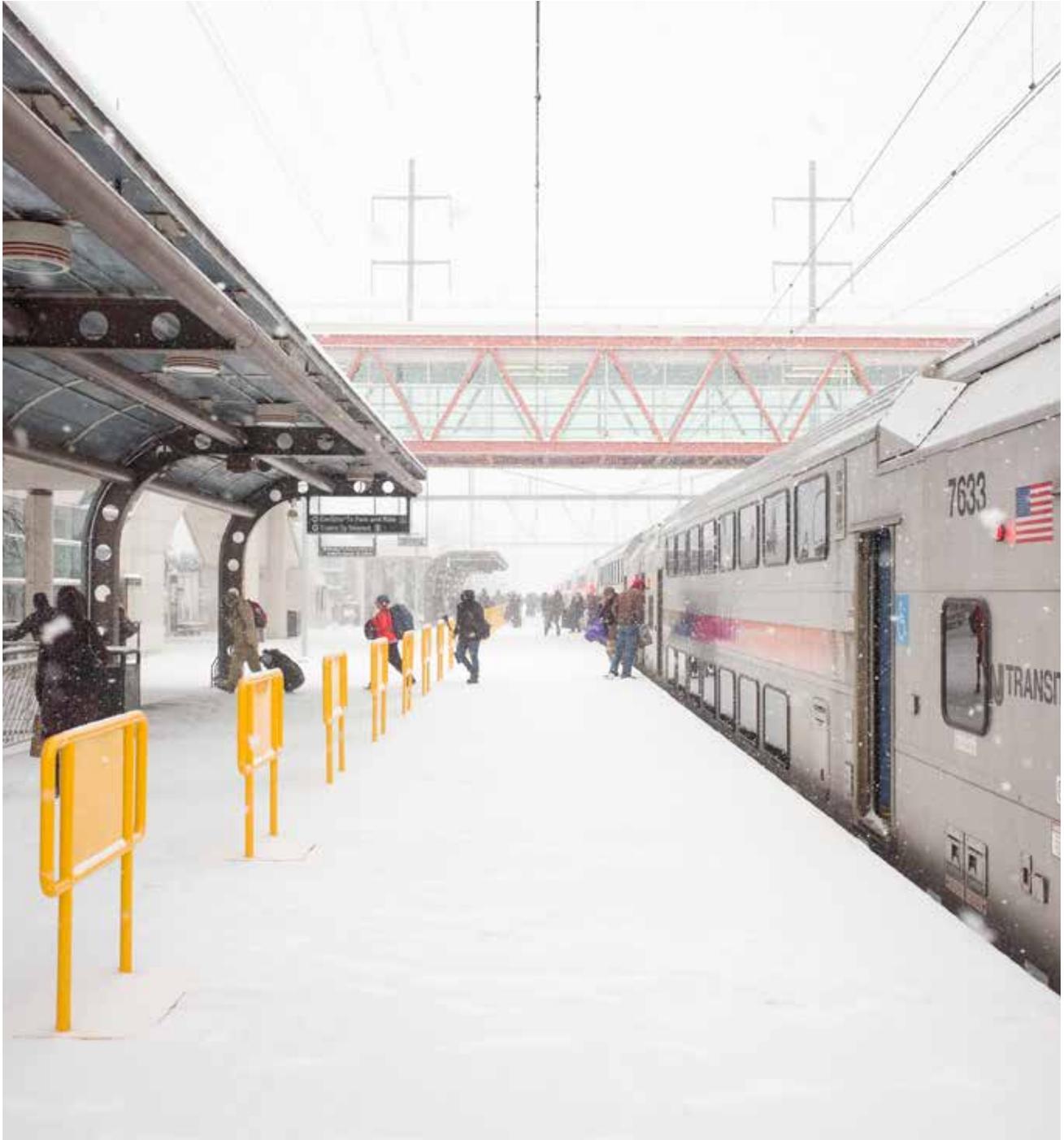


If the C35 project delivery sequence is followed, investment in this territory will be as much as \$55 billion total over 15 years.

Figure 6-5: NYM Estimated Total Capital Costs – 5 Year Increments



Source: C35 Analysis, 2021



NJ TRANSIT train at Hamilton Station (NJ)

Improve Mobility and Connections

Reliable Service

In FY2019 NJ TRANSIT trains were delayed over 3,100 hours and 11 percent of trains were late. LIRR trains were delayed over 2,200 hours and 8 percent of trains were late.⁶² The substantial investment in NYM will improve reliability of commuter and intercity service along the entire NEC. The existing capacity constraints in the NYM territory affect service reliability for intercity trains from Boston to Washington, DC and commuter trains operating in New Jersey, New York, and Connecticut.

The C35 analysis of Amtrak 2019 dispatch data identified seven NYM key locations that contributed to Amtrak and commuter train delay. C35 improvements would mitigate or eliminate train delays at each location. The Gateway improvements will provide increased reliability and operational flexibility for Amtrak and NJ TRANSIT. Improvements between PSNY and east to Harold Interlocking include East River Tunnel high density signaling and interlocking improvements. The Harold work will provide conflict-free train routes through the busiest switch point on the NEC, a chokepoint that causes the most delay of any location on the NEC. Located in Queens, NY, this interlocking sorts Amtrak, LIRR, and NJ TRANSIT trains as they travel north and east of PSNY or to access Sunnyside Yard for service and storage.

Hunter Flyover will improve reliability and operating flexibility by eliminating the at-grade crossing where the Raritan Valley Line joins the NEC. This project includes construction of an elevated viaduct structure to allow for NJ TRANSIT's Newark-bound Raritan Valley Line trains to cross over and above the NEC tracks to serve Newark. Eliminating this point of conflict will increase capacity for NJ TRANSIT and Amtrak and support peak-period one-seat ride Raritan Line service into PSNY.



Figure 6-6: NYM Estimated Delay Relief Improvements

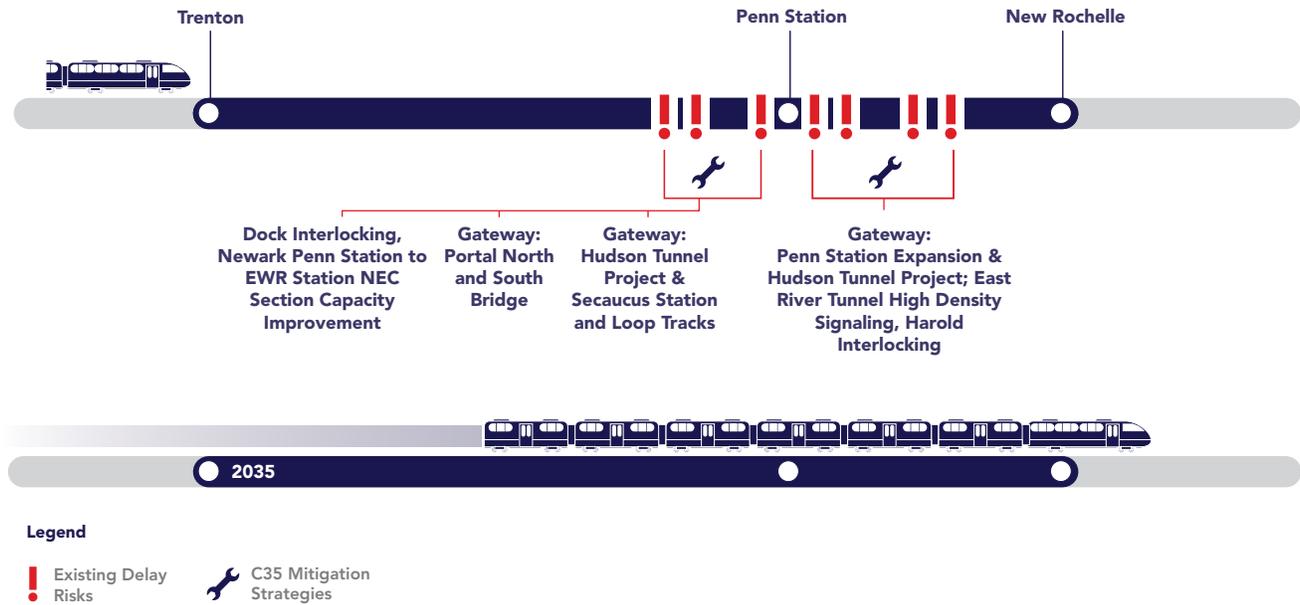


Figure note: Connecting corridors not included

Source: C35 Analysis, 2021

New Services

New one-seat ride service on the NJ TRANSIT Main and Bergen County lines (including Metro-North Port Jervis line to Orange County, NY) and NJ TRANSIT Pascack Valley line (including Metro-North service to Rockland County, NY) will be possible with the completion of the Gateway projects with a direct connection between those lines and PSNY. Metro-North's Penn Station Access will provide a one-seat ride between four new stations in the East Bronx and PSNY or the New Haven Line in Westchester, NY and Connecticut.



People walking through the Newark Penn Station Concourse (NJ)

Frequent Service

C35 special projects and capital renewal enable more frequent service across NYM. The maximum time between trains for NJ TRANSIT passengers connecting to the NEC in the off-peak will be reduced overall from thirteen minutes to nine minutes (averaged for all NEC stations).

The C35 plan increases capacity and operating flexibility in the NYM territory to support dramatic growth in NJ TRANSIT commuter service, more than doubling total daily revenue round trips from 196 to 465. The Gateway projects support these service objectives to double trans-Hudson peak hour service into PSNY which NJ TRANSIT hopes to further expand beyond 2035. The C35 plan accommodates up to an estimated 54 percent growth in NJ TRANSIT off-peak service and an estimated 41 percent growth in NJ TRANSIT reverse-peak service by adding capacity and flexibility to the NEC.

With the Penn Station Access project, Metro-North will introduce as many as 51 new daily round trips on the New Haven Line to PSNY. Amtrak Acela and Northeast Regional daily service will be increased by 33 percent corridor-wide, including half-hourly service to Washington Union Station and hourly service Boston South Station.

Figure 6-7: NYM Estimated Off-Peak Maximum Time Between Trains Averaged Across All NEC Stations (minutes)



Figure note: Actual times will vary by destination.

Source: C35 Analysis, 2021

Figure 6-8: NYM Estimated Daily Revenue Round Trips

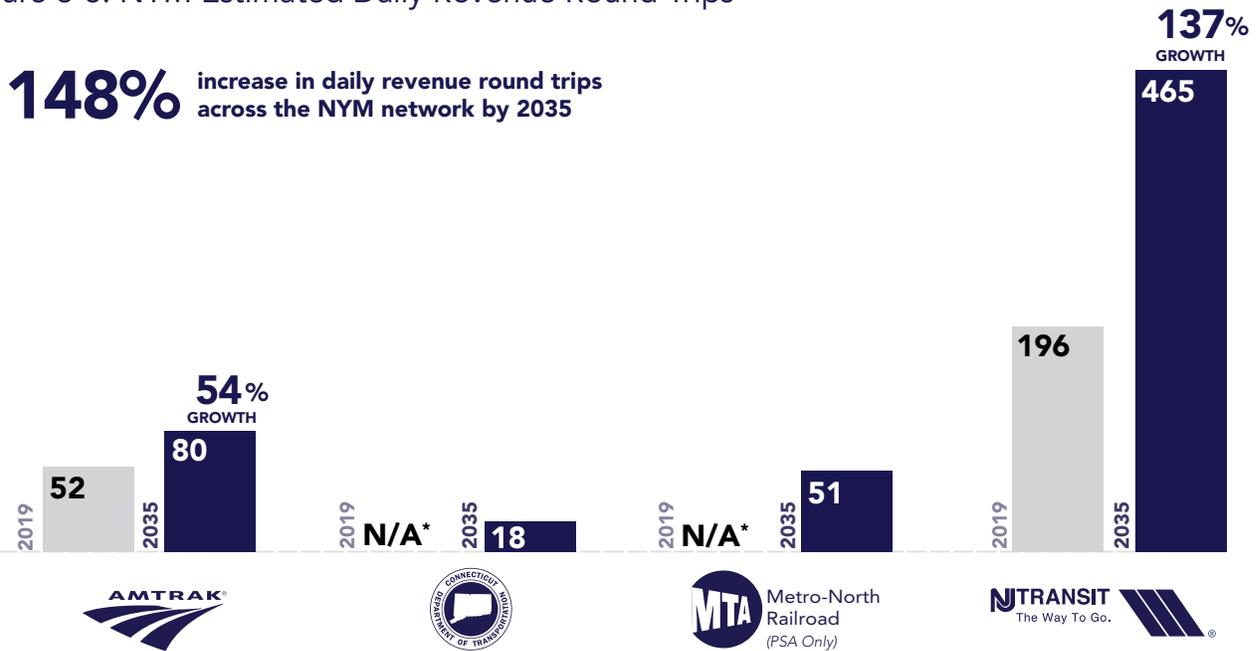


Figure note:

* No CTDOT or Metro-North service in 2019. Trains leave the NEC at New Rochelle. Penn Station Access will bring CTDOT and Metro-North trains into the territory.

Source: C35 Analysis, 2021

Faster Service

As a result of C35 improvements, Amtrak Acela service will save approximately 20 minutes in the NYM territory. Amtrak’s Acela express service will be approximately 26 minutes faster between PSNY and Washington, DC (an estimated 15 percent less than the current travel time) and 28 minutes faster between PSNY and Boston (an estimated 13 percent less than current travel time).

C35 improvements that address capacity constraints and reliability, such as the Gateway program, interlocking, and signal system improvements, also support higher-speed service and reduced trip times for commuter and intercity passengers alike. The New Jersey High Speed Rail Improvement Program includes upgrades to electrical power, signal systems, tracks, and overhead catenary wires to extend high speed operations from New Brunswick, NJ to Newark, NJ and reduce trip times for NJ TRANSIT and Amtrak trains. New one-seat ride service for NJ TRANSIT Main and Bergen County line (including Metro-North Port Jervis line to Orange County, NY) and NJ TRANSIT Pascack Valley line (including Metro-North service to Rockland County, NY) customers will eliminate the need to transfer and reduce overall travel time.

Metro-North’s Penn Station Access will provide a savings to riders traveling between the East Bronx and PSNY up to approximately 50 minutes and East Bronx passengers traveling to Connecticut could save up to approximately 75 minutes compared to existing transit options.

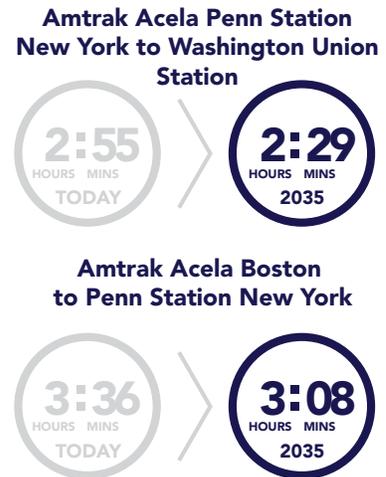
Station Improvements

Gateway Penn Station Expansion will provide additional track and platform capacity at PSNY to support growth in rail service possible with the new Gateway Hudson Tunnels. This expansion will complement the recently completed Moynihan Train Hall and planned reconstruction of the existing Penn Station, which will transform the station; relieve overcrowding; and improve passenger waiting areas, access, and street-facing elements of the facility. These improvements will benefit Amtrak, NJ TRANSIT, LIRR, and future Metro-North customers.

Metro-North's Penn Station Access project will include four new ADA-accessible passenger rail stations in the East Bronx at Co-op City, Morris Park, Parkchester/Van Nest, and Hunts Point, providing new rail service to Manhattan and key job markets in Westchester and Connecticut.

Station upgrades at Newark, Elizabeth, and New Brunswick, NJ provide for fully ADA-accessible stations, improve the customer experience with better station amenities, and bring the stations into a state of good repair. Improvements at Elizabeth station would also accommodate a future fifth track along the NEC. Newark Penn Station investments include platform capacity improvements (crossovers to provide more flexible operations) to better serve Newark International Airport Station.

Figure 6-9: Estimated Travel Time Improvements (PSNY-DC and PSNY-BOS)



Source: C35 Analysis, 2021



Passengers waiting for a train at Newark Penn Station (NJ)

SPOTLIGHT

Newark Penn Station:

A state-sponsored overhaul of Newark Penn Station will include new lighting and improved drainage in the bus facility, along with improved directional and way-finding signage inside. Longer-term enhancements will improve the station's openness, natural light, and overall commuter and visitor experience.⁶³

Create Economic Opportunity

New York City is an economic engine for not only the Northeast but the entire nation. Quality connections between New York City, its surrounding cities and suburbs, and other major cities, are important for continued growth across the region. Faster and more reliable rail service creates more choices for where residents and businesses can locate while sustaining access to affordable housing and good jobs. Improving access in underserved communities is especially important for the future economic health of the region.



Job Creation

C35 investment will generate approximately 434,000 total new jobs (direct construction-related, indirect [non-construction] and induced) in NYM over the 15-year plan, an average of 28,900 jobs per year. These jobs will in turn generate \$27.1 billion in earnings throughout the territory over the 15-year period.

Delivering the C35 plan will require an estimated average of 1,400 specialized railroad construction jobs each year, well in excess of current staffing levels. Workforce development initiatives are necessary to make sure opportunity is afforded to residents within the NYM territory to fill the skilled workforce needs of the C35 plan.

Equity and Access

The NEC serves diverse populations in NYM. While C35 will improve rail for higher income Acela riders with speedier intercity service, 90 percent of riders in NYM use LIRR and NJ TRANSIT services which create access to economic opportunity for a variety of high, medium, and lower income communities.

C35 will benefit historically disadvantaged communities within the territory. Today two-thirds of the population within 3 miles of an NEC station identify as persons of color and/or Hispanic. Over a quarter of the population live in low-income households, defined as earning below 150 percent of the federal poverty line. Nearly half of households do not own a car. Better, faster, and more reliable service will improve access for these populations to strong employment centers.

Additionally, Metro-North's Penn Station Access service will increase access from the four new East Bronx stations to high paying jobs in New York City and Westchester/Connecticut, providing new job opportunities for residents throughout the region and expanding the labor pool for employers.⁶⁴

NYM commuter railroads have seen increased demand for reverse-peak and off-peak services. These trains provide mobility for those working late night shifts, such as essential health care workers. C35 investments provide the capacity to increase these services across NYM.

A major challenge facing the New York region is access to affordable housing. By improving travel times and rail capacity, C35 will facilitate travel between higher wage job centers and communities with lower housing costs. Improved trans-Hudson capacity will improve access to New York City for commuters coming from mid-size cities in New Jersey like Newark and Paterson. Similarly, Metro-North's Penn Station Access will improve mobility for residents of the eastern Bronx to Manhattan and suburban job centers.

The NJ TRANSIT commuter rail network extends well beyond the NEC. Today, six of the nine NJ TRANSIT lines connect to the NEC and major cities along the NEC. With C35, all lines will connect to Manhattan via the NEC.



Hell Gate Bridge circa 1977 (NY)

Penn Station Access

Metro-North's Penn Station Access project includes new rail service for the East Bronx neighborhoods that are underserved by existing transit. It will also bring Amtrak's Hell Gate Line to a state of good repair. This new, direct rail service will significantly reduce commute times for residents and create options to reach jobs, education, and other opportunities in midtown Manhattan, Westchester, and Connecticut. Ninety percent of East Bronx residents are minority, 25 percent are below the poverty level, and many spend up to 1½ hours each way on their daily commutes.⁶⁵

Combat Climate Change

Reduced Carbon Footprint

The NY Department of Environmental Conservation (NYDEC) states that approximately 36 percent of New York State's GHG emissions come from the transportation sector.⁶⁶ The NYDEC is supporting ways to reduce congestion by upgrading or expanding public transportation systems. New York City committed to reducing GHG emissions by 80 percent by 2050 compared to 2005 levels⁶⁷ and its transportation goals are "...to avoid trips we don't need, shift those trips we do need to lower-carbon modes, and improve existing infrastructure and technology to enable even greater emission reductions".⁶⁸



New Jersey's Global Warming Response Act identified the goal of reducing emissions of climate pollutants (carbon dioxide equivalent emissions or CO₂e) to 80 percent below their 2006 levels by the year 2050 (the "80x50" goal). A strategy towards achieving that goal is to "pursue increased ridership on NJ TRANSIT, expansion of transit villages and work-from-home policies to reduce vehicle miles traveled".⁶⁹

Better and more reliable rail service, provided by the implementation of C35, could attract riders to change their mode of travel to rail thereby contributing to a reduction in GHG.

Resilient Infrastructure

Superstorm Sandy highlighted the flooding vulnerability of the NEC within this territory. It is expected that if climate conditions continue to worsen, events like Superstorm Sandy will likely increase in both frequency and intensity. C35 provides an opportunity to address areas subject to inundation by providing hardened and more resilient infrastructure. In New Jersey, several projects provide infrastructure that will make the overall system more resilient to extreme weather events. The NJTRANSITGRID project will provide resilient and sustainable backup power generation and distribution to the regional network. The Gateway NJ TRANSIT Storage Yard and Delco Lead projects will provide for train servicing and storage outside of flood prone areas.

The Gateway Program of projects provides system redundancy to allow for service to continue in the event of an outage in the existing North River tunnels under the Hudson River. Penn Station Access will add redundancy and resiliency to the Metro-North network by giving New Haven Line trains an alternative destination in Manhattan to Grand Central Terminal.



Amtrak Acela train exiting the East River Tunnel (NY)

River-to-River Rail Resiliency project will protect the East River Tunnels and the West Side Yard against flood hazards to ensure connectivity at PSNY for Amtrak, LIRR, Metro-North, and NJ TRANSIT. The program consists of multiple elements including West Side Yard perimeter protection and drainage improvements, hardening the Queens Portals of the East River Tunnels, and resiliency improvements within the East River Tunnels, including the installation of permanent emergency generators, and waterproofing of the entrances and manhole/conduit points of entry to two ventilation facilities.

Support Desirable Cities and Communities

Station Area Development

The City of New Rochelle, NY, a recipient of New York State’s Downtown Revitalization Initiative funds, has rezoned 300 acres around its train station for 12 million square feet of development that includes 7,000 new residential units.⁷⁰ The city also created live/workspace in the train station and another building has made it available to artists and entrepreneurs.⁷¹ New Rochelle is one example of many cities across the NYM territory that have put their NEC station at the center of their economic growth and development plans.



Metro-North trains at New Rochelle Station (NY)

A planned new North Brunswick, NJ train station will be located in the existing North Brunswick Transit Village off Route 1 adjacent to the NEC. “The North Brunswick train station embodies Middlesex County’s vision of Destination 2040 and its economic goals. As we move this project forward, we will be creating investment opportunities which will create jobs and new tax rate levels. This will not only benefit North Brunswick, but the County and the region as a whole,” said Middlesex County Improvement Authority (MCIA) Chairman James Nolan.⁷² Middlesex County is partnering with the New Jersey Department of Transportation, NJ TRANSIT, North Brunswick Township, and MCIA for the project.



Rendering of North Brunswick TOD (NJ)

At the Amtrak and NJ TRANSIT Metropark Station, plans are underway to convert existing parking into a new, walkable community. NJ TRANSIT is looking to redevelop a 12-acre site next to the station by adding new residential, retail, office, and hospitality space. The site will also include improvements for cars, bikes, and pedestrians accessing the station from the surrounding community.⁷³

Newark, NJ has also been leveraging NEC access to help revitalize the city's downtown. Over the last decade, major firms like Panasonic and the Mars Corporation have relocated their suburban offices to Downtown Newark to take advantage of rail connections. The Prudential Center, which hosts over 200 sports and entertainment events per year, opened in October 2007. At \$375 million, it was the largest private investment in the history of downtown Newark. It is located just 2 ½ blocks from Newark Penn Station and attracts over two million visitors per year. Pre-pandemic (2019), more than a third of Prudential Center patrons chose rail, with some events seeing more than 50 percent of patrons choose rail.



Rendering of Ironside Newark (NJ)

Innovation Districts

Princeton University, Rutgers University, Hackensack Meridian Health, and RWJBarnabas Health will be the first tenants of The Hub, a new collaborative site in downtown New Brunswick, NJ designed to foster research, entrepreneurship, innovation, and start-up incubation in New Jersey. The plan calls for a ten-story, 210,000 square foot state-of-the-art building in downtown New Brunswick with a direct connection to the NEC. The site, owned by the City of New Brunswick and managed by the New Brunswick Development Corporation (DEVCO), provides strong proximity to existing corporate, medical, and academic research activity. The New Brunswick Train Station is situated across the street from The Hub, via a skybridge.⁷⁴

“Through our role as the Hub’s first institutional tenant, Princeton University will help transform our region into a vibrant center of innovation with a firm commitment to ensuring inclusive participation. By harnessing the vast reservoirs of ingenuity among our regional research institutions together with community and industry partners, we will build a better future.” - Princeton University Vice Dean of Innovation, Rodney Priestley.⁷⁵



Rendering of The Hub @ New Brunswick Station (NJ)

CHAPTER 7

Mid-Atlantic North



Harrisburg

Middletown

Elizabethtown

Mount Joy

Lancaster

PA

MD



Parkesburg

Coatesville

Downingtown

Exton

Paoli

Ardmore

Newark, DE

Wilmington Station

North Philadelphia
Philadelphia 30th St

Cornwells Heights

DE

NJ

— NEC

— Commuter Rail Lines



Passengers boarding a SEPTA train at 30th Street Station (PA)

Overview

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The Mid-Atlantic North (MAN) territory extends from Perryville, MD to Morris Interlocking in Pennsylvania, which is just south of Trenton, NJ. It also includes the Harrisburg Line from Harrisburg, PA to Philadelphia. Philadelphia's 30th Street Station is the third busiest station after PSNY and Washington Union Station, serving over 30,000 trips per day.⁷⁶ It is poised for growth with a new district plan that will further catalyze development around the major transportation hub. The station is served by Amtrak, SEPTA, and NJ TRANSIT. The Harrisburg line is served by Amtrak and SEPTA. Amtrak owns and manages the right-of-way in MAN and coordinates projects with DelDOT, PennDOT, and SEPTA.

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Amtrak Northeast Regional train at Newark Regional Transit Center (DE)

MAN faces challenges in replacing its aging infrastructure while meeting the service goals of the providers in the territory. MAN has the most undergrade bridges of any NEC territory, and the greatest overall capital renewal need. Services in the MAN territory are affected by bottlenecks, high train volumes during peak times competing for track and station access, and operational constraints due to a limited number of interlockings and sidings (meaning there are few opportunities for turning back trains and limited flexibility to respond to incidents).

The implementation of the C35 plan in MAN will enable expanded commuter rail service on the three SEPTA lines and one NJ TRANSIT line that operate in the territory, improve intercity travel times, and increase intercity service frequency. The NJ TRANSIT Atlantic City Line will see hourly service, representing 67 percent growth versus today. SEPTA's future service on the Paoli/Thorndale Line will see Exton trains extended to Malvern while Thorndale trains could be extended to Coatesville. SEPTA's Wilmington/Newark Line will see DeIDOT-funded service extensions from Marcus Hook to Wilmington and on to the Newark Transportation Center. SEPTA's Trenton Line will see new trains serving Cornwells Heights, providing 30-minute frequencies all day long on the inner portion of the line. The addition of new trains originating at Cornwells Heights will allow the conversion of some existing local trains from Trenton to express service.



Amtrak Acela south of Philadelphia 30th Street Station (PA)

MAN Project Highlights

With over 500,000 residents and over 300,000 jobs in the Harrisburg-Carlisle area, the MAN territory facilitates connections between the NEC mainline and points west along the Harrisburg Line.⁷⁷ The Philadelphia-Camden-Wilmington area has 6.1 million residents and 2.8 million jobs.⁷⁸ Though the area underwent de-industrialization in the mid- to late-20th century, the territory now enjoys a robust business services, education, healthcare, retail and hospitality, and financial services economy. The territory also supports a large tourism economy, with over 46 million trips to the Greater Philadelphia region alone in 2019.⁷⁹

MAN Special Project Highlights

- **Harrisburg Line Interlocking Improvement Projects:** This includes interlocking improvements for Amtrak's Keystone Corridor and SEPTA's Paoli-Thorndale Line, replacing or reconfiguring outdated interlockings that present a challenge to reliability. The interlocking improvements support existing and future ridership growth and support flexible operations.
- **Harrisburg Line Catenary and Signal Projects:** This includes catenary and signal improvements for Amtrak's Keystone Corridor and SEPTA's Paoli-Thorndale Line. The projects will replace outdated signal systems to allow bi-directional train movements and support flexible and more efficient operations than are currently possible. Overhead catenary will be replaced and upgraded to improve system reliability.
- **New Interlocking and Turnback Track between Cornwells Heights and Eddington:** This project will allow growth in Trenton Line service by allowing some trains to turn back to Philadelphia at Cornwells Heights, reducing the amount of operational activity by SEPTA in the delay-prone southern approach to Trenton.
- **Ragan Turnback Track:** Allows select SEPTA Wilmington Line trains to use multiple tracks at Wilmington Station, using a turnback track past the station to allow for more reliable and more frequent SEPTA service and saving an estimated 4 to 7 minutes for southbound trips ending at Wilmington Station.
- **Holly-Bell-Landlith Improvement Project:** This project eliminates a bottleneck north of Wilmington by adding a third track in this location, offering Amtrak and SEPTA greater flexibility and schedule reliability.
- **Harrisburg Line: Station Accessibility Program – SEPTA-led stations (Villanova, Malvern, Devon, and Wynnewood):** The project will make the stations fully ADA accessible with high-level platforms, improve the customer experience, and bring the stations into a state of good repair.
- **Morrisville Yard:** This project will provide additional train storage and capacity at Trenton Transit Center by providing a new SEPTA facility at Morrisville Yard adjacent to NJ TRANSIT's facility.

Figure 7-1: MAN Special Project Groups and Benefits



MAN Special Project Groups

(See Appendix for full list of projects)

- | | |
|----------------|----------------|
| 1 Morrisville | 9 Coatesville |
| 2 Bristol | 10 PennDOT ADA |
| 3 Philadelphia | 11 Potts |
| 4 Hook | 12 Bryn Mawr |
| 5 Claymont | 13 Zoo |
| 6 Wilmington | |
| 7 Ragan | |
| 8 Royalton | |

MAN 2035 Benefits



More frequent service

- More service on all three SEPTA lines
- Amtrak service increase 48% on the NEC and Harrisburg Line
- NJ TRANSIT service increase 67% on Atlantic City Line



Extensions of Service

- SEPTA trains terminating at Marcus Hook extended to Wilmington and Newark, DE
- SEPTA Thorndale trains potential extension to Coatesville



Accessibility and Resilient Design

- All Harrisburg Line stations fully ADA accessible
- Wilmington station ADA accessible

Source: C35 Analysis, 2021

MAN Capital Renewal Highlights

Capital renewal in the MAN territory includes upgrades to nearly 100 percent of the communications, signals, and power supply assets (including signal bridges, catenary hardware and wire, transmission wire, ABS, and interlockings). Work also renews the 237 culverts in the territory. There are approximately 440 undergrade bridges within MAN, the greatest number of any territory. C35 will make significant progress in bringing these critical infrastructure elements to a state of good repair, with approximately 14 percent programmed for replacement.

Figure 7-2: MAN Estimated Assets Replaced in Territory

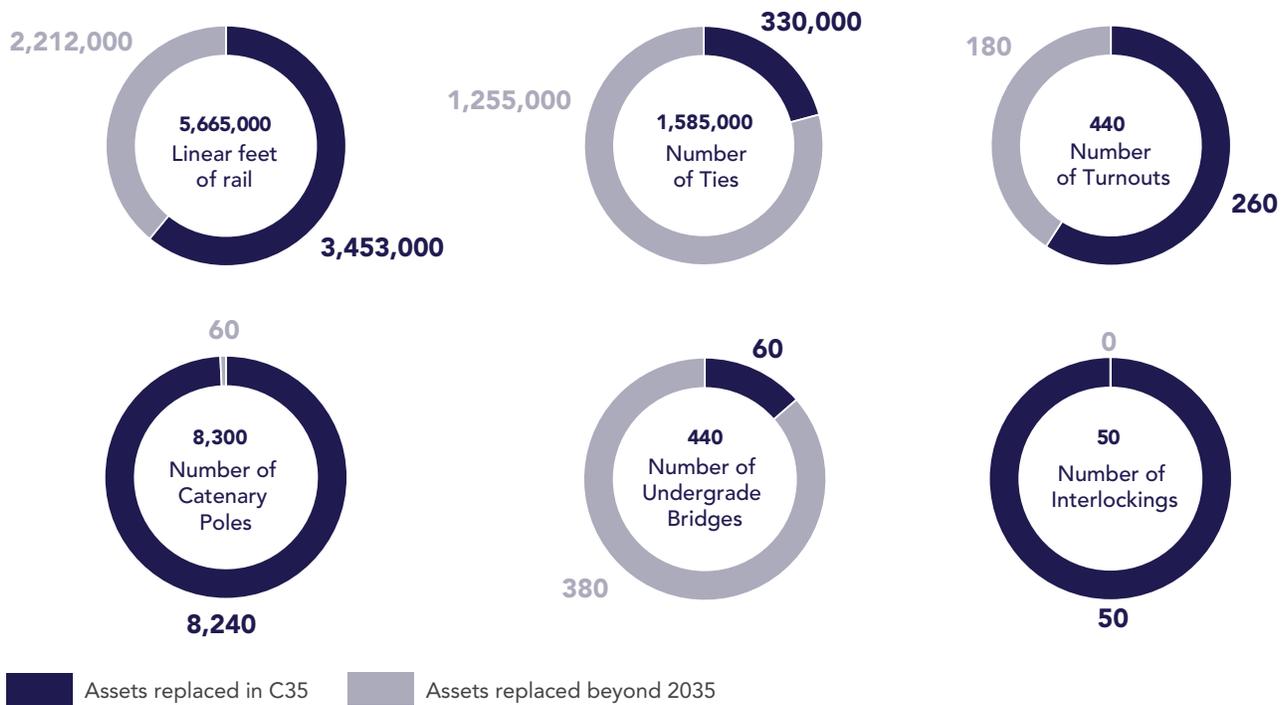
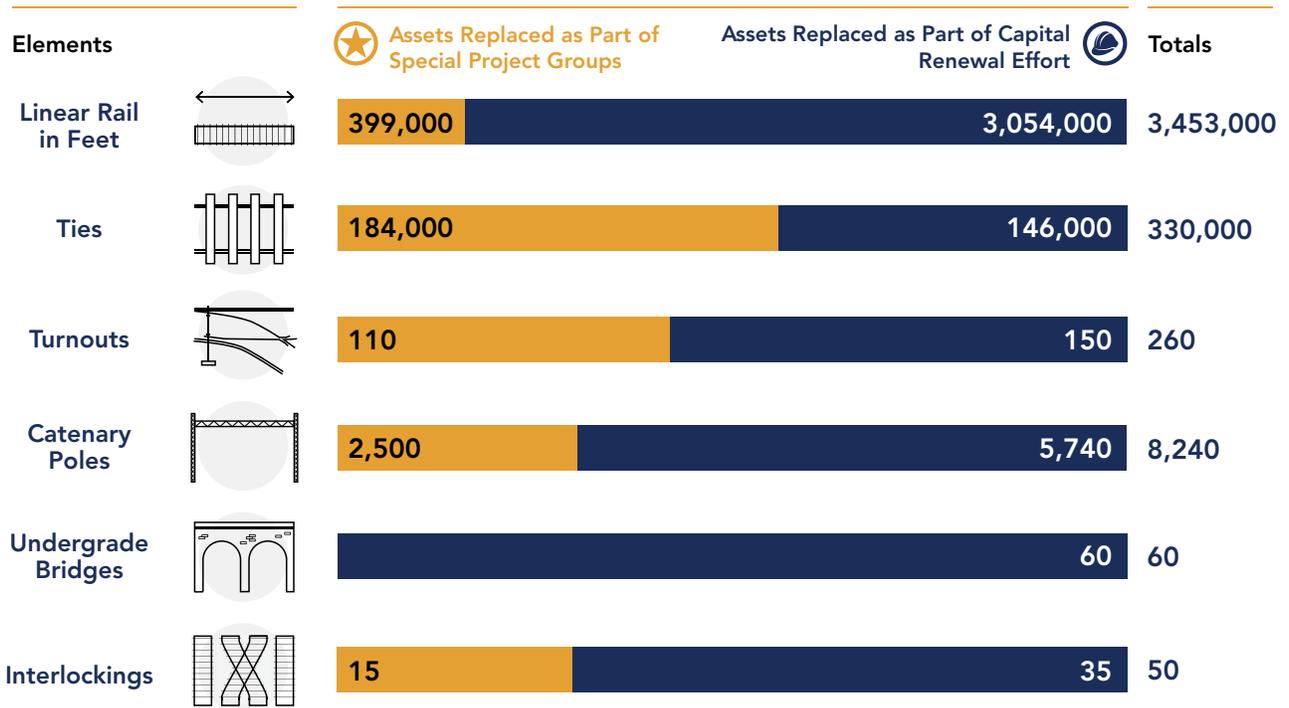


Figure notes:

1. Number in center of circle represents total assets
2. Numbers rounded

Source: C35 Analysis, 2021

Figure 7-3: MAN Estimated Assets Replaced in Special Project Groups and Capital Renewal Programs



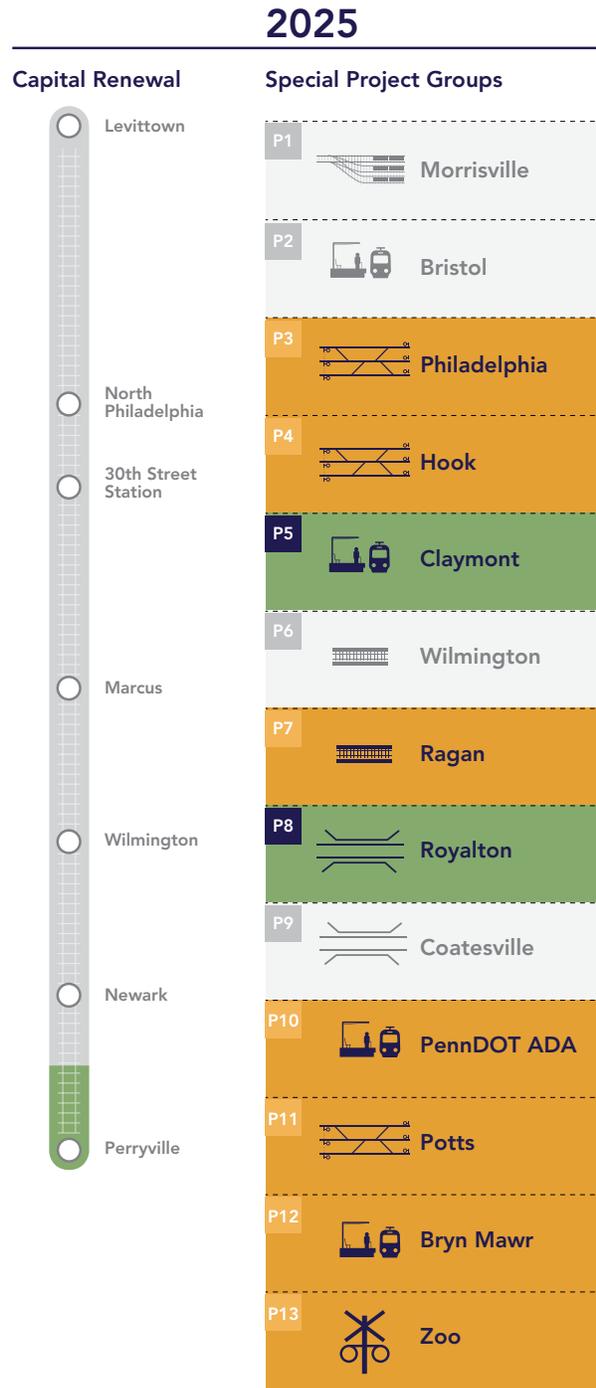
Source: C35 Analysis, 2021

Schedule of Investments

The C35 plan sequenced 13 special project groups and 32 capital renewal programs in MAN, and evaluated temporary construction-related service adjustments and permanent service benefits. Special projects and capital renewal, such as the Harrisburg Line Paoli Interlocking Improvements and Paoli to Thorndale Catenary Replacement, were analyzed collectively and sequenced to maximize productivity of track outages, minimize service disruption, and create overall project delivery efficiencies in MAN. The C35 plan does require some peak-period service reductions for SEPTA, NJ TRANSIT, and Amtrak to allow for necessary track outages longer than a midday, overnight, or weekend period.

The roadmap for future project delivery provides an initial schedule timeline for efficient construction of special projects and capital renewal over the 15-year period.

Figure 7-4: MAN Estimated Initial Timeline Capital Renewal and Special Project Groups



Initial analysis results to be updated in C37

Source: C35 Analysis, 2021

Capital Renewal

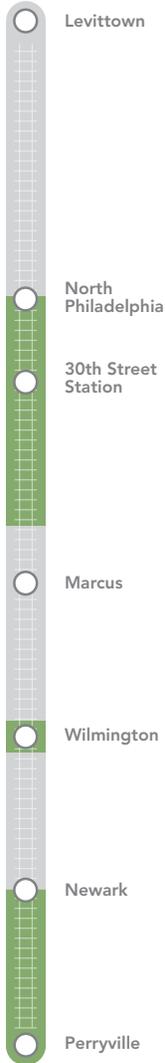
- Complete
- Not Complete

Special Project Groups

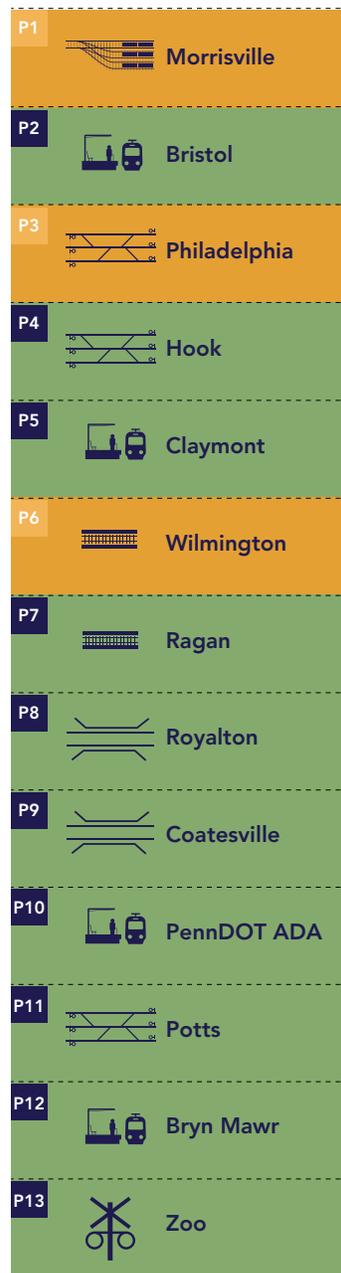
- Complete
- Ongoing
- Not Started

2030

Capital Renewal

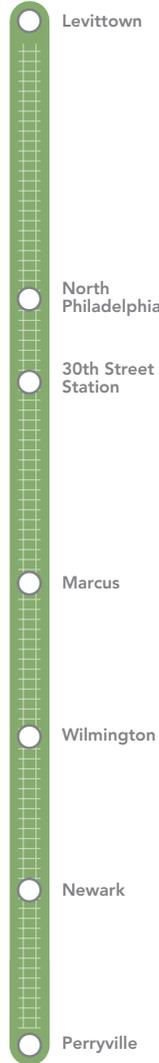


Special Project Groups



2035

Capital Renewal



Special Project Groups

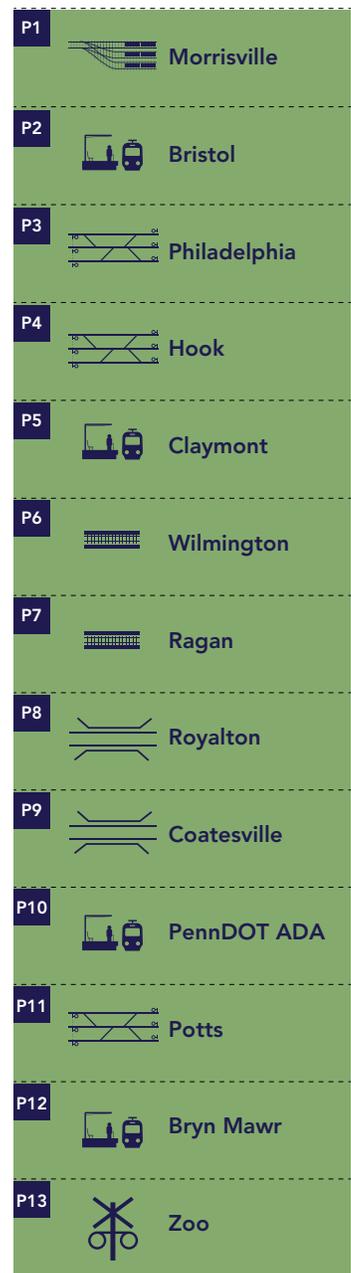
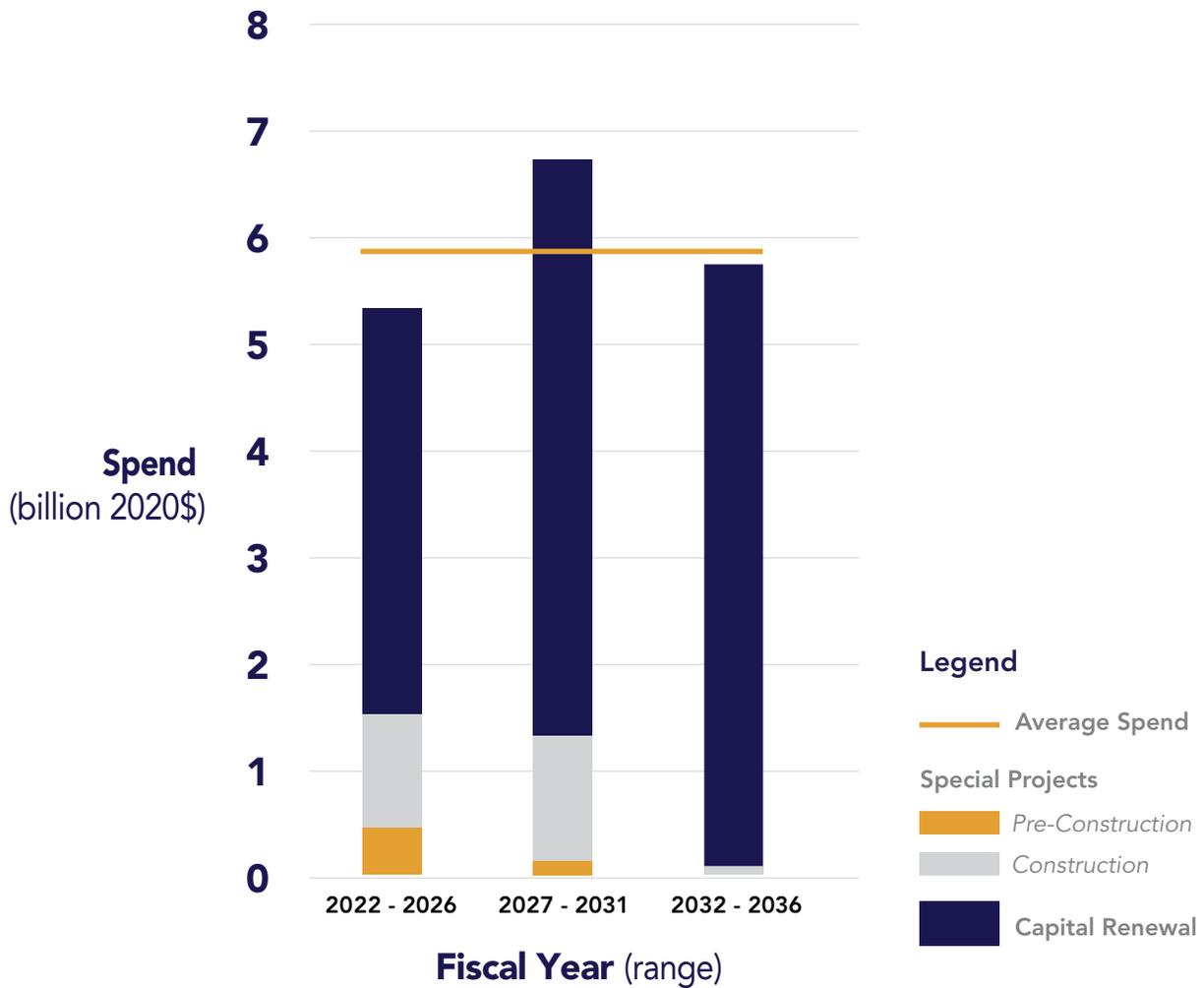


Figure 7-5: MAN Estimated Total Capital Costs – 5 Year Increments

If the C35 project delivery sequence is followed, investment in this territory will be as much as \$18 billion total over 15 years.



Source: C35 Analysis, 2021



Harrisburg Line interlocking (PA)

Improve Mobility and Connections

Reliable Service

In FY2019 SEPTA trains were delayed over 2,600 hours and 13 percent of trains were late.⁸⁰ By bringing the territory to a state of good repair, risks of unexpected delay due to infrastructure and systems limitations will be dramatically reduced.



The C35 analysis of Amtrak 2019 dispatch data identified seven key locations that contributed to Amtrak and SEPTA train delay. Congestion and resulting delays occur in the MAN territory due to two-track operations in some segments, few interlockings that allow trains to shift between local and express tracks, and a limited number of turnback tracks where service can be originated/terminated without delaying other through trains. As a result, congestion occurs from operations associated with turning trains, switching tracks, or serving stations. The C35 plan will unlock these key capacity chokepoints by advancing several congestion relief projects. The new Cornwells Heights Interlocking and Turnback is an example of a C35 project that allows trains to turn without affecting mainline operations. Similarly, a plan by DeIDOT and SEPTA to eliminate all Marcus Hook train turns (which can cause delays to Amtrak and other SEPTA trains) and operate through to Wilmington on a new/upgraded dedicated third track will reduce congestion. The Holly-Bell-Landlith Improvement project will reduce sources of delay at this location by about 25 percent by limiting the need to hold southbound SEPTA trains at Holly Interlocking or northbound trains at Wilmington due to mainline traffic.

Figure 7-6: MAN Estimated Delay Relief Improvements

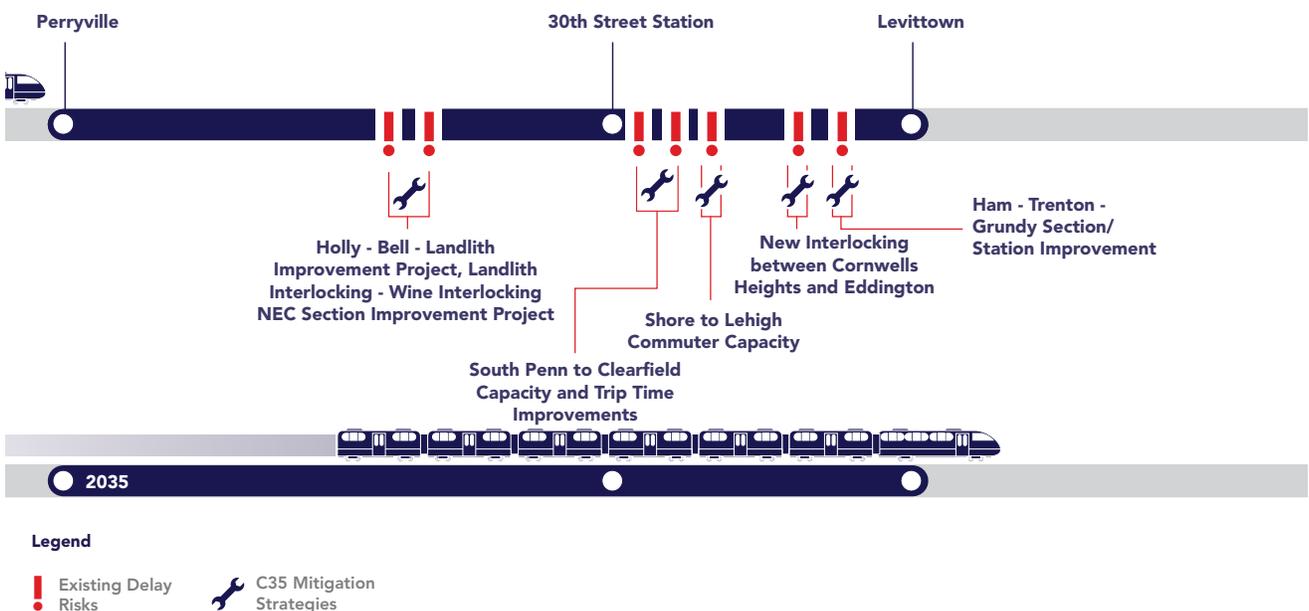


Figure note: Connecting corridors not included

Source: C35 Analysis, 2021

New Services

C35 improvements lay the foundation for advancing possible SEPTA service extensions on the Harrisburg Line from Thorndale (the last SEPTA station) to Amtrak's Coatesville Station, allowing for the possibility of an additional extension to Parkesburg in the future. The existing SEPTA Wilmington Line trains that terminate at Marcus Hook Station will be extended to Wilmington or Newark, DE in the 2035 plan.

Frequent Service

C35 special projects and capital renewal enable more frequent service across MAN. Maximum time between trains for SEPTA passengers traveling from Philadelphia on all lines will be reduced overall from 20 to 17 minutes in the reverse direction morning peak period (averaged for all NEC stations).

C35 will add tracks and interlockings, and upgrade communications and signals in the MAN territory to enable more frequent service across the territory. This includes enhanced Acela frequencies from Philadelphia, PA south to Washington, DC and north to New York via expansion of the NEC from two tracks to three between Marcus Hook and Wilmington. Under C35, Amtrak service, including the NEC mainline and Harrisburg line, will grow from 52 to 77 daily revenue round trips (48 percent increase). All three SEPTA lines (Trenton, Wilmington-Newark, and Paoli-Thorndale) will have increased frequencies after C35 projects are implemented and NJ TRANSIT Atlantic City Line service will expand to all-day hourly service. SEPTA service will increase 10 percent, growing from 107 to 118 trains per day (with additional service expansion by extending existing trains to Wilmington and Newark, DE), and NJ TRANSIT Atlantic City Line service will increase from 12 to 20 trains per day (67 percent).

The Harrisburg Line will also be improved, with upgrades to interlockings, track, and the signal system, including replacement of some of the last unidirectional signaling on the NEC with bidirectional signaling. These improvements support additional SEPTA peak-hour service and enhanced Amtrak Keystone service that will operate hourly off-peak, and twice hourly in the peak.

Figure 7-7: MAN Estimated AM Reverse-Peak Maximum Time Between Trains Averaged Across All NEC Stations (minutes)



Figure note: Actual times will vary by destination.

Source: C35 Analysis, 2021

Figure 7-8: MAN Estimated Daily Revenue Round Trips

26% increase in daily revenue round trips across the MAN network by 2035

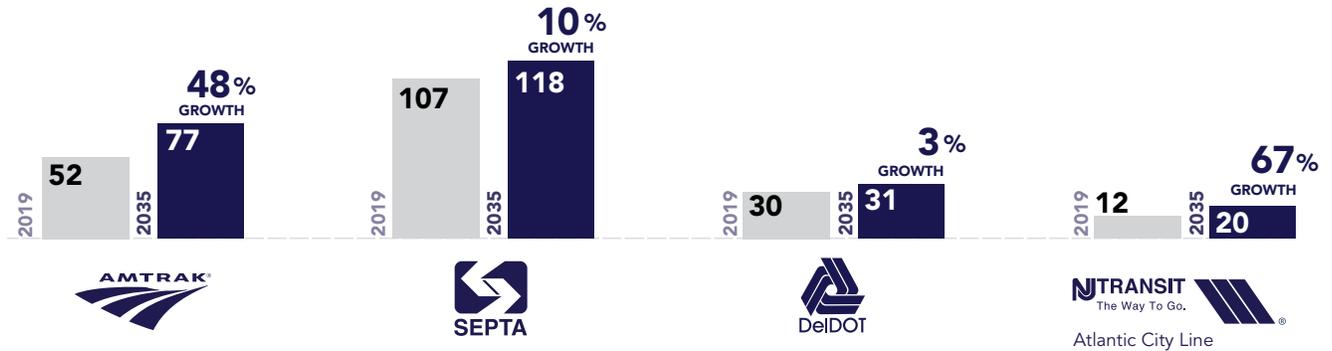


Figure Note: SEPTA included in DelDOT, DelDOT included in SEPTA
 Source: C35 Analysis, 2021

Service Growth between Cornwells Heights and Trenton

The flexibility provided by C35 improvements would allow for southbound trains from Trenton, NJ every 20 minutes in the morning rush hour, every hour at other times, and every 30 minutes from Cornwells Heights throughout the day and evening. Some existing local SEPTA trains from Trenton will become new express service in C35, skipping inner zone stations to be served instead by the new trains originating at Cornwells Heights.



Amtrak Keystone Service departing Paoili Station (PA)

Faster Service

As a result of C35 improvements, Acela service will be approximately 15 minutes faster between New York City and Philadelphia, PA and 11 minutes faster between Philadelphia, PA and Washington, DC. Acela service will benefit from curve speed improvements as well as a new constant tension catenary system that allow for speeds greater than the current maximum 135 mph in the MAN territory. Overall, Amtrak Acela service will experience travel time savings of seven minutes in the MAN territory.

The C35 analysis shows that improvements at Landlith Interlocking (Holly-Bell-Landlith) that reconfigure crossovers and add a third track to the NEC could play a role in providing travel time savings and better on-time-performance. These improvements will eliminate or mitigate delays that currently hold each SEPTA and Amtrak train an average of 3.25 minutes at this location, which totals over roughly 35 train hours of delay each year. Overall, C35 improvements in MAN territory could mitigate or eliminate delays that currently total over 1,152 train hours of total annual delay and allows schedules to be adjusted accordingly to speed service.

If the C35 plan is implemented, MAN will benefit from a more reliable railroad with fewer service disruptions and delays. This can translate to even faster commuter travel times, and schedules could be modified to eliminate extra time built in to recover from recurring or typical delays. The C35 analysis did not yet incorporate this improvement and future analyses will revisit commuter operating schedules and potential travel time savings.

Station Improvements

All Harrisburg Line stations will be fully ADA accessible with high-level platforms for step-free boarding. Wilmington Station improvements will include ADA accessibility improvements, high-level platforms, platform extensions, and track geometry improvements to improve the customer experience and allow for greater flexibility of operations at the station.

Figure 7-9: Travel Time Improvements (PHL-DC and PHL-NYC)

Amtrak Acela Philadelphia 30th Street to Washington Union Station



Amtrak Acela New York Penn Station to Philadelphia 30th Street



Source: C35 Analysis, 2021

Create Economic Opportunity

Job Creation

The C35 investment will generate nearly 173,000 total new jobs (direct construction-related, indirect [non-construction] and induced) in MAN territory over the 15-year plan or an average of over 11,500 jobs per year. These jobs will in turn generate over \$10.5 billion in earnings throughout the territory over the 15-year period.

Delivering the C35 plan will require an estimated average of 1,600 specialized railroad construction jobs each year, well in excess of current staffing levels. Workforce development initiatives are necessary to make sure opportunity is afforded to residents within the MAN territory to fill the skilled workforce needs of the C35 plan.



Equity and Access

The NEC serves diverse populations in MAN. While C35 will improve rail for higher income Acela riders with speedier intercity service, an estimated 75 percent of riders in MAN use SEPTA services which create access to economic opportunity for a variety of high, medium, and lower income communities.

The MAN territory has some of the highest concentrations of poverty and lower income communities along the NEC. Twenty-three percent of residents within three miles of an NEC or connecting corridor station in the MAN territory are low-income (defined as household income less than 150 percent of the federal poverty rate), and almost 50 percent are minorities.⁸¹ Living within a three-mile radius of an NEC station provides an opportunity to link residents with economic and learning opportunities along the corridor.

These demographics are reflected in SEPTA regional rail ridership through the territory. Fifty-four percent of SEPTA riders are low-income (household income less than \$50,000 per year) and 46 percent of riders are from minority groups. Service improvements will offer more access to opportunities for these communities.⁸²

The station accessibility program for the Harrisburg Line will make four more stations along SEPTA's Paoli/Thorndale line ADA accessible (Villanova, Malvern, Devon, and Wynnewood). The line is the busiest in the SEPTA regional rail network, serving over 20,000 weekday passengers in 2018.⁸³



Exterior of Wilmington Station (DE)

Supporting Wilmington's Economy

Wilmington is the largest city in Delaware - a smaller city with economic influence regionally and nationally. Within walking distance of Wilmington Station are 16,000 jobs, 32 percent of which are in the financial services and insurance sectors.⁸⁴ Downtown Wilmington is home to 25 nationally recognized firms in these sectors that are closely integrated into the wider Northeast Corridor economy.⁸⁵ Key factors for financial services firms locating in Wilmington include access to the cluster of specialized financial services talent and convenient access to New York City and to Washington, DC via Amtrak.

Amtrak offers frequent regional and Acela service to Wilmington. Face-to-face meetings remain essential for financial services companies making large-scale decisions where it is weighing risks and alternatives.⁸⁶ Enhanced Acela frequencies and an overall 26 minutes of travel time savings between New York, Wilmington, and Washington, DC enabled by C35 improvements will support the continued growth of financial services and other knowledge economy industries in Wilmington.

Combat Climate Change

Reduced Carbon Footprint

C35 improvements support many of the environmental goals in the MAN territory. The Pennsylvania Climate Change Act of 2008 required an inventory of GHG emissions updated annually and a Climate Change Action Plan updated every three years.⁸⁷ The Pennsylvania Climate Action Plan released in 2018 identifies GHG reduction goals of 26 percent reduction in GHG emissions by 2025, and 80 percent reduction in GHG emissions by 2050. The plan also identifies strategies for adapting to climate change impacts and reducing pollution, including reducing vehicle miles traveled for single-occupancy vehicles.⁸⁸ In Delaware, the Cabinet Committee on Climate and Resiliency implements and carries out the 2013 Executive Order Preparing Delaware for Emerging Climate Impacts and Seizing Economic Opportunities from Reducing Emissions. The committee identified a GHG reduction goal for Delaware of 30 percent reduction by 2030 and developed a climate action plan to achieve that goal.⁸⁹ Improvements to the rail infrastructure in this territory will support more reliable travel and less disruptions in service, resulting in more resilient rail system. These factors aim to attract more commuters to rail that will ultimately support efforts to combat climate change.



Resilient Infrastructure

The replacement of crucial infrastructure in the MAN territory will reduce disruptions to service and preserve the reliability and resiliency of the system for years to come. C35 provides an opportunity to address areas subject to inundation through hardened and more resilient infrastructure. The Claymont Regional Transportation Center project replaces the existing Claymont, DE train station. The existing station does not meet current accessibility standards and suffers from a pedestrian tunnel that is subject to flooding because of the high water table. The new station will increase passenger safety and provide a more resilient facility for rail passengers.

Support Desirable Cities and Communities

Station Area Development

The Trenton Transit Center, the twelfth busiest station in the NJ TRANSIT system, provides a key link between Amtrak, NJ TRANSIT, and SEPTA. Governor Phil Murphy emphasized this, noting that it is a 'critical component of our transit system...while also serving as a gateway between the New York City and Philadelphia, PA metropolitan areas.'⁹⁰ The city of Trenton, NJ has recognized the importance of this key connection, designating the area around the station as a Downtown Transit Village neighborhood, a focus area for redevelopment and increased density.⁹¹ A 2018 Strategic Action Blueprint from 2018 provides guidance and strategies for ensuring that development around the station is of high-quality design and is walkable, mixed-use, and welcoming to pedestrians and cyclists.⁹²

In Wilmington, DE, an effort to revitalize the city's riverfront has enhanced the city while creating new job opportunities. Originally a busy industrial zone, activity at Wilmington's riverfront slowed by the 1980s and many businesses vacated the area. In the 1990s, a decision was made to redevelop the riverfront, which is directly adjacent to Wilmington Station, into an economic and tourism hub. Now home to new residences, and retail, cultural, and recreational destinations, the redeveloped riverfront has successfully attracted new businesses and corporate headquarters. Between 2011 and 2017, employment on the riverfront increased by almost 1,750 jobs. Additionally, the average salary of riverfront employees grew from \$31,800 in 1997 to \$82,000 in 2017, primarily thanks to new high-skill, high-wage jobs at financial and insurance service companies.⁹³ Similar place-based planning efforts can leverage the benefits afforded by C35 to revitalize other cities in the MAN that have experienced population or job loss in recent years.



Philadelphia's 30th Street Station is the nexus of several major developments that connect downtown Philadelphia with the Schuylkill riverfront and University City. Amtrak's 30th Street District Plan envisions that the area surrounding the station will have 8.1 million square feet of residential development, 6.3 million square feet of office space, and 3.9 million square feet of hotel and retail space.⁹⁵



Rendering from 30th Street District Plan (PA)

One of the projects adjacent to 30th Street Station is Schuylkill Yards, a mixed-use community currently under development. The site covers 14 acres and when completed will include housing, office space, retail, and community amenities. This project, estimated to take 20 years to complete at an estimated \$3.5 billion, promotes NEC access at 30th Street Station as a major benefit of the development.⁹⁴

Innovation Districts

The cornerstone industries of the MAN territory, including healthcare, finance, education, management, arts, and entertainment, will benefit from the service enhancements that C35 will bring. There is already a strong relationship between medical and research institutions in Philadelphia and Delaware. The University of Delaware's Science Technology and Advanced Research (STAR) Campus is a 272-acre campus focused on fostering collaboration between researchers at the University and private-sector and governmental partners. It is located directly adjacent to

the Newark Amtrak and SEPTA regional rail station. The University also has partnerships with Thomas Jefferson University Hospital in Philadelphia and Maryland’s Aberdeen Proving Grounds, and considers rail service a critical part of its strategy to attract corporate partners based in Baltimore, Philadelphia, and elsewhere.⁹⁶ C35 will increase frequencies and add express service between Philadelphia and Newark, DE, providing better access to the STAR Campus and helping facilitate the increased exchange of knowledge among researchers, businesses, and other partners.

The amenities, office space, and lab space in the new developments surrounding 30th Street Station will attract businesses in the science and technology industries, providing new job opportunities for graduates of nearby Drexel University and University of Pennsylvania. Proximity to the NEC will provide the science and technology companies who choose to locate here with direct linkages to other science and technology hubs throughout the Northeast.



University of Delaware STAR Campus Building (DE)

CHAPTER 8

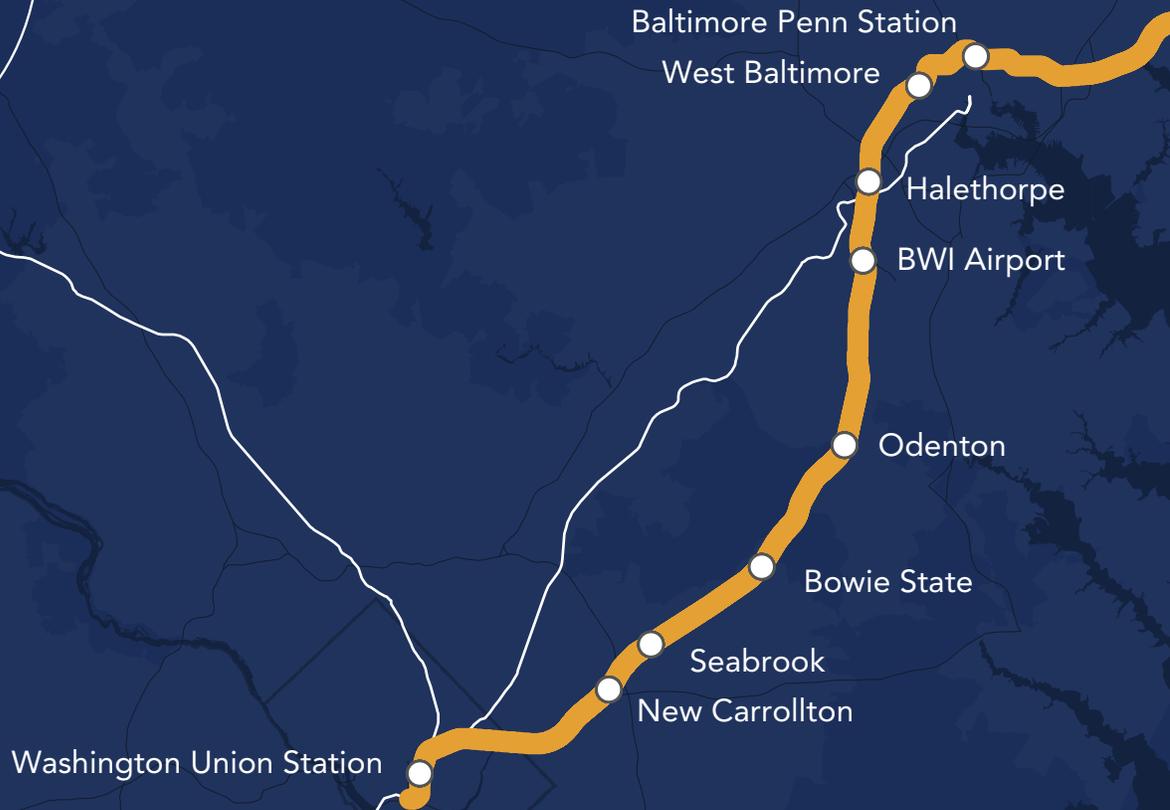
Mid-Atlantic South



MD

VA

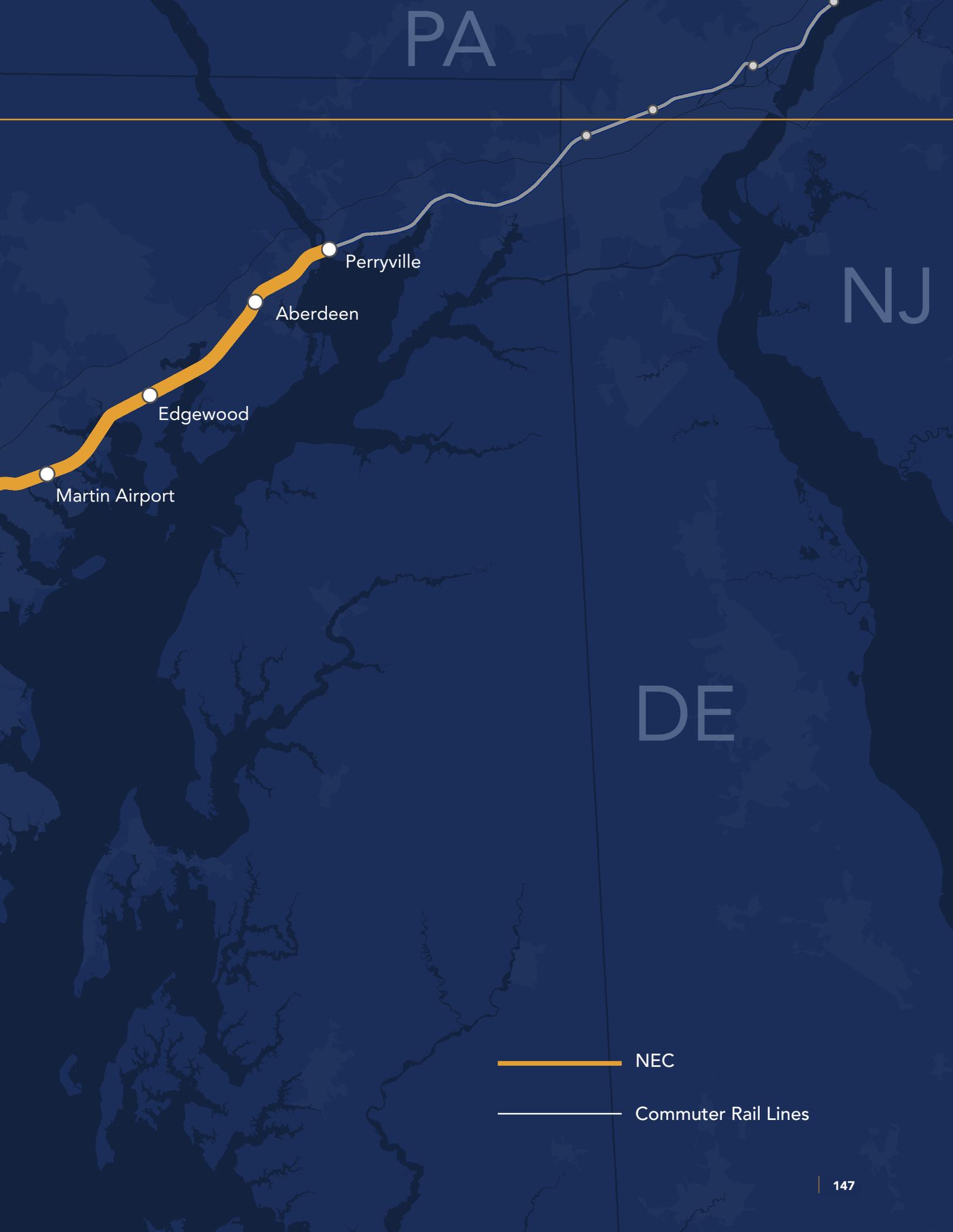
DC



PA

NJ

DE



— NEC

— Commuter Rail Lines



A MARC train on the NEC

Overview

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The Mid-Atlantic South (MAS) territory extends from Washington Union Station (WAS) in the south to Perryville, MD in the north. Amtrak owns the right-of-way infrastructure in this territory with special projects coordinated by MARC, VRE, and Amtrak. WAS serves 50,000 trips a day and is a key intermodal node connecting Amtrak, Maryland Area Regional Commuter (MARC), and Virginia Railway Express (VRE) commuter rail services, Washington Metropolitan Area Transportation Authority (WMATA) buses and metro, and various intercity bus services.⁹⁷ WAS is also the gateway to the NEC for many Amtrak services from Virginia, North Carolina, and other points south.

.....



Amtrak Susquehanna River Bridge (MD)

MAS service is challenged by aging and outdated infrastructure including the Baltimore and Potomac (B&P) Tunnel and Susquehanna River Bridge. The B&P Tunnel has the lowest non-terminal speed restriction on the NEC and service suffers from delays due to ongoing repairs. The current aging signal system and the two-track segment between New Carrollton, MD and WAS restrict service frequency in this territory.

The implementation of the C35 plan in MAS will provide a doubling of peak-period service frequency, new ADA-accessible stations, faster trains, and shorter commute times.



Passengers leaving Washington Union Station (DC)

MAS Project Highlights

The MAS territory is the southern anchor of the NEC and connects points north with the metropolitan areas of Washington, DC and Baltimore, MD. The Washington, DC metro region, with nearly 6.3 million residents,⁹⁸ is home to 3.1 million jobs with a robust federal employment sector and a diverse defense, research, education, and technology economy.⁹⁹ As the U.S. capital, the region draws over 20 million tourist- and business-related trips a year.¹⁰⁰ Metropolitan Baltimore, with over 2.8 million residents,¹⁰¹ has over 1.3 million jobs in one of the nation's leading centers for education, life science, and medical research.¹⁰²

The District of Columbia State Rail Plan (released in 2017), quantified this benefit to the capital region, noting that MARC and VRE riders annually add a combined \$1.64 billion to Washington, DC's economy,¹⁰³ a significant benefit that would be lost if these rail systems could not provide a reliable source of travel.

MAS Special Project Highlights

- **The B&P Tunnel Replacement** – Replaces the functionally outdated, low speed, two-track, mile-and-a-half-long B&P Tunnel constructed in 1873 with a modern higher speed, two-mile-long tunnel. The new Frederick Douglass Tunnel will reduce trip times for more than 22,000 daily passengers by permitting speeds up to 100 mph, a dramatic improvement from the current maximum speed of 30 mph, the lowest non-terminal speed on the NEC.
- **Susquehanna River Bridge Replacement (Phases 1 and 2)** – In Phase 1, this project improves speed and reliability by replacing the existing two-track movable Susquehanna River Bridge with a modern, two-track, high-level, fixed structure. Phase 2 of this project will add a second two-track bridge to facilitate higher speeds and increase capacity.
- **Baltimore Penn Station Infrastructure Improvements** – In addition to track, signal, and electric power supply improvements, this project includes the construction of two new high-level platforms.
- **Baltimore Penn Station Capacity Project** – Improves station capacity by doubling access to high level platforms. Reconfigures two interlockings, Charles and Paul, to support higher speeds and allow simultaneous train overtakes, such as Acela overtaking Regional service. This will also support expanded MARC through trains and Baltimore originations/terminations.
- **Wilkins Interlocking Project** – Creates first half of a new universal interlocking which would improve operational flexibility and provide connectivity needed for the Penn-Camden Connector Project. It also provides temporary crossovers to support construction phasing of the B&P Tunnel replacement.
- **Washington Union Station Improvement Projects** – This station will be modernized to improve the passenger experience, add tracks and platforms to expand capacity, and ensure efficient operations at this key railroad hub.
- **Maryland to Delaware Capacity and Performance Planning Study** – Study of options to accommodate a future higher speed segment between Maryland and Delaware.

Figure 8-1: MAS Special Project Groups and Benefits



MAS Special Project Groups

(See Appendix for full list of projects)

- | | |
|---------------|------------------|
| 1 Susquehanna | 7 Baltimore |
| 2 Aberdeen | 8 New Carrollton |
| 3 Bush | 9 Washington |
| 4 Edgewood | 10 MAS Planning |
| 5 Gunpowder | 11 Anacostia |
| 6 Martin | |

MAS 2035 Benefits



More Frequent Service

- Twice as much MARC commuter service at WAS and Baltimore Penn Station



Upgrade and Replace Aging Assets

- All Major Backlog projects complete



Accessibility and Resilient Design

- High level platforms at West Baltimore, Martin Airport, Edgewood, and Aberdeen

Source: C35 Analysis, 2021

MAS Capital Renewal Highlights

The capital renewal programs in MAS include major upgrades to communications, signals, and electric power supply assets. Nearly 100 percent of the catenary system constructed between the 1920s and 1930s is scheduled for replacement, in addition to electric transmission lines and substations providing power. All signals and communications systems within this territory are also scheduled for replacement. These critical systems improvements will allow for higher speed and more reliable operations.

The MAS territory includes approximately 125 undergrade bridges, many of which date back to the original construction by the Pennsylvania Railroad. Approximately 12 percent are estimated for replacement in the C35 Plan.

Figure 8-2: MAS Estimated Assets Replaced in Territory

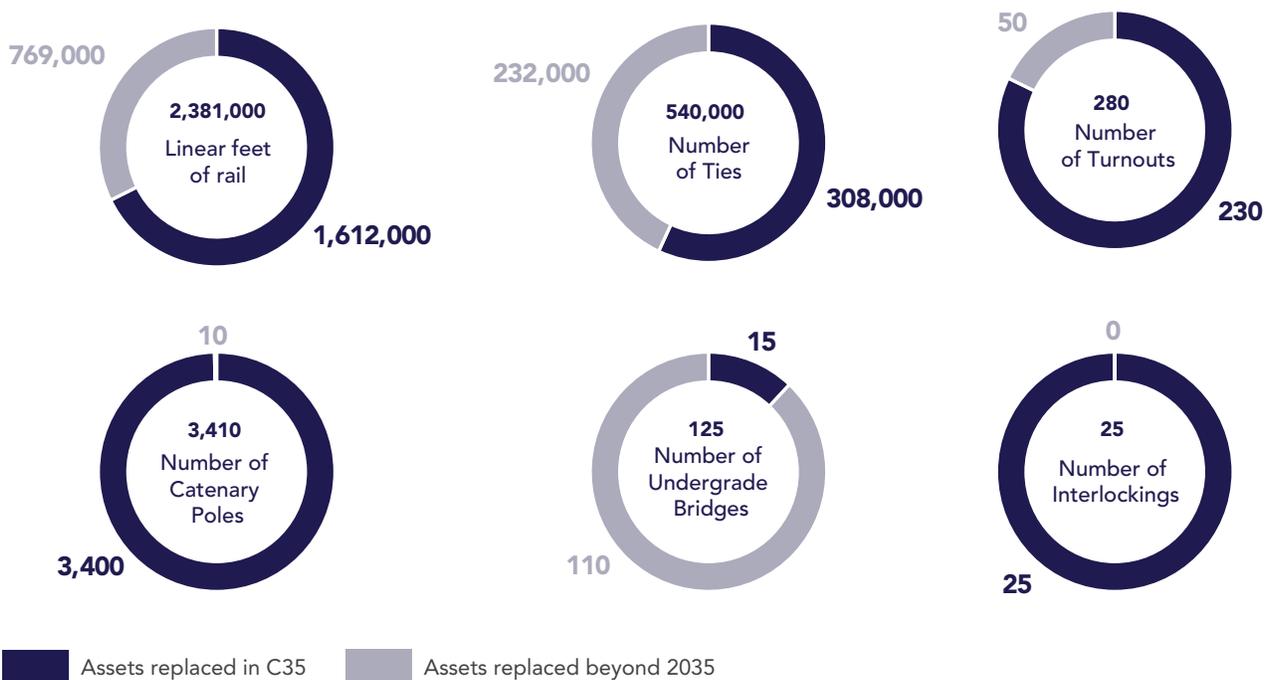
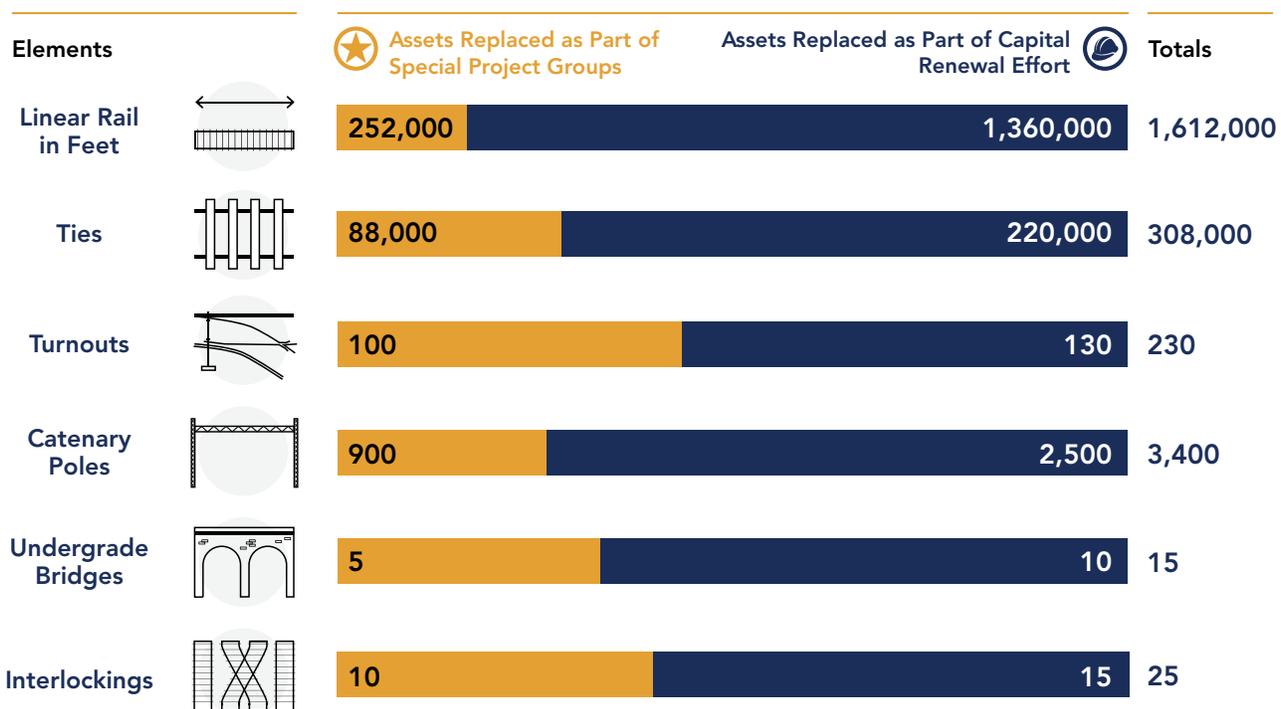


Figure notes:

1. Number in center of circle represents total assets
2. Numbers rounded

Source: C35 Analysis, 2021

Figure 8-3: MAS Estimated Assets Replaced in Special Project Groups and Capital Renewal Programs



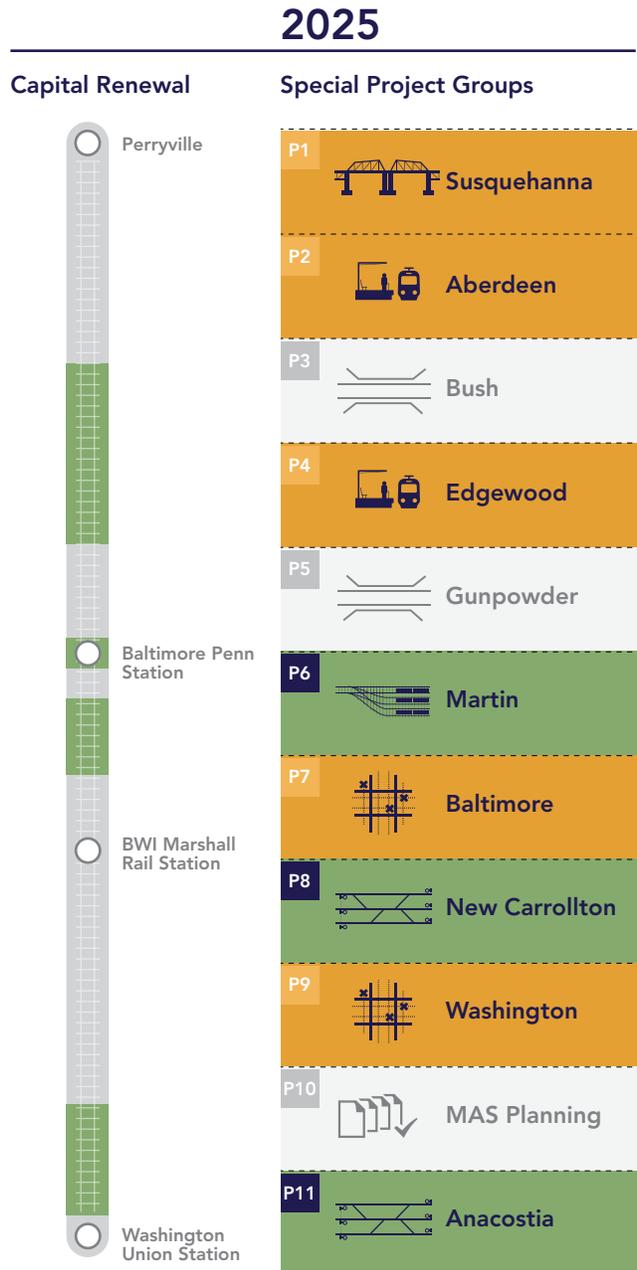
Source: C35 Analysis, 2021

Schedule of Investments

The C35 plan sequenced 11 special project groups and 12 capital renewal programs in MAS, and evaluated temporary construction-related service adjustments and permanent service benefits. Special projects and capital renewal, such as the replacement of the B&P Tunnel and the Susquehanna River Bridge, were analyzed collectively and sequenced to maximize productivity of track outages, minimize service disruption, and create overall project delivery efficiencies in MAS. The C35 plan does require some peak-period service reductions for both MARC and Amtrak to allow for necessary track outages longer than a midday, overnight or weekend period.

The roadmap for future project delivery provides an initial schedule timeline for efficient construction of special projects and capital renewal over the 15-year period.

Figure 8-4: MAS Estimated Initial Timeline Capital Renewal and Special Project Groups



Initial analysis results to be updated in C37

Source: C35 Analysis, 2021

Capital Renewal



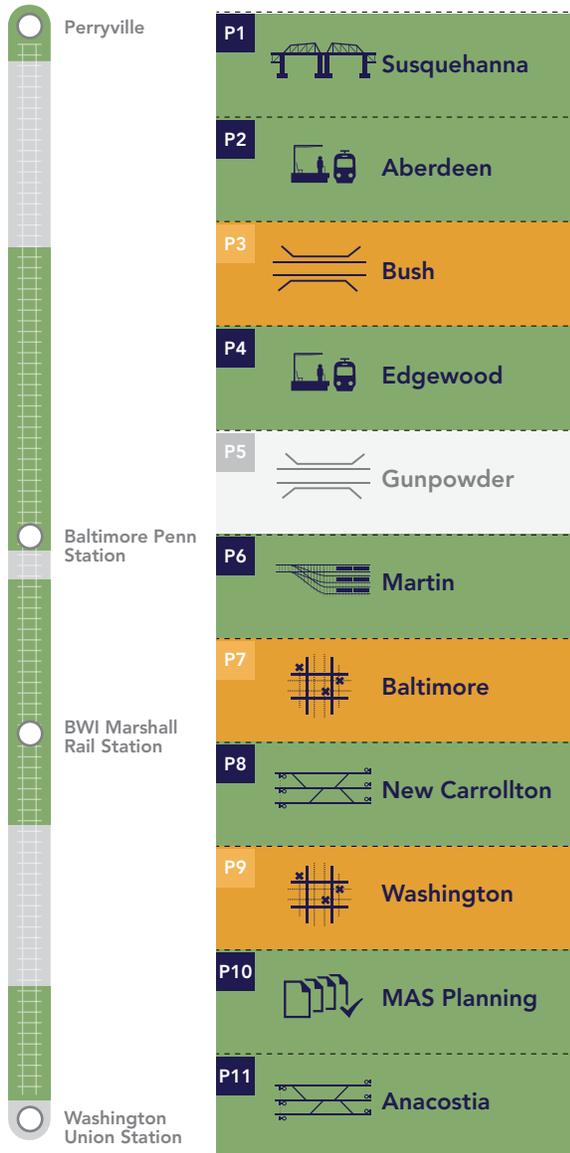
Special Project Groups



2030

Capital Renewal

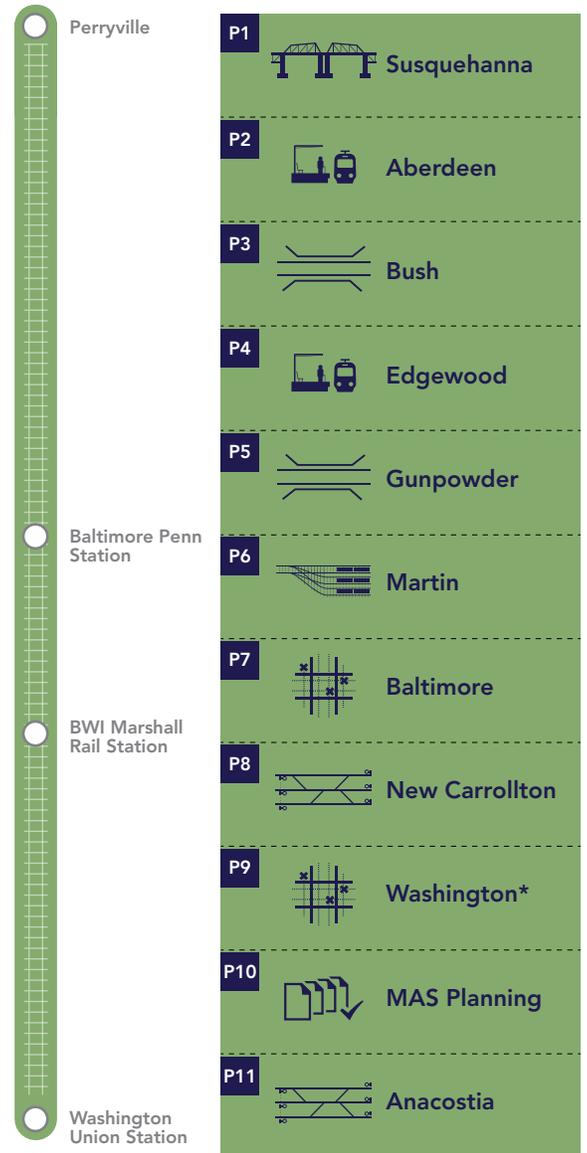
Special Project Groups



2035

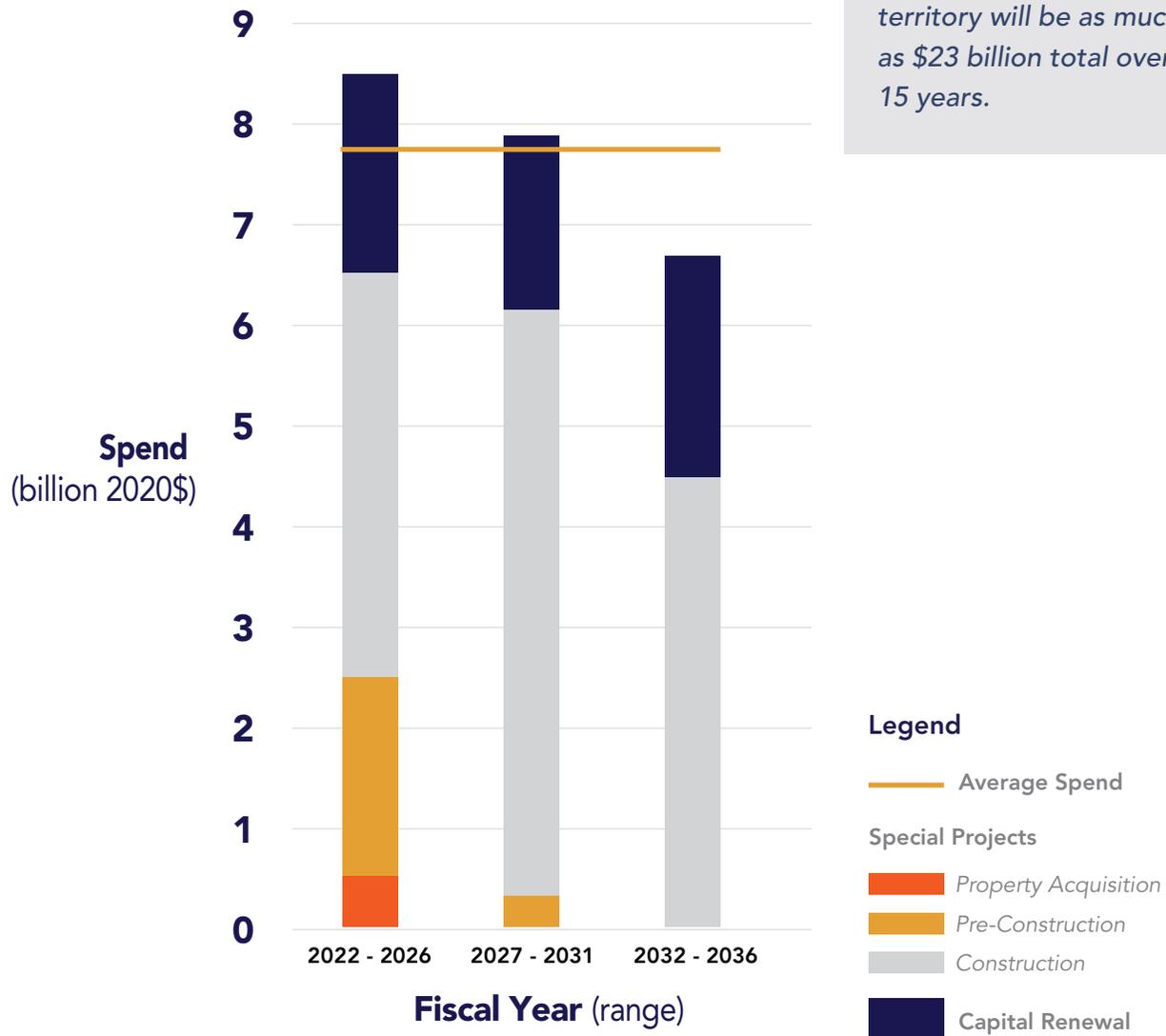
Capital Renewal

Special Project Groups



*Full completion of all phases will occur after 2035

Figure 8-5: MAS Estimated Total Capital Costs – 5 Year Increments



If the C35 project delivery sequence is followed, investment in this territory will be as much as \$23 billion total over 15 years.

Source: C35 Analysis, 2021

Improve Mobility and Connections

Reliable Service

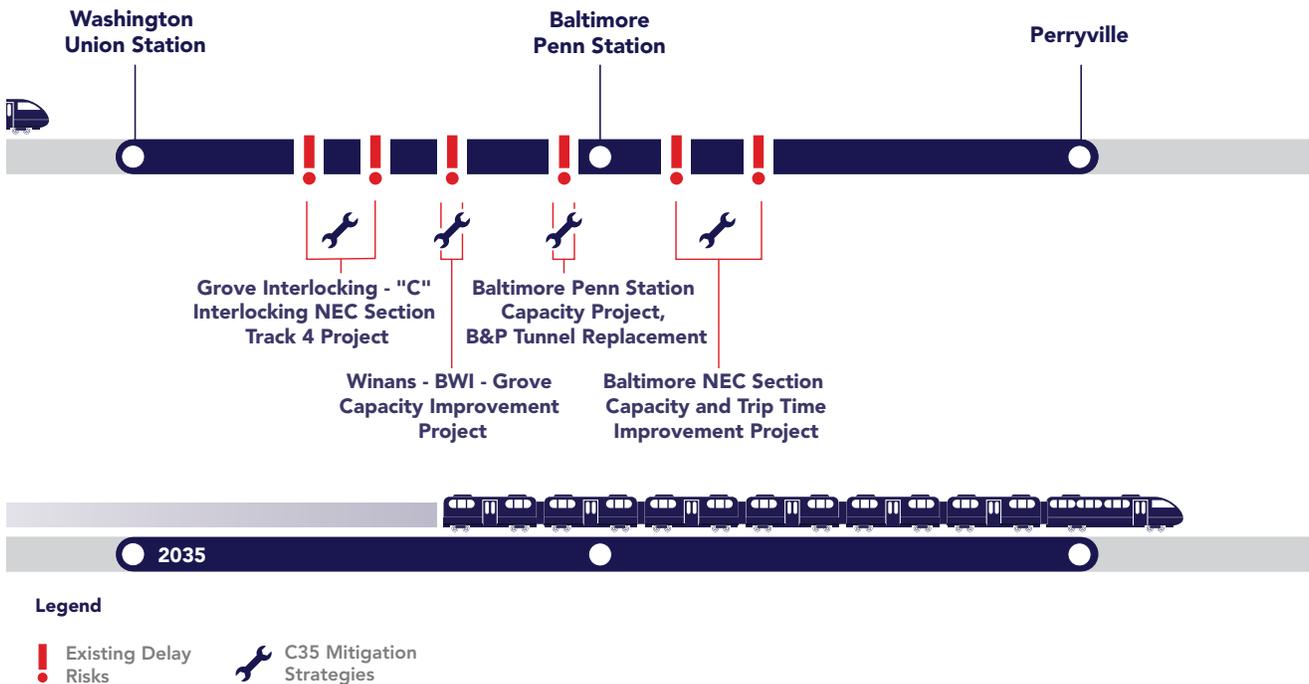
In FY2019 MARC trains were delayed over 1,000 hours and 10 percent of trains were late.¹⁰⁴ The completion of B&P Tunnel and Susquehanna Bridge, major backlog projects and capital renewal investments that bring the corridor to state of good repair, will significantly improve on-time performance and reliability for both MARC and Amtrak trains by 2035.



The C35 analysis of Amtrak 2019 dispatch data identified six key locations that contributed to Amtrak and MARC train delay. The C35 plan will unlock these six capacity chokepoints by advancing new interlockings at Paul, Wilkens, and Grove and infrastructure improvements at Baltimore Penn Station. These upgrades will allow trains to more easily pass each other, avoiding the cascading delays typically experienced during today's service disruptions.

Analysis conducted during the creation of the C35 plan demonstrates that the B&P Tunnel replacement alone could play a large role in mitigating or eliminating delays that currently total over 22,600 train minutes of delay per year (roughly 376 hours).

Figure 8-6: MAS Estimated Delay Relief Improvements



Source: C35 Analysis, 2021



Inside of the B&P Tunnel (MD)

The District Department of Transportation (DDOT) investigated the potential impacts of rail service disruptions in the Washington, DC area. If MARC and VRE commuters were forced to use alternative modes to travel to Washington, DC, the region would miss out on over \$60 million annually in monetary benefits currently provided by commuter rail, including over \$6 million saved in fuel consumption, and over \$6 million in congestion.¹⁰⁵

New Services

The C35 operating plan includes VRE all-day service, providing expanded peak service and new off-peak and reverse-peak service. MARC service includes expanded reverse-peak and off-peak service, doubling daily service between Baltimore and Washington, DC.

Efforts have been underway in the MAS region to study the potential for through-running of MARC and/or VRE services onto each other's networks in order to provide one-seat ride options between places like Baltimore, MD and Alexandria, VA. The C35 plan incrementally lays a foundation for advancing through-running services through investments in signal systems, new interlockings, and station upgrades.

Frequent Service

C35 special projects and capital renewal enable more frequent service across MAS. Maximum time between trains for MARC passengers traveling in the morning reverse-peak direction north from Washington, DC will be reduced from 16 to 13 minutes (averaged for all NEC stations). MARC service at WAS and Baltimore Penn Station will double, VRE will grow by 159 percent, and Amtrak service will increase by 29 percent.

The replacement of existing signals with a high-density signal system on all tracks between the northern limits of “C” Interlocking, near New Carrollton station, and the southern limits of Bridge Interlocking, just south of the B&P Tunnel will be a key investment for unlocking these service frequencies. The new system will allow trains to operate every three minutes instead of today’s every seven minutes.

Figure 8-7: MAS Estimated AM Reverse-Peak Maximum Time Between Trains Averaged Across All NEC Stations (minutes)



Figure note: Actual times will vary by destination.

Source: C35 Analysis, 2021

Figure 8-8: MAS Estimated Daily Revenue Round Trips

78% increase in daily revenue round trips across the MAS network by 2035



Source: C35 Analysis, 2021

Faster Service

As a result of C35 improvements, Amtrak's Acela express service will be 26 minutes faster between PSNY and Washington, DC (15 percent less than current travel time). Though today's Acela vehicles have a top speed of 150 mph, the current top speed in MAS is 125 mph because of the limitations of supporting infrastructure. By 2035, Acela trains will take advantage of C35 investments in smoothing existing curves and replacing the 1930s catenary system to allow speeds of up to 160 mph.

If the C35 plan is implemented, MAS will benefit from a more reliable railroad with fewer service disruptions and delays. This can translate to even faster MARC travel times, and schedules could be modified to eliminate extra time built in to recover from recurring or typical delays. The C35 analysis did not yet incorporate this improvement and future analyses will revisit commuter operating schedules and potential travel time savings.

Station Improvements

WAS has planned platform reconfigurations that allow for faster passenger boarding and alighting and reduced dwell times, eliminate delay risks, and improve the overall customer experience. C35 also includes four station projects that provide high-level platforms at West Baltimore, Martin Airport, Edgewood, and Aberdeen.

Figure 8-9: Travel Time Improvements (DC-NYC)



Source: C35 Analysis, 2021

Create Economic Opportunity

Job Creation

C35 investment will generate 198,000 total new jobs (direct construction-related, indirect [non-construction] and induced) in MAS over the 15-year plan, an average of over 13,200 jobs per year. These jobs will in turn generate \$11.2 billion in earnings throughout the territory over the 15-year period.

Delivering the C35 plan will require an estimated average of 1,200 specialized railroad construction jobs each year, well in excess of current staffing levels. Workforce development initiatives are necessary to make sure opportunity is afforded to residents within the MAS territory to fill the skilled workforce needs of the C35 plan.



Equity and Access

The NEC serves diverse populations in MAS. While C35 will improve rail for higher income Acela riders with speedier intercity service, an estimated 60 percent of riders in MAS use MARC and VRE services which create access to economic opportunity for a variety of high, medium, and lower income communities.

A 2016 survey found that 18 percent of MARC riders earn less than \$50,000 per year (the median income in Baltimore), approximately 46 percent are from minority groups, and 27 percent live in zero-car households (averaged across MARC lines – nearly 33 percent of Penn Line riders directly on the NEC are without access to a vehicle).¹⁰⁶

Today 29 percent of all commuters in MAS¹⁰⁷ travel to work during off-peak periods, more than half of whom work late-shift jobs (defined as jobs starting between 3pm and 6am). The number of off-peak commuters in this territory has grown at twice the rate of peak-period commuters over the last 10 years. Many of these riders work in “essential” industries like healthcare and logistics that were critical during the COVID-19 pandemic and are expected to grow post-pandemic. C35 investments will support these commuters with an increase in off-peak service and reverse-peak service.

C35 will improve access to the NEC by constructing high-level platforms at four (West Baltimore, Martin Airport, Edgewood, and Aberdeen) of the five stations that have low-level platforms today. These improvements assist populations with mobility challenges, but also ease and speed boarding for all passengers.

Opening access to higher wages jobs and affordable housing

For station areas such as West Baltimore, with a 97.3 percent minority population, median household income of \$27,375 (compared to \$81,598 for the Baltimore metropolitan area), and 51 percent of households without access to an automobile, the NEC is a reliable and fast connection to several employment centers.¹⁰⁸

While for some people the NEC may open up economic opportunities outside the communities in which they live, for other people the NEC opens up affordable housing opportunities for those with jobs in expensive housing markets; In the DC region, communities like Odenton and New Carrollton on the MARC Penn Line have average home prices that are approximately half those in Washington, DC.¹⁰⁹

Table 8-1: Median Home Values (2019) for Maryland Communities as Compared to Washington, DC

Geography	Median Home Value (2019)
Washington, DC	\$601,500
New Carrollton, MD	\$271,100
Odenton, MD	\$323,500
Baltimore City, MD	\$160,100
Aberdeen, MD	\$205,900

Source: US Census Bureau (2020), 2019 American Community Survey 5-Year Estimates. Median value of owner-occupied housing units (DP04). Tables access through <http://census.gov/quickfacts/>; All stats represent city or census designated place

Combat Climate Change

Reduced Carbon Footprint

The Washington, DC region has some of the worst traffic congestion in the country.¹¹⁰ While a GHG inventory summary prepared for the greater Washington, DC region by the Metropolitan Washington Council of Governments found that GHG from all sectors has decreased by 13 percent between 2005 and 2018, the emissions from transportation have stayed relatively constant.¹¹¹ Better and more reliable rail service, provided by the implementation of C35, could prove attractive to drivers sick of sitting in traffic, affecting emissions in the region by offering residents low-carbon mobility options.



Resilient Infrastructure

The C35 capital renewal effort to replace the 1930's overhead catenary power supply in this territory with constant tension catenary provides more resilient infrastructure less subject to the impacts of extreme temperatures. Extreme weather and flooding has long impacted the existing B&P tunnel resulting in sinking floor slabs and flooded tracks. The new Fredrick Douglass Tunnel and its ancillary facilities will be constructed with hardened methods to protect the assets.

Support Desirable Cities and Communities

Station Area Development

Ten of the stations along the NEC in this territory feature recent and/or planned station area developments. These range from transformative mega-projects to modest redevelopments. Baltimore's Penn Station Redevelopment proposal calls for 1.6 million square feet of development with a hotel, residential and commercial uses while also upgrading and restoring the historic Baltimore Penn Station.¹¹² Washington, DC's Burnham Place atop the railroad tracks calls for 1.5 million square feet of office space, 1,300 residential units, 500 hotel rooms and 100,000 square feet of retail.¹¹³ Both efforts will add to the already dense mixture of office, residential, retail and arts and culture activities in each downtown.

In Odenton, Maryland, approximately 700 housing units have been constructed within a half-mile radius of the train station since 2015. A report released by the Greater Washington Partnership notes that additional TOD could improve Odenton's connectivity to Fort Meade, the largest employer in the state, and transform Odenton into a walkable, mixed-use community with a strong residential base. The Greater Washington Partnership estimates that the potential for new TOD (including more than 1,050 residential units, 580,000 square feet of office space, 210,000 square feet of retail space, 70 hotel rooms, and new public amenities) could result in benefits of 5,100 new jobs, \$6 million in local taxes, \$16 million in state taxes, and 134,000 new MARC trips annually.¹¹⁴

Investments in C35 will ensure these communities retain the value they have based on regional access and mobility, and provide additional transportation capacity to allow these neighborhoods to grow without generating more congestion on other modes.



Innovation Districts

The University of Maryland, Baltimore is in the process of building out a 14-acre innovation campus, BioPark, in the heart of the city. As of 2020, the district provided approximately 1,000 jobs, about half of the intended total, and is building more laboratory and office space to house science and research companies.¹¹⁵ The non-profit organization responsible for the development is funding community initiatives including new STEM equipment for a local high school and workforce development training.¹¹⁶

The Discovery District, located near the MARC College Park station and College Park-U of MD Metro station, is another initiative by the University of Maryland in the Washington, DC area. The district, a re-imagined office park adjacent to the existing campus, provides over two million square feet of office, retail, and residential space hosting over 60 companies.¹¹⁷ There are plans for a five-acre mixed-use development that will accommodate between 200 and 250 residential units alongside workspaces, further expanding the rail-adjacent neighborhood.¹¹⁸

Financial Strategy

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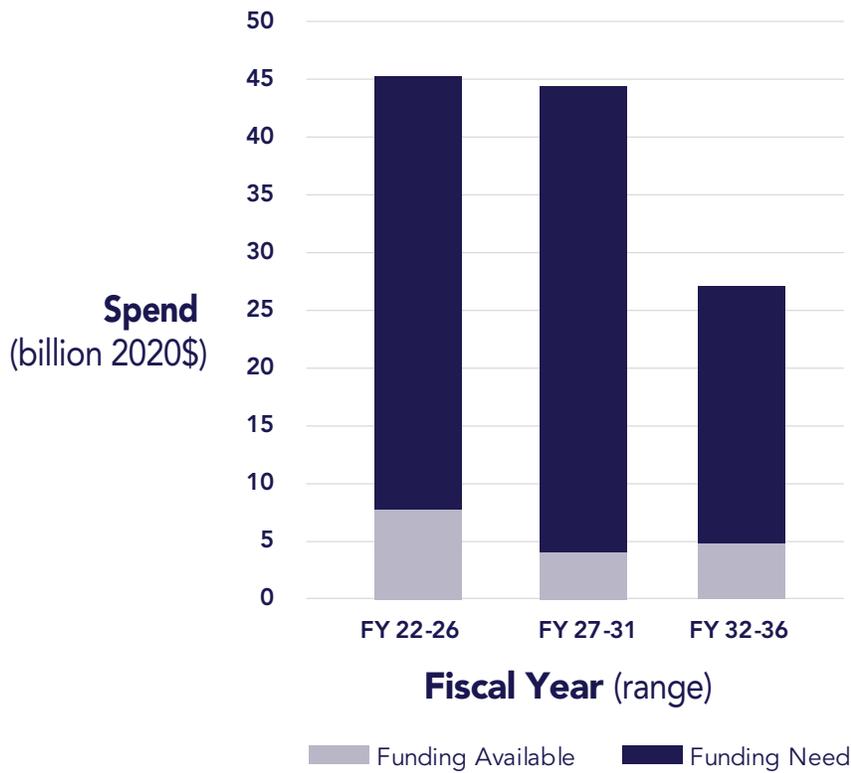
Ongoing investments by the federal government, Congress, and Commission member agencies have stabilized the condition of the corridor. But far higher levels of investment must be generated to implement C35, replace the NEC's 100-year-old-plus major bridges and tunnels, move the corridor to a SOGR, and improve service. While some funding is already identified, such as the Baseline Capital Charges (BCCs) shared through the Commission's Cost Allocation Policy and funding for Gateway Portal North Bridge in New Jersey, the funding gap for C35 is estimated to be approximately \$100 billion.

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Passengers waiting for a SEPTA train at 30th Street Station (PA)

Figure 9-1: C35 Estimated Spend & Funding Need



Source: C35 Analysis, 2021

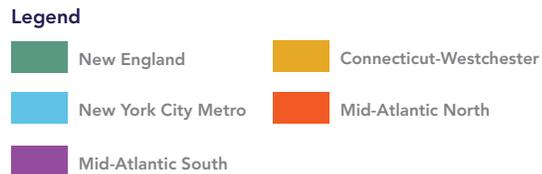
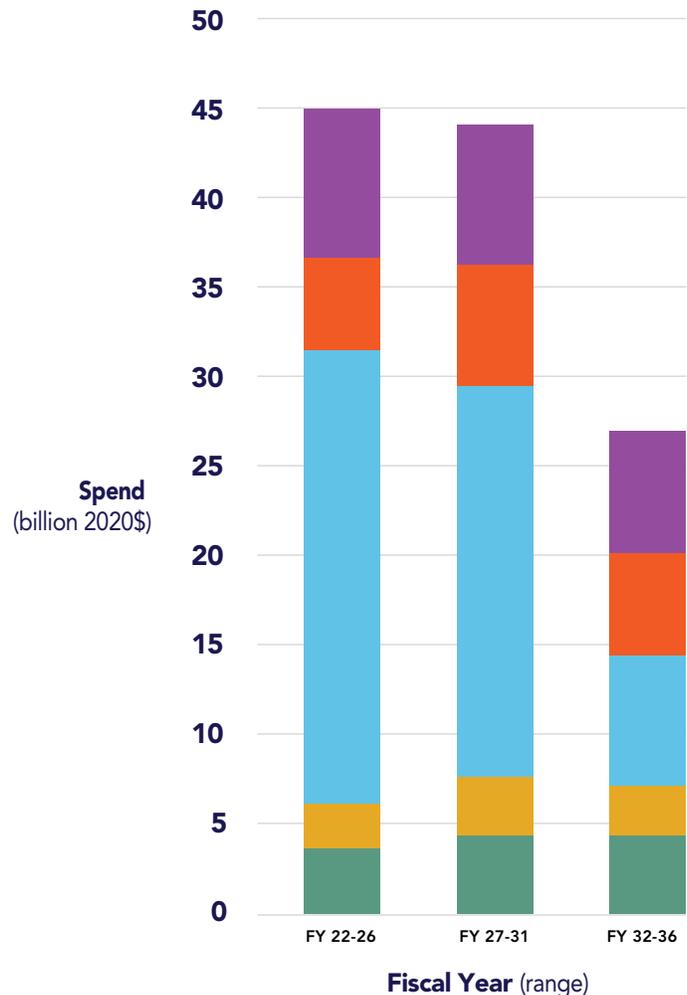
This chapter presents estimated cash flows for implementing C35 according to its proposed 15-year sequence, identifies challenges within existing programs that fund the NEC, and lays out principles, designed around the unique needs of the NEC, for a new or revised program to close the gap between existing fund sources and the capital needs to renew and improve the corridor.

Cash Flow Estimates

The total investment needed to implement C35 over the 15-year period is estimated to be \$117 billion in 2020 dollars. Figure 9-2 includes cost estimates for special projects and capital renewal. Special project cost estimates were primarily prepared by project sponsors. For some near-term special projects, sponsors have completed designs and projected costs are based on detailed engineering estimates. For other projects, particularly those in the later stages of the 15-year period, detailed designs have not yet been developed, so cost estimates are preliminary and based on early conceptual design.

Capital renewal includes annual needs for the routine replacement of assets, like rail and ties, plus bringing down the backlog of older and more expensive assets, like undergrade bridges and overhead catenary structures. The capital renewal analysis targeted replacement of most assets that reach or exceed 95 percent of their projected useful life during the 15-year period.

Figure 9-2: Estimated Capital Spending by Territory

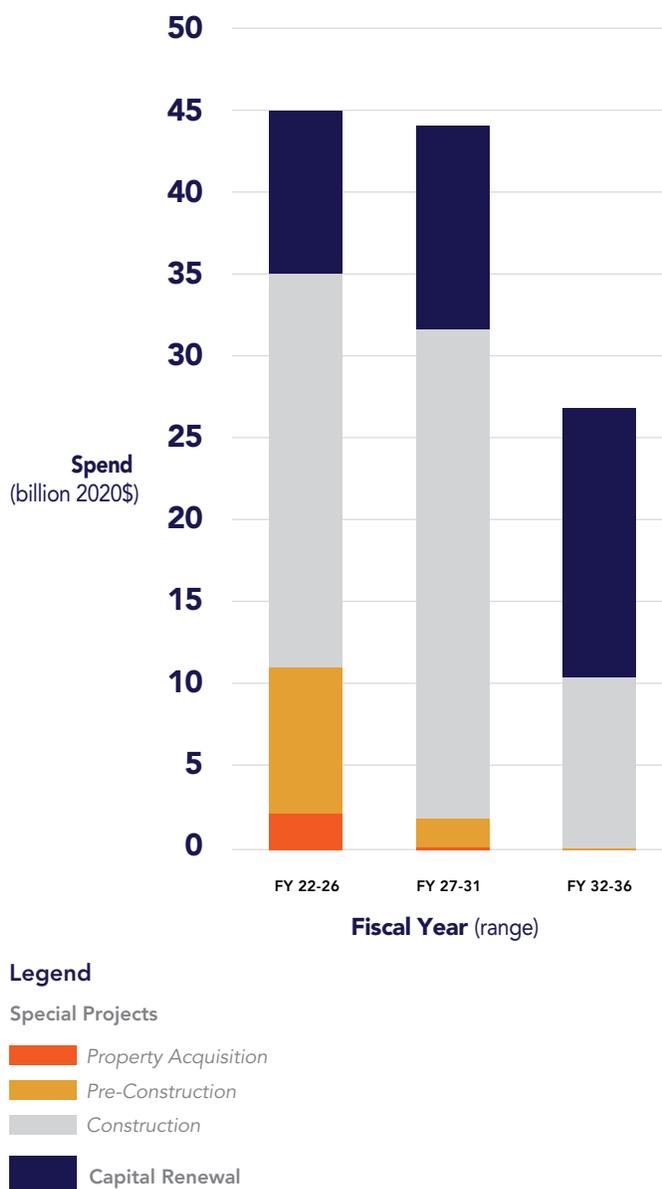


Source: C35 Analysis, 2021

The profile of expenditure estimates over time and by geography correspond to the project delivery sequence outlined in previous chapters, based on proposed project schedules and track outage constraints that limit the pace at which work can be performed without causing unacceptable service disruptions. While track outage availability is a major factor that can limit feasible capital expenditure rates, many major bridge and tunnel projects will be constructed adjacent to the existing NEC, requiring track outages only at the end of construction when new assets are tied into the existing corridor. Workforce availability is also a limiting factor and one that will require more review and analysis, as described in Chapter 10. Off-corridor construction projects like major bridges and tunnels are opportunities to bring on contracted construction forces which can be put to work more quickly, although current agency labor agreements require in-house forces to conduct certain tasks.

While the profile of expenditures is much more ambitious than historic spending levels, current spending levels do not reflect any significant construction related to major bridges and tunnels. However, two such projects, Gateway Portal North Bridge and Walk Bridge, have already completed their design and approval phases, have most or all of their funding committed, and are already or soon to be under construction. A similar example is the Gateway Hudson Tunnel Project where design work began more than a decade ago and the major factor delaying implementation is availability of funding. Billions of dollars over the next five years will be spent on these three projects alone.

Figure 9-3: Estimated Capital Spending by Activity



Source: C35 Analysis, 2021

What these figures represent

The estimates presented show projected cash outlays, or expenditures, which would be made up largely of payments for materials and labor. These cash expenditures generally occur pursuant to construction contracts issued by sponsor agencies. In most cases, agencies may sign such contracts only when they have all funding for the full value of the work either in hand or legally committed.

This has important consequences for how a federal funding program is structured. For example, a \$100 million bridge project might generate \$25 million per year in actual expenses over four years. Unfortunately, four one-year grants of \$20 million to the project sponsor (80 percent federal share) without an upfront commitment for the full \$80 million would not allow the project to proceed efficiently. Ideally the sponsor would have committed funding for the full amount, \$100 million (\$80 million federal and \$20 million local), to sign contracts and get started. This full funding would avoid start-stop inefficiencies in project delivery.

There are two potential ways to address this issue:

- **Create multi-year funding certainty to give agencies the authority to enter into contracts.** The Federal Transit Administration's (FTA's) Capital Investment Grant program provides this certainty through what are called Full Funding Grant Agreements. There is more discussion on this as a principle for an NEC funding program later in this chapter.
- **Fully fund multi-year projects at their start, rather than granting funds for each annual expenditure.** If such an approach were pursued, the estimated funding graphs in this chapter would not accurately represent the annual funding commitments that would be required to generate the outlay profile shown. Commitments would need to be significantly more front-loaded than expected outlays. That approach could be challenging given the fact that many individual C35 projects total in the billions of dollars.



Passengers waiting for a train at Trenton Transit Center (NJ)

C35 is the first iteration of a 15-year plan to eliminate the NEC SOGR backlog and improve the corridor to meet 2035 service and travel time goals. C35 focused on sequencing construction to maximize productivity of track outages and minimize service impacts and is not yet constrained by funding, workforce, and equipment needs. Schedules for capital renewal and special projects will continue to be analyzed in light of these additional constraints and it is likely that some work in early years may be shifted to later years based on future analyses, potentially reducing early-year costs and increasing out-year costs. The next round of analysis will begin in FY22.

Current Investment Levels and Sources

Significant investments are already being made in the NEC. Spending on capital renewal and special projects has totaled over \$1 billion per year in each of the last five years and reached \$1.4 billion in fiscal year 2020. Stakeholders raise these funds from a variety of sources, including many at the state and local level. However, every state and transit agency has significant competing capital needs off the NEC and it is unlikely these sources alone could meaningfully address the C35 funding gap. Some project sponsors utilize loan programs that are also ultimately repaid through a combination of the following sources.

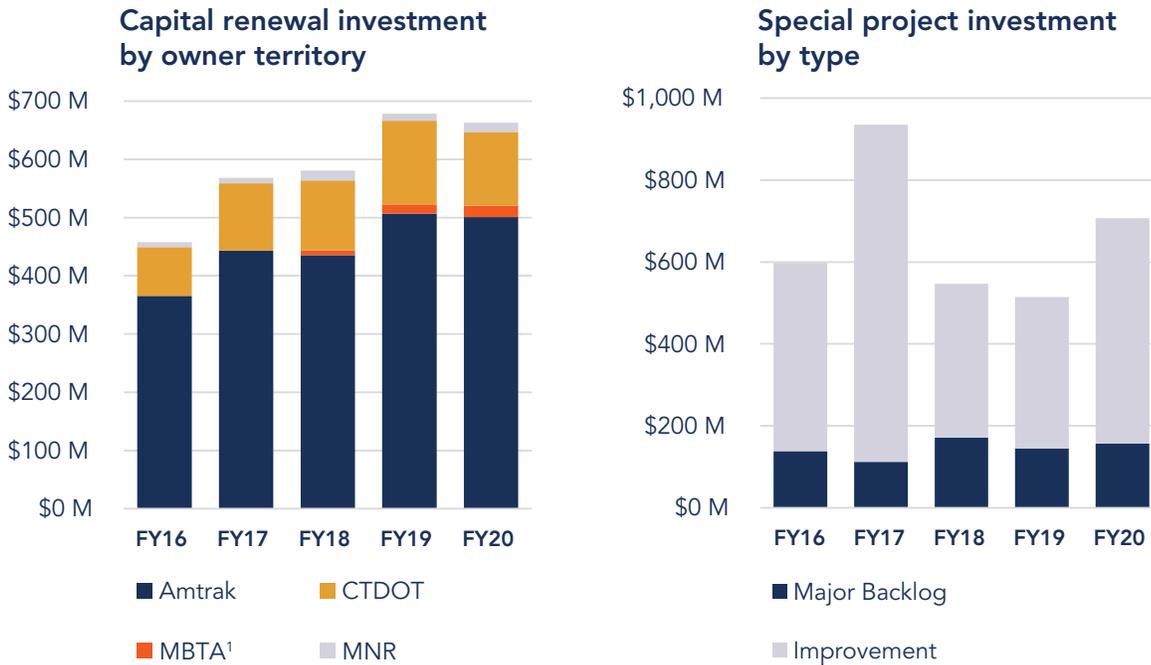
Baseline Capital Charges (BCCs). In September 2015, the Commission adopted the first Northeast Corridor Commuter and Intercity Rail Cost Allocation Policy. Under this policy, all passenger railroads operating on the NEC agreed to contribute funding toward the capital needs of the corridor based on a consistent formula to be followed by all parties. For fiscal year 2021, the level set by the Policy for these contributions was \$616 million.

While BCCs are not themselves an original source (i.e., they are raised from a variety of sources at the disposal of each individual operator), they do represent an ongoing commitment from rail operators to fund the NEC's basic capital needs. To supplement other sources, BCC payments flow from operators to the four infrastructure owners (Amtrak, MBTA, CTDOT, and MTA Metro-North) who invest the funds provided in renewal or replacement of the corridor's basic infrastructure assets, such as track, structures, electric power supply systems, and communication and signal systems. Only by exception can they be used on major bridges and tunnels or improvements.

Amtrak's NEC Operating Surplus. Prior to the pandemic, Amtrak's NEC services consistently earned more in revenue each year than they cost to operate and generated an operating surplus. This surplus was as much as several hundred million dollars per year and was in part supported by several hundred million dollars per year in operating payments made by other railroad operators through the Cost Allocation Policy. Amtrak reinvests these funds back into the corridor, into both the infrastructure needs described in this report, and into other NEC needs such as rolling stock.

Amtrak's Northeast Corridor Account. Amtrak is both a major NEC infrastructure owner, and a major operator. Therefore, it both receives funding from other operators and contributes its own funds to invest in the corridor. Required contributions that are not funded by Amtrak's NEC operating surplus come out of its Northeast Corridor Account. Each year, as part of its annual legislative and grant request to Congress, Amtrak requests funding for the NEC account. Amounts for this account that are provided by Congress are invested in NEC infrastructure and other NEC needs, such as rolling stock.

Figure 9-4: Historic Capital Renewal and Special Project Investment



(1) For capital renewal, MBTA assumed the role of the right-of-way owner beginning in FY18. Prior to FY18, Amtrak maintained MBTA territory.

Source: NEC Commission Annual Report, FY 2020

State and Agency Sources. Each state and transit agency along the NEC has its own revenue sources that fund transportation investment. In some cases, states and transit agencies use these sources on NEC projects, sometimes as local matches for federal grants described below or as a means of sourcing their BCC payments.

Federal Formula-Based Sources. FTA has several formula-based grant programs allocated to geographic areas and, ultimately, transit agencies or providers. Agencies have some discretion in how to spend such funds within defined allowable uses. In some cases, states and transit agencies decide to spend some of their allocation on NEC projects, either as contributions to special projects or as a means of sourcing their BCC payments.

Federal Project-Based Competitive Grants. NEC infrastructure investment is an eligible activity under a variety of past and present federal competitive grant programs. Agencies may apply for funding, and occasionally awards are made for NEC projects. Some programs may only be applied for by commuter railroads because of their status as transit agencies under federal law, while others are open to all NEC agencies. Current competitive grant programs funding NEC projects include:

- USDOT’s Rebuilding American Infrastructure with Sustainability and Equity (RAISE) program (formerly known as the TIGER or BUILD program)
- FTA Sec. 5309 Capital Investment Grants
- FRA Consolidated Rail Infrastructure and Safety Improvements (CRISI) Grant Program
- FRA Federal-State Partnership for State of Good Repair Grant Program

These programs, while currently beneficial for the NEC, present several challenges for implementing C35. First, they are national programs and the funding needs of the NEC are so large that C35 could vastly reduce the amount of funding available for projects elsewhere in the country.

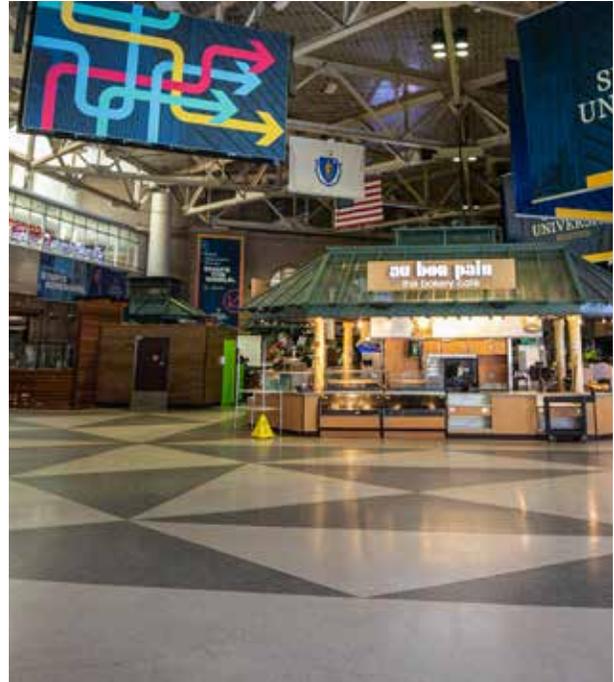
Second, these programs can be intensely competitive and often receive double, triple, or more in applications than available funds. This dynamic results in “grant bingo” where year-on-year agencies have no certainty which, if any, of their projects will be able to advance. This funding uncertainty makes it difficult to advance design and acquire the resources (e.g., workforce, equipment, materials) to implement projects in an efficient and timely fashion. As a result, the sequencing identified in C35 could not be implemented and there would potentially be a greater disruption to customers, with the same tracks and services impacted more than once.

Third, these programs implement individual projects, and often only those meeting narrow criteria, not coordinated plans. C35 analyses were tailored to the unique circumstances of constructing projects on the nation’s busiest passenger railroad. The resulting plan is an elaborate choreography of interdependent track outages that advances project construction while supporting over 2,000 daily trains in as efficient a manner as possible. Project-based competitive grants and their associated uncertainty would not ensure that all projects sequenced to occur at a particular time would have funding to do so.

Public-Private Partnerships

The Commission embraces and encourages opportunities for the real estate value created by the existing NEC and future C35 investments to help close the funding gap. Value capture strategies like tax increment financing, special assessments, and joint development projects are financing tools that can create revenue streams to pay back loans that cover the upfront costs of building infrastructure. Stations are the components of passenger rail infrastructure that most directly affect real estate value and are the most feasible projects for which value capture strategies can help raise revenue to finance investment.

However, most C35 investments are in track, bridges, tunnels, power supply, and signal systems. While those assets comprise the system that delivers NEC service, such individual projects have a less direct connection with real estate value. Other than real estate value, the only revenue generated by the NEC that is available to fund or finance NEC investment is the operating surplus from Amtrak's intercity service ticket sales. However, those funds historically help defray other existing NEC costs, such as those related to buying and maintaining train equipment and paying Amtrak's BCC obligation for ongoing infrastructure capital renewal. Those operating surpluses have also at least temporarily become a victim of the coronavirus pandemic. These realities reinforce the importance of the proposed federal-state partnership to close the funding gap for advancing C35.



Interior of Boston South Station (MA)

Principles for an NEC Funding Program

The Commission established principles for a federal-state funding partnership in its original Cost Allocation Policy approved in 2015, particularly for the elimination of the SOGR backlog and the improvement of service. The C35 planning process has only reaffirmed the importance of these original principles as the magnitude of the NEC's investment need and the complexities of construction on the nation's busiest passenger railroad were analyzed in greater detail. Below are principles for a new or restructured funding program to implement C35.

Make Funding Predictable. C35's immense workforce and other resource needs and the project development process make funding predictability critically important. While agencies are currently hiring to fill existing gaps, agencies cannot hire workers and buy equipment to allow for higher investment levels when there is no certainty that funding will be available in the future. Agencies are reluctant to invest time and money in advancing projects through the design and development process when there is no certainty that funding will be available to construct them. The only way agencies can do this preparatory work in an efficient manner is when they know what funding is on the way.

Fund the Plan Rather than Individual Projects. C35 is a detailed 15-year sequence of NEC investment focused on maximizing the productivity and efficiency of track outages and minimizing service impacts to passengers. Commuter rail agencies and Amtrak will need to carry out different parts of this plan according to a specific timeline. The uncertainty inherent in project-based annual grant competitions and relying on a patchwork of FRA and FTA funding sources prevents agencies from executing work according to this kind of plan efficiently. Funding allocations should be made in a manner that supports advancing projects in a coordinated fashion. The program that built the Interstate Highway System addressed this challenge by giving each state annual grants eligible to fund any and all designated projects in a pre-approved plan.

Many C35 outcomes are achievable not through the implementation of individual projects, but by the synergies created by multiple projects at multiple locations, in some cases in multiple states. Travel time benefits, for example, are generated by dozens of slight curve modifications made during track rehabilitation and hundreds of miles of overhead catenary reconstruction. Less than full funding for the plan simply means those benefits will take longer than 15 years to achieve. Though C35's funding needs are large, they represent a once-in-many-generations investment to restore a vital asset and build a foundation for growth.



Passenger waiting for a train at Baltimore Penn Station (MD)

Table 9-1: C35 Estimated Funding Need - Special Projects and Capital Renewal (billion 2020\$)

Project	State	TOTAL Remaining Project Cost	SPEND BY FEDERAL FISCAL YEAR			TOTAL Spend Between FY22-FY36	TOTAL Available Funding	TOTAL C35 Funding Need Yr 1-15
			Yr 1-5 FY22-FY26	Yr 6-10 FY27-FY31	Yr 11-15 FY32-FY36			
SPECIAL PROJECTS								
Boston South Station Expansion	MA	\$2.25	\$0.05	\$0.82	\$1.39	\$2.25		\$2.25
Massachusetts Third Track (Readville to Canton)	MA	\$0.14	\$0.05	\$0.08		\$0.14		\$0.14
RIDOT Stations: Warwick/ T.F. Green Airport	RI	\$0.18	\$0.18			\$0.18	\$0.00	\$0.18
Connecticut River Bridge Replacement (SLE)	* CT	\$0.42	\$0.18	\$0.25		\$0.42	\$0.07	\$0.37
SPG Line: Hartford Station Relocation	CT	\$0.51	\$0.05	\$0.46		\$0.51		\$0.51
Devon Bridge Replacement	* CT	\$0.95	\$0.17	\$0.78		\$0.95	\$0.01	\$0.95
Saugatuck River Bridge Replacement	* CT	\$0.36	\$0.01	\$0.18	\$0.17	\$0.36	\$0.01	\$0.35
Walk Bridge Program	* CT	\$0.68	\$0.68			\$0.68	\$0.57	\$0.69
Cos Cob Bridge Replacement	* CT	\$1.00	\$0.10	\$0.79	\$0.10	\$1.00		\$1.00
Penn Station Access	NY	\$1.51	\$1.51			\$1.51	\$0.03	\$1.55
Pelham Bay Bridge Replacement	* NY	\$0.59	\$0.05	\$0.30	\$0.24	\$0.59		\$0.59
East River Tunnel Rehabilitation	* NY	\$1.16	\$1.16			\$1.16	\$0.00	\$1.16
Gateway: Penn Station Expansion	NY	\$9.15	\$4.75	\$4.40		\$9.15	\$0.00	\$9.15
Gateway: Penn Station Expansion Property Acquisition	NY	\$1.75	\$1.60	\$0.15		\$1.75		\$1.75
Penn Station New York: Reconstruction Master Plan	NY	\$6.53	\$4.10	\$2.42		\$6.53	\$0.03	\$6.85
Penn Station New York Reconstruction Master Plan Property Acquisition	NY	\$0.25	\$0.25			\$0.25		\$0.25
Gateway: Hudson Tunnel Project	* NY/ NJ	\$11.56	\$4.68	\$6.18	\$0.70	\$11.56		\$11.60
Gateway: Highline Renewal and State of Good Repair	* NJ	\$0.24		\$0.08	\$0.16	\$0.24		\$0.24
Gateway: Secaucus Station and Loop Tracks	NJ	\$1.62		\$0.73	\$0.89	\$1.62		\$1.62
Gateway: Portal North Bridge	* NJ	\$1.74	\$1.74			\$1.74	\$1.80	
Gateway: Portal South Bridge	NJ	\$3.77	\$0.28	\$2.23	\$1.25	\$3.77		\$3.77
Gateway: Sawtooth Bridge	* NJ	\$1.43	\$0.68	\$0.75		\$1.43		\$1.44
Gateway: Dock Bridge Rehabilitation	NJ	\$0.06	\$0.06			\$0.06	\$0.01	\$0.05
Gateway: NJT Storage Yard	NJ	\$1.88	\$0.56	\$1.33		\$1.88		\$1.88
Gateway: Harrison Fourth Track Phase 1	NJ	\$0.07	\$0.07			\$0.07		\$0.08

Pre-construction
 Construction
 Property Acquisition
 * Major Backlog Project

Project	State	TOTAL Remaining Project Cost	SPEND BY FEDERAL FISCAL YEAR			TOTAL Spend Between FY22-FY36	TOTAL Available Funding	TOTAL C35 Funding Need Yr 1-15
			Yr 1-5 FY22-FY26	Yr 6-10 FY27-FY31	Yr 11-15 FY32-FY36			
SPECIAL PROJECTS								
Newark Penn Station: NJ TRANSIT Projects	NJ	\$0.53	\$0.21	\$0.31	\$0.01	\$0.53	\$0.02	\$0.51
Philadelphia 30th Street Station District Plan Implementation	PA	\$0.35	\$0.35			\$0.35	\$0.01	\$0.35
SEPTA Airport Line Separation Project	PA	\$0.07		\$0.01	\$0.06	\$0.07		\$0.07
Harrisburg Line Interlocking Improvement Program	PA	\$0.31	\$0.13	\$0.18		\$0.31	\$0.00	\$0.31
Harrisburg Line Catenary & Signal	PA	\$0.26	\$0.07	\$0.19		\$0.26	\$0.02	\$0.25
Landlith Interlocking - Wine Interlocking NEC Section Improvement Project	DE	\$0.73	\$0.10	\$0.62		\$0.73		\$0.73
Susquehanna River Bridge Replacement (Phase 1)	* MD	\$2.07	\$1.72	\$0.35		\$2.07	\$0.01	\$2.08
Susquehanna River Bridge Replacement (Phase 2)	MD	\$0.56	\$0.11	\$0.45		\$0.56		\$0.56
Bush River Bridge Major Rehabilitation	* MD	\$0.35		\$0.25	\$0.10	\$0.35		\$0.35
Gunpowder River Bridge Major Rehabilitation	* MD	\$0.48		\$0.05	\$0.43	\$0.48		\$0.48
Baltimore Penn Station Master Plan	MD	\$0.10	\$0.10			\$0.10		\$0.12
Baltimore & Potomac Tunnel Replacement: Enabling Components	* MD	\$0.33	\$0.16	\$0.17		\$0.33	\$0.01	\$0.34
Baltimore & Potomac Tunnel Replacement: The Tunnel Proper	* MD	\$3.60	\$0.90	\$2.14	\$0.56	\$3.60	\$0.04	\$3.62
Washington Union Station: All phases (near term, subbasement and long term)	DC	\$10.48	\$2.20	\$2.26	\$3.37	\$7.84	\$0.02	\$7.91
Washington Union Station: Property Acquisition	DC	\$0.45	\$0.45			\$0.45		\$0.45
ALL OTHER PROJECTS – shared and intercity benefit		\$8.42	\$4.82	\$2.57	\$1.02	\$8.42	\$1.16	\$8.22
ALL OTHER PROJECTS – commuter benefit		\$1.53	\$1.07	\$0.38	\$0.08	\$1.53	\$0.43	\$1.27
TOTAL Special Projects		\$80.43	\$35.36	\$31.89	\$10.53	\$77.78	\$4.27	\$76.01
CAPITAL RENEWAL								
New England Territory (NE)			\$2.52	\$2.09	\$2.41	\$7.01		
Connecticut-Westchester Territory (CTW)			\$0.65	\$1.26	\$2.39	\$4.29		
New York City Metro Territory (NYM)			\$1.10	\$2.12	\$3.81	\$7.03		
Mid-Atlantic North Territory (MAN)			\$3.68	\$5.26	\$5.67	\$14.62		
Mid-Atlantic South Territory (MAS)			\$1.97	\$1.70	\$2.24	\$5.91		
TOTAL Capital Renewal			\$9.92	\$12.43	\$16.52	\$38.86	\$12.50*	\$26.36
TOTAL C35 - Capital Renewal and Special Projects			\$45.28	\$44.32	\$27.05	\$116.64	\$16.77	\$102.37

*Annual BCC funding levels subject to annual approvals and will be impacted over time by escalation, service changes, and other factors.

Source: C35 Analysis, 2021

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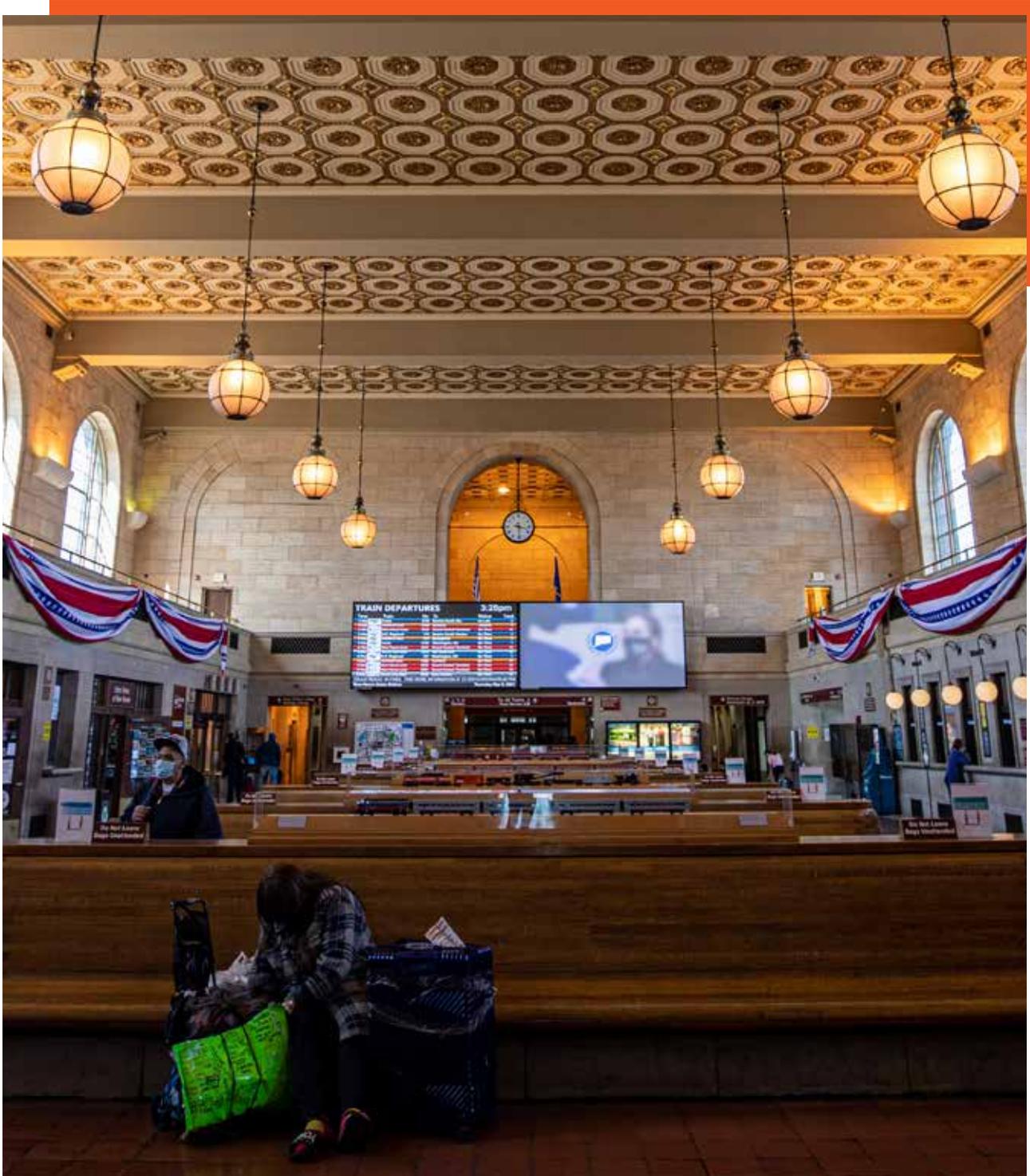


Next Steps

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C35 represents the most ambitious reinvestment program in the NEC’s history and a new way of planning: a multi-agency, multi-year, shared action plan guided by a long-term vision. As a result, its success will require a new level of coordination among NEC agencies and USDOT as well as new ways of doing business across a broad spectrum of activities, including human resources/labor relations, procurement, and project delivery.

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The main waiting area at New Haven Union Station (CT)

Though the C35 plan was not constrained by funding, workforce, or equipment availability, the C35 analysis tools have identified the resource needs in each of these areas to accomplish our shared goals and vision at a level of detail that is actionable by NEC stakeholders. The C35 analyses revealed the enormity of the task before us: investing \$117 billion over 15 years, and dramatically expanding our workforce levels and equipment inventory. However, with a dedicated, predictable funding source for C35, the Commission would have the certainty needed to fundamentally change the way projects are implemented along the corridor and mobilize the entire industry to rise to the challenge.

The Commission plans to update the CONNECT NEC project delivery analysis roughly every two years. The next iteration is CONNECT NEC 2037 (C37). Prior to the C37 update, Commission member agencies will take the following actions to build upon the significant planning work undertaken to date and ensure we are well positioned to implement the C35 plan:

- **Develop agency Program Management Plans (PMP).** Efforts have been underway at Commission member agencies to improve the ability to deliver individual projects according to a planned scope, schedule, and budget. To ensure the entire program of C35 projects can be delivered, project sponsors will develop a PMP for their C35 projects to facilitate the establishment of workforce development plans, equipment and material procurement plans, contracting plans, and protocols for internal decision-making and external coordination. Developing PMPs will help agencies identify where changes in policies and business practices are needed to address C35's unprecedented level of investment. Project sponsor PMPs will be incorporated into a corridor-wide plan.
- **Create a corridor-wide Program Coordination Office (PCO).** While individual C35 project management responsibilities (planning, design, permitting, budgeting, procurement, contract management, construction management, etc.) will reside within project sponsor agencies, many cross-cutting issues, such as track outage schedules and workforce allocations, will affect multiple projects managed by different sponsors. A corridor-wide PCO will provide overall coordination to ensure construction schedules are aligned and resources are available for all project sponsors to successfully implement their projects. The PCO will provide a forum for planning track outages and will allow NEC agencies to coordinate temporary service changes, reducing impacts to NEC customers and maximizing advance notice of such impacts.

In addition to a new focus on implementation, planning and design activities must continue as well:

- **Advance project-level planning.** C35 projects are at various stages of development, from projects already under construction to projects in the earliest stages of conceptual planning. Project sponsors, in collaboration with their partners, will advance planning, design, and other pre-construction activities according to the coordinated schedules laid out in C35 as much as possible. This project-level planning may include required environmental review and associated project-level stakeholder and public engagement. All new information generated during project-level planning and design will in turn feed the next generation of the CONNECT NEC project delivery analysis (C37).
- **Identify opportunities to utilize innovative project delivery, labor practices, and construction methods.** C35 presumes more construction work can be delivered during coordinated track outages than typically takes place today. For example, an outage with a single track out of service may need to support track renewal, catenary system replacement, an undergrade bridge rehabilitation, and the construction of new assets that add capacity all at the same time. During planning and design, project sponsors will identify opportunities to utilize innovative project delivery and construction methods with the goals of expediting delivery, growing resource availability, and maximizing cost efficiency.
- **Continue to use, refine, and improve the CONNECT NEC project delivery analysis tool and update sequencing as needed.** C35 created a sophisticated delivery analysis tool for standardizing and organizing the way NEC agencies analyze future investments; however, there are several factors the project delivery tool does not yet account for and the Commission will build its capability to do so. Future enhancements will:
 - Evaluate the challenge of project sponsors’ feasible rates of ramping up of workforce and equipment resources based on the PMPs and adjust project sequencing accordingly
 - Refine program sequencing based on anticipated levels of funding
 - Re-evaluation of delivery analysis track outages, frequency/advanced notice of temporary schedule changes, and dispatch protocols to minimize overall reliability impacts to all operators
 - Consider condition assessments beyond asset age for more asset types in planning capital renewal programs
 - Evaluate what service growth opportunities may exist at milestones before 2035
- **Continue to improve all commuter and intercity rail services.** Each commuter rail system and Amtrak includes non-NEC territories with similar investment and modernization demands. Agencies will be working to expand operating and capital budgets to support service improvements that have network benefits to corridor and off-corridor connecting services.



A passenger boards the Amtrak Northeast Regional train at Washington Union Station (DC)

CONSISTENCY WITH NEC FUTURE AND ADVANCING THE VISION

The NEC FUTURE Tier 1 EIS and ROD defined the future vision of the NEC. C35 defines construction sequencing for a first 15-year phase of that vision and anticipated progress on its goals.

- Improve Rail Service – By 2035, Amtrak Acela travel time reduction of 26 minutes between DC and NYC and 28 minutes between NYC and Boston, representing over 50 percent progress toward the NEC FUTURE goal. Doubling of overall commuter rail service and 33 percent growth in Amtrak service.
- Modernize NEC Infrastructure - 100 percent progress towards eliminating major backlog bridges and tunnels. Major progress toward bringing all assets on the NEC to a state of good repair, with limited sections programmed through C35 but completed beyond 2035.
- Expand Rail Capacity – Elimination of all major chokepoints along the NEC. Additional infrastructure capacity between New York City and Newark, NJ, along the Hell Gate Line in NY, in the Baltimore and Wilmington areas, and around the Route 128 (MA) station. Expanded capacity on the Hartford Line in Connecticut and the Harrisburg Line between Philadelphia and Harrisburg in Pennsylvania.

C35 also identifies the following planning activities that will take place over the first 15 years to set the stage for future phases of development.

- Project level environmental reviews tiering off the NEC FUTURE Final EIS and ROD (i.e., Gateway Penn Station Expansion, Pelham Bay Bridge Replacement, Saugatuck and Cos Cob Bridge Replacements)
- New high-speed segment planning studies (New Haven to Providence and Maryland to Delaware)

Future CONNECT NEC efforts (C37) will continue to assess and monitor progress in advancing the NEC FUTURE vision and will develop strategies and timelines to achieve the full vision as defined in the ROD.

C37 will reflect changing conditions on the ground, new information discovered during project-level planning, and refined methods as the sophistication of our planning tools grows. This rolling 15-year program will be a direct input to the Commission’s annual five-year Capital Investment Plan (CIP) process that identifies a more detailed level of available funding sources, anticipated scopes of work, and upcoming project milestones. The CIP also serves as the baseline for measuring annual capital program delivery performance. Through this process, the Commission will report on future progress in advancing the CONNECT NEC 15-year plan.

Advancing a plan that dramatically increases the pace and magnitude of improvements requires innovative thinking and greater collaboration. Unprecedented financial investment will also require elevated transparency, oversight, and reporting to build confidence among stakeholders and to keep the plan on track. The CONNECT NEC process will leverage existing systems to the extent practicable and initiate processes where they don’t exist.

The Commission is ready to rise to these challenges and others that are certain to emerge as work progresses. The foundation of partnership is strong. Together, we can at long last rebuild this critical public asset and ensure a bright future for this region and the nation.



Passengers at 30th Street Station (PA)

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Source Data

1. Northeast Corridor Commission. (2018). Northeast Corridor American Economy Report, Executive Summary. https://nec-commission.com/app/uploads/2018/04/NEC_american_economy_report_executive_summary.pdf
2. Northeast Corridor Commission. (2020). Northeast Corridor annual report: Operations and infrastructure, fiscal year 2019. <http://nec-commission.com/app/uploads/2020/04/NEC-Annual-Report-FY19.pdf>
3. Northeast Corridor Commission. (2018). Northeast Corridor American Economy Report, Executive Summary. https://nec-commission.com/app/uploads/2018/04/NEC_american_economy_report_executive_summary.pdf
4. Northeast Corridor Commission. (2014). State of the Northeast Corridor region transportation system – Summary report. https://nec-commission.com/app/uploads/2018/04/NECC_transportation_summary_report_2014-02-18.pdf
5. Ibid.
6. Data from FAA, Air Transport Association, Mitre Corp. and other sources; analysis by WSP, 2019.
7. WSP. (2019). Ultra-high-speed ground transportation business case analysis. Washington State Department of Transportation. <https://wsdot.wa.gov/sites/default/files/2019/07/12/Ultra-High-Speed-Ground-Transportation-Study-Business-Case-Analysis-Full-Report-with-Appendices-2019.pdf>; New Jersey Turnpike Authority. (n.d.). Widening program overview. NJ Turnpike Widening Program. <http://njturnpikewidening.com/overview.php>; Connecticut Department of Transportation. (n.d.). I-95 strategies to reduce congestion. <https://portal.ct.gov/-/media/Malloy-Archive/Press-Room/20180222-CTDOT-I95-Strategies-to-Reduce-Congestion.pdf>; Orange County Transportation Authority. (n.d.). I-405 improvement project. <http://www.octa.net/Projects-and-Programs/Under-Construction/I-405-Improvement-Project/?frm=7135>
8. C35 Team. (2021). Northeast Corridor rail service: Change in regional CO2 emissions resulting from CONNECT 2035 Program.
9. Federal Railroad Administration. (2017). Record of decision: NEC FUTURE. U.S. Department of Transportation. <https://www.fra.dot.gov/necfuture/pdfs/rod/rod.pdf>
10. Northeast Corridor Commission. (2020). Northeast Corridor annual report: Operations and infrastructure, fiscal year 2019, Appendix A. <http://nec-commission.com/app/uploads/2020/04/NEC-Annual-Report-FY19.pdf>
11. Northeast Corridor Commission. (2020). Update to valuation of train delay impact on the Northeast Corridor.
12. Northeast Corridor Commission. (2020). Northeast Corridor annual report: Operations and infrastructure, fiscal year 2019. <http://nec-commission.com/app/uploads/2020/04/NEC-Annual-Report-FY19.pdf>
13. U.S. Census Bureau. (2021). 2015-2019 American Community Survey 5-year estimates, Hispanic or Latino Origin by Race (B03002), Ratio of Income to Poverty Level (C17002), Tenure of Vehicle Available (B25004) [Data sets]. Retrieved from <https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes.html>; U.S. Census Bureau. (2021). Longitudinal Employer-Household Dynamics, LEHD Origin-Destination Employment Statistics (LODES) [Data set]. Retrieved from <https://lehd.ces.census.gov/data/>
14. U.S. Energy Information Administration. (2021). State energy-related carbon dioxide emissions by sector (Table 4) [Data set]. Retrieved from: <https://www.eia.gov/environment/emissions/state/>; U.S. Census Bureau. (2020). 2015-2019 American Community Survey 5-Year estimates Total Population (B01003) [Data set]. Retrieved from <https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes.html>
15. C35 Team. (2021). Northeast Corridor rail service: Change in regional CO2 emissions resulting from CONNECT 2035 Program.

16. Amtrak. (n.d.). Amtrak sustainability report FY 2020. <https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/environmental1/Amtrak-Sustainability-Report-FY20.pdf>
17. Amtrak. (n.d.). Travel green with Amtrak. <https://www.amtrak.com/about-amtrak/sustainability/travel-green.html>
18. Ewing, R. et al. (2007). Growing Cooler: The Evidence on Urban Development and Climate Change. https://www.nrdc.org/sites/default/files/cit_07092401a.pdf
19. U.S. Census Bureau. (2020). 2019 American Community Survey 1-Year Estimates Total Population (B01003) [Data set]. Retrieved from <https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes.html>; U.S. Census Bureau. (2013). 2011 American Community Survey 1-Year Estimates Total Population (B01003) [Data set]. Retrieved from <https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes.html>; U.S. Census Bureau. (2021). Longitudinal Employer-Household Dynamics, LEHD Origin-Destination Employment Statistics (LODES) [Data set]. Retrieved from <https://lehd.ces.census.gov/data/>
20. NJTOD. (n.d.). What is TOD?. <http://www.njtod.org/about-us/what-is-transit-oriented-development/>
21. City of New Haven. (n.d.). Union Station transit-oriented development. https://www.newhavenct.gov/gov/depts/city_plan/plans_n_projects/union_station.htm
22. Akridge. (n.d.). Home page. Burnham Place at Union Station. <http://www.burnhamplace.com/>
23. Eichmann, M. (2019). Financial tech hub at the University of Delaware to blend academics, business. WHYY PBS NPR. <https://whyy.org/articles/financial-tech-hub-at-the-university-of-delaware-to-blend-academics-business/>
24. I-195 Redevelopment District Commission (n.d.) Providence Innovation and Design District. <https://www.195district.com/>
25. Northeast Corridor Commission. (2014). The Northeast Corridor and the American economy. <http://nec-commission.com/app/uploads/2018/04/NEC-American-Economy-Final.pdf>
26. Leung, S. (2021, January 30). The Seaport has become Boston's Innovation District. Somewhere former mayor Tom Menino is saying 'I told you so'. The Boston Globe. <https://www.bostonglobe.com/2021/01/30/business/seaport-has-become-innovation-district-somewhere-tom-menino-is-saying-i-told-you-so/>
27. Amtrak. (n.d.). Amtrak fact sheet fiscal year 2019: Commonwealth of Massachusetts [Fact sheet]. <https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/statefactsheets/MASSACHUSETTS19.pdf>; Massachusetts Department of Transportation. (n.d.). 2018 commuter rail counts [Data set]. Commonwealth of Massachusetts. Retrieved from <https://www.mass.gov/lists/2018-commuter-rail-counts>
28. Census Reporter. (2019). Boston-Cambridge-Newton, MA-NH Metro Area. <https://censusreporter.org/profiles/31000US14460-boston-cambridge-newton-ma-nh-metro-area/>; U.S. Bureau of Labor Statistics. (2021, May 4). Boston area economic summary. https://www.bls.gov/regions/new-england/summary/blsummary_boston.pdf; Greater Boston Convention & Visitors Bureau. (n.d.). 2018 Annual Report. https://assets.simpleviewinc.com/simpleview/image/upload/v1/clients/boston/Annual_Report_2018_6896678a-7d20-4a20-a436-49afb5b12758.pdf
29. Census Reporter. (2019). Providence-Warwick, RI-MA Metro Area. <https://censusreporter.org/profiles/31000US39300-providence-warwick-ri-ma-metro-area/>; U.S. Bureau of Labor Statistics. (2021, May 10). Providence area economic summary. https://www.bls.gov/regions/new-england/summary/blsummary_providence.pdf
30. Census Reporter. (2019). Hartford-East Hartford-Middletown, CT Metro Area. <https://censusreporter.org/profiles/31000US25540-hartford-east-hartford-middletown-ct-metro-area/>; U.S. Bureau of Labor Statistics. (2021, May 10). Hartford area economic summary. https://www.bls.gov/regions/new-england/summary/blsummary_hartford.pdf

31. Northeast Corridor Commission. (2020). Northeast Corridor annual report: Operations and infrastructure, fiscal year 2019, Appendix A. <http://nec-commission.com/app/uploads/2020/04/NEC-Annual-Report-FY19.pdf>
32. Jessen, K. (2019, August 27). MassDOT awarded federal grant for South Station's Tower 1 Interlocking. MassDOT Blog. <https://blog.mass.gov/transportation/mbta/massdot-awarded-federal-grant-for-south-stations-tower-1-interlocking/>
33. Northeast Corridor Commission. (2020). Northeast Corridor annual report: Operations and infrastructure, fiscal year 2019, Appendix A. <http://nec-commission.com/app/uploads/2020/04/NEC-Annual-Report-FY19.pdf>
34. Dimino, R., Nally, T., Carlson, K., Raine, A., & Horst, T. (2018). The transportation dividend: Transit investments and the Massachusetts economy. A Better City. <https://www.abettercity.org/assets/images/Transportation%20Dividend%20-%20FINAL%20-%2020012918.pdf>
35. U.S. Census Bureau. (2021). 2015-2019 American Community Survey 5-year estimates, Hispanic or Latino Origin by Race (B03002), Ratio of Income to Poverty Level (C17002) [Data sets]. Retrieved from <https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes.html>
36. Boston Region Metropolitan Planning Organization. (2017). MBTA Title VI report. Massachusetts Bay Transportation Authority. <https://cdn.mbta.com/sites/default/files/2017-11/2017-2020-mbta-title-vi-report.pdf>
37. U.S. Census Bureau. (2021). 2015-2019 American Community Survey 5-year estimates, Hispanic or Latino Origin by Race (B03002), Ratio of Income to Poverty Level (C17002) [Data sets]. Retrieved from <https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes.html>
38. Felson, L. (2018, July 20). Inside a commuter rail comeback in Hartford. Bloomberg CityLab. <https://www.bloomberg.com/news/articles/2018-07-20/inside-a-commuter-rail-comeback-in-hartford-connecticut>
39. Ibid.
40. State of Rhode Island Office of Energy Resources. (n.d.). Resilient Rhode Island Act (2014). <http://www.energy.ri.gov/policies-programs/ri-energy-laws/resilient-rhode-island-act-2014.php>
41. Office of Governor Charlie Baker and Lt. Governor Karyn Polito. (2021, March 26). Governor Baker signs climate legislation to reduce greenhouse gas emissions, protect Environmental Justice communities [Press release]. <https://www.mass.gov/news/governor-baker-signs-climate-legislation-to-reduce-greenhouse-gas-emissions-protect-environmental-justice-communities>
42. Federal Railroad Administration. (2016). NEC FUTURE Tier 1 Environmental Impact Statement. U.S. Department of Transportation. https://www.fra.dot.gov/necfuture/tier1_eis/feis/
43. South Station Air Rights. (n.d.). Project overview. <https://southstationairrights.com/project-overview>
44. Hoban, M. (2018, September 10). The creation of a neighborhood: Boston's Seaport. Urbanland. <https://urbanland.uli.org/development-business/the-creation-of-a-neighborhood-bostons-seaport/>
45. Rhode Island Department of Transportation. (n.d.). Pawtucket/Central Falls Transit Center. <http://www.dot.ri.gov/projects/PCF/index.php>
46. Northeast Corridor Commission. (2014). The Northeast Corridor and the American economy. <http://nec-commission.com/app/uploads/2018/04/NEC-American-Economy-Final.pdf>
47. Leung, S. (2021, January 30). The Seaport has become Boston's Innovation District. Somewhere former mayor Tom Menino is saying 'I told you so'. The Boston Globe. <https://www.bostonglobe.com/2021/01/30/business/seaport-has-become-innovation-district-somewhere-tom-menino-is-saying-i-told-you-so/>

48. Amazon bringing 3,000 more jobs to Boston's Seaport. (2021, January 26). CBS Boston. <https://boston.cbslocal.com/2021/01/26/amazon-boston-seaport-jobs-expansion/>
49. Northeast Corridor Commission. (2014). The Northeast Corridor and the American economy. <http://nec-commission.com/app/uploads/2018/04/NEC-American-Economy-Final.pdf>
50. Northeast Corridor Commission. (2014). The Northeast Corridor and the American economy. <http://nec-commission.com/app/uploads/2018/04/NEC-American-Economy-Final.pdf>
51. Northeast Corridor Commission. (2019). Northeast Corridor and the American Economy. <http://nec-commission.com/app/uploads/2018/04/NEC-American-Economy-Final.pdf>
52. Northeast Corridor Commission. (2014). The Northeast Corridor and the American economy. <http://nec-commission.com/app/uploads/2018/04/NEC-American-Economy-Final.pdf>
53. Providence Innovation & Design District. (n.d.). <https://www.195district.com/>
54. The Office of Governor Ned Lamont. (2020, October 23). Governor Lamont, Senators Blumenthal and Murphy, Representatives Himes and Courtney announce over \$144 million in federal funding for Connecticut rail bridges [Press release]. <https://portal.ct.gov/Office-of-the-Governor/News/Press-Releases/2020/10-2020/Governor-Lamont-Announces-144-Million-in-Federal-Funding-for-Connecticut-Rail-Bridges>
55. Northeast Corridor Commission. (2020). Northeast Corridor annual report: Operations and infrastructure, fiscal year 2019, Appendix A. <http://nec-commission.com/app/uploads/2020/04/NEC-Annual-Report-FY19.pdf>
56. MTA. Fall GCT Train Counts. (2019).
57. Abraham, M. (2014). How transportation problems keep people out of the workforce in Greater New Haven. Greater New Haven Job Access and Transportation Working Group and DataHaven. https://www.ctdatahaven.org/sites/ctdatahaven/files/DataHaven_TranspRpt_WEB_pgs.pdf
58. Downtown Crossing New Haven. (n.d.). New Haven's Downtown Crossing project. <https://downtowncrossingnewhaven.com/>; City of New Haven. (n.d.). Union Station transit-oriented development. https://www.newhavenct.gov/gov/depts/city_plan/plans_n_projects/union_station.htm
59. CTNext. (n.d.). Innovation places. <https://ctnext.com/entrepreneurial-ecosystem/innovation-places/>
60. Stamford Innovation Week. (n.d.). <https://siweek.org/>
61. NXTHVN. (n.d.). About. <https://www.nxthvn.com/about/>
62. Northeast Corridor Commission. (2020). Northeast Corridor annual report: Operations and infrastructure, fiscal year 2019, Appendix A. <http://nec-commission.com/app/uploads/2020/04/NEC-Annual-Report-FY19.pdf>
63. Burd, J. (2020, December 9). Murphy unveils \$190 million renovation plan for Newark Penn Station. Real Estate NJ. <https://re-nj.com/murphy-unveils-190-million-renovation-plan-for-newark-penn-station/>
64. Metropolitan Transportation Authority. (n.d.). Benefits. Penn Station Access. <https://pennstationaccess.info/benefits>
65. Metropolitan Transportation Authority. (2021). MTA Metro-North Railroad Penn Station Access Project, Environmental Assessment and Section 4(F) Evaluation. https://static1.squarespace.com/static/5d278d57950ce60001fd9b83/t/60a43147441b54130be6bba2/1621373256001/00_PSA+EA_Cover+Page+and+Table+of+Contents.pdf
66. New York State Department of Environmental Conservation. (n.d.). Reducing greenhouse gas emissions. <https://www.dec.ny.gov/energy/99223.html>

67. New York City Mayor's Office of Sustainability. (n.d.). Inventory of New York City greenhouse gas emissions. <https://nyc-ghg-inventory.cusp.nyu.edu/>
68. New York City Mayor's Office of Sustainability. (n.d.). Reducing the cars on the road and making the cars that are there electric. <https://www1.nyc.gov/site/sustainability/our-programs/transportation.page>
69. Barr, H., Orlando, P., Kettig, R., Barry, R. C., Karmarkar-Deshmukh, R., & Kamel, M. (2020). New Jersey's global warming response act 80 x 50 report. New Jersey Department of Environmental Protection. <https://www.nj.gov/dep/climatechange/docs/nj-gwra-80x50-report-2020.pdf#page=30>
70. Governor Andrew M. Cuomo. (2018, September 27). Governor Cuomo announces New Rochelle as \$10 million Mid-Hudson Valley winner of the third-round Downtown Revitalization Initiative [Press release]. <https://www.governor.ny.gov/news/governor-cuomo-announces-new-rochelle-10-million-mid-hudson-valley-winner-third-round-downtown>
71. Mocker, G. (2020, August 20). New Rochelle creates apartment in train station to promote downtown living. PIX11. <https://pix11.com/news/local-news/northern-suburbs/new-rochelle-creates-apartment-in-train-station-to-promote-downtown-living/>
72. Salvadore, S. (2020, October 15). North Brunswick train station project moves to next phase. MSN. <https://www.msn.com/en-us/news/us/north-brunswick-train-station-project-moves-to-next-phase/ar-BB1a3H6S>
73. North Brunswick TOD Associates, LLC. (n.d.). Community benefits. Main Street North Brunswick. <http://www.ourtowncenter.info/community/index.html>; NJTOD. (2020, November 28). Reinventing Metropark Station: From suburban park-and-ride to TOD community. <http://www.njtod.org/reinventing-metropark-station/>
74. Jones Lang LaSalle IP, Inc. (n.d.). Transportation. The Hub @ New Brunswick Station. <http://www.thehubnewbrunswick.com/transportation.html>
75. Knapp, Krystal. (2020, November 19). Princeton University to be first institutional tenant at the Hub research and business incubator in New Brunswick. Planet Princeton. <https://planetprinceton.com/2020/11/19/princeton-university-to-be-first-institutional-tenant-at-hub-research-and-business-incubator-in-new-brunswick/>
76. Amtrak. (n.d.). Amtrak fact sheet fiscal year 2019: Commonwealth of Pennsylvania [Fact sheet]. <https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/statefactsheets/PENNSYLVANIA19.pdf>; Southeastern Pennsylvania Transportation Authority. (2018, July 9). SEPTA – Regional rail systems. https://septaopendata-septa.opendata.arcgis.com/datasets/64eaa4539cf4429095c2c7bf25c629a2_0/explore; Northeast Corridor Commission. (2019). NJTRANSIT Ridership Data [Data set]. Retrieved from NECC Cost Allocation Model.
77. Census Reporter. (2019). Harrisburg-Carlisle, PA Metro Area. <https://censusreporter.org/profiles/31000US25420-harrisburg-carlisle-pa-metro-area/>; U.S. Bureau of Labor Statistics. (2021, May 3). Harrisburg area economic summary. https://www.bls.gov/regions/mid-atlantic/summary/blsummary_harrisburg.pdf
78. Census Reporter. (2019). Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metro Area. <https://censusreporter.org/profiles/31000US37980-philadelphia-camden-wilmington-pa-nj-de-md-metro-area/>; U.S. Bureau of Labor Statistics. (2021, May 3). Philadelphia area economic summary. https://www.bls.gov/regions/mid-atlantic/summary/blsummary_philadelphia.pdf
79. Office of the Mayor. (2020, September 10). Philadelphia Region sets a record in 2019 with 46 million visitors. City of Philadelphia. <https://www.phila.gov/2020-09-10-philadelphia-region-sets-a-record-in-2019-with-46-million-visitors/#:~:text=Philadelphia%20Region%20Sets%20a%20Record%20in%202019%20with%2046%20Million%20Visitors,-For%20immediate%20release>

80. Northeast Corridor Commission. (2020). Northeast Corridor annual report: Operations and infrastructure, fiscal year 2019, Appendix A. <http://nec-commission.com/app/uploads/2020/04/NEC-Annual-Report-FY19.pdf>
81. U.S. Census Bureau. (2021). 2015-2019 American Community Survey 5-year estimates, Hispanic or Latino Origin by Race (B03002), Ratio of Income to Poverty Level (C17002) [Data sets]. Retrieved from <https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes.html>
82. SEPTA CSS 2019 Demographics by Mode Customer Survey, 2018
83. Southeastern Pennsylvania Transportation Authority Service Planning Department. (2019). Fiscal year 2020 annual service plan. <https://planning.septa.org/wp-content/uploads/2021/02/Annual-Service-Plan-FY2020.pdf>.
84. U.S. Census Bureau. (2021). Longitudinal Employer-Household Dynamics, LEHD Origin-Destination Employment Statistics (LODES) [Data set]. Retrieved from <https://lehd.ces.census.gov/data/>
85. Downtown Wilmington. (n.d.). Downtown Wilmington DE business directory. <http://downtownwilmingtonde.com/business-directory>
86. Northeast Corridor Commission. (2014). The Northeast Corridor and the American economy. <http://nec-commission.com/app/uploads/2018/04/NEC-American-Economy-Final.pdf>
87. Pennsylvania Department of Environmental Protection. (n.d.). Climate change. <https://www.dep.pa.gov/Citizens/climate/Pages/default.aspx>
88. Pennsylvania Department of Environmental Protection. (n.d.). Pennsylvania Climate Action Plan. <https://www.dep.pa.gov/Citizens/climate/Pages/PA-Climate-Action-Plan.aspx>
89. Delaware Department of Natural Resources and Environmental Control. (n.d.). Taking action. <https://dnrec.alpha.delaware.gov/climate-coastal-energy/climate-change/taking-action/>
90. \$18.3M for Trenton Transit Center upgrade announced. (2020, October 26). New Jersey Business Magazine. <https://njbmagazine.com/njb-news-now/18-3m-for-trenton-transit-center-upgrade-announced/>
91. NJTOD. (2008, July 27). Trenton continues station area redevelopment efforts. <http://www.njtod.org/trenton-continues-station-area-redevelopment-efforts/>
92. New Jersey Future. (2018). Trenton Transit Center strategic action blueprint. <https://www.njfuture.org/wp-content/uploads/2018/10/Trenton-Transit-Center-Strategic-Action-Blueprint-July-2018.pdf>
93. Borla, O. J. (2018). The fiscal and economic impact of the Wilmington Riverfront. Center for Applied Demography & Survey Research, University of Delaware. <https://riverfrontwilm.com/wp-content/uploads/2015/03/RDC-Fiscal-and-Economic-Impact-of-the-Wilmington-Riverfront-Feb-2018.pdf>
94. Drexel University. (2016, March 16). Schuylkill Yards: Innovation with inclusion. <https://drexel.edu/close/news/announcements/2016/March/Schuylkill%20Yards/>
95. Amtrak. (2017). 30th Street Station Plaza preferred concept plan. https://static1.squarespace.com/static/539b050fe4b077b40b221f4f/t/5a0479990d9297da01057945/1510242754240/171107-Preferred+Concept+Plan_Final_public_web.pdf
96. Northeast Corridor Commission. (2016). Investing in the Northeast Corridor: Advancing the American economy. http://nec-commission.com/app/uploads/2018/04/2016-02-16_Report-Investing-in-NEC_FINAL.pdf

97. Amtrak. (n.d.). Amtrak fact sheet fiscal year 2019: District of Columbia [Fact sheet]. <https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/statefactsheets/DC19.pdf>; Northeast Corridor Commission. (2019). MARC and VRE Ridership Data [Data set]. Retrieved from NECC Cost Allocation Model.
98. Census Reporter. (2019). Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area. <https://censusreporter.org/profiles/31000US47900-washington-arlington-alexandria-dc-va-md-wv-metro-area/>
99. U.S. Bureau of Labor Statistics. (2021, April 28). Washington area employment – March 2021 [Press release]. https://www.bls.gov/regions/mid-atlantic/news-release/areaemployment_washingtondc.htm#table1
100. Cooper, R. (2017, May 9). D.C. breaks another domestic tourism record. Washington Business Journal. <https://www.bizjournals.com/washington/news/2017/05/09/d-c-breaks-another-domestic-tourism-record.html>
101. Census Reporter. (2019). Baltimore-Columbia-Towson, MD Metro Area. <https://censusreporter.org/profiles/31000US12580-baltimore-columbia-towson-md-metro-area/>
102. U.S. Bureau of Labor Statistics. (2021, May 3). Baltimore area economic summary. https://www.bls.gov/regions/mid-atlantic/summary/blssummary_baltimore.pdf
103. District Department of Transportation. (2017). State rail plan: Final report. https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/DC%20SRP%20FinalReport.pdf
104. Northeast Corridor Commission. (2020). Northeast Corridor annual report: Operations and infrastructure, fiscal year 2019, Appendix A. <http://nec-commission.com/app/uploads/2020/04/NEC-Annual-Report-FY19.pdf>
105. District Department of Transportation. (2017). State rail plan: Final report. https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/DC%20SRP%20FinalReport.pdf
106. Maryland Transit Administration. (2016). 2016 MARC Origin-Destination Survey.
107. U.S. Census Bureau. (2019). 2014 – 2018 American Community Survey 5-year estimates, Public Use Microdata Sample, Time of arrival at work [Data set]. Retrieved from: <https://data.census.gov/mdat/>
108. U.S. Census Bureau. (2020). 2015 – 2019 American Community Survey 5-year estimates, Hispanic or Latino by Race (A04001), Median Household Income (A14006), Housing Units by Vehicle Available (A10030) [Data sets]. Retrieved from <https://www.sociaexplorer.com/>
109. U.S. Census Bureau. (2020). 2015 – 2019 American Community Survey 5-year estimates, Median value of owner-occupied housing units (DP04) [Data set]. Retrieved from <https://www.census.gov/quickfacts/>
110. Texas A&M Transportation Institute. (2019). 2019 urban mobility report. <https://static.tti.tamu.edu/tti.tamu.edu/documents/mobility-report-2019.pdf>
111. Metropolitan Washington Council of Governments. (2021, February 8). Community-wide greenhouse gas emissions inventory summary. <https://www.mwcog.org/documents/2018/02/08/metropolitan-washington-community-wide-greenhouse-gas-emissions-inventory-summary--featured-publications-greenhouse-gas/>
112. Cross Street Partners. (n.d.). Baltimore Penn Station. <https://www.crossstpartners.com/project/baltimore-penn-station/>
113. Northeast Corridor Commission. (2014). The Northeast Corridor and the American economy. <http://nec-commission.com/app/uploads/2018/04/NEC-American-Economy-Final.pdf>
114. Ernst & Young LLP. (2020). Unlocking the potential for inclusive transit-oriented development in Anne Arundel County. Greater Washington Partnership. https://greaterwashingtonpartnership.com/wp-content/uploads/2021/01/GWP-Anne-Arundel-Report_11547-211US_2-spreads.pdf

115. Cohn, M. (2019, June 27). University of Maryland BioPark plans 10-story gateway tower on MLK Blvd. The Baltimore Sun. <https://www.baltimoresun.com/business/real-estate/bs-bz-um-biopark-expands-20190627-story.html>
116. University of Maryland, Baltimore. (n.d.). University of Maryland BioPark. <https://www.umbiopark.com/>
117. University of Maryland. (n.d.). Discovery District. <https://discoverydistrict.umd.edu/>
118. Truss-Williams, A. (2021, April 2). A \$300 million mixed-use complex is coming to College Park's Discovery District. The Diamondback. <https://dbknews.com/2021/04/02/college-park-discovery-district-mixed-use-complex/>

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C35 Project List

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New England (NE)						
NE	MA	Boston South Station Expansion	MBTA	MassDOT, Amtrak	Expand Boston South Station (1899, rebuilt in 1985) Rail Terminal and related layover capacity to meet current and anticipated future high-speed, intercity, and commuter rail service demands. Improves service reliability; enhances passenger capacity and experience; promotes city-building in a key area of Boston; and allows for Dorchester Avenue to be reopened for public use and enjoyment.	NE PG 1: Boston
NE	MA	Boston South Station: Tower 1 Interlocking	MBTA	MassDOT, Amtrak	Complete redesign of Tower 1 Interlocking (as part of Boston South Station Expansion) to address current reliability and resiliency issues. Tower 1 Interlocking is the railway “intersection” that provides operational flexibility for trains converging on South Station. It distributes each train to and from its platform track at the station.	NE PG 1: Boston
NE	MA	Back Bay Station Platform Ventilation	MBTA	MassDOT, Amtrak	Design and construct an advanced ventilation system at the track and platform level, addressing environmental, safety, and state of good repair issues.	NE PG 1: Boston
NE	MA	Massachusetts Third Track (Readville to Canton)	MBTA	Amtrak	Add an additional third track between Readville to Canton Junction to expand capacity and enable Amtrak and MBTA to improve and increase service.	NE PG 2: Canton
NE	MA	MBTA Station Improvements - Canton Junction	MBTA		Implement station accessibility upgrades at Canton Junction to ensure the safety of customers.	NE PG 2: Canton

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New England (NE)						
NE	MA	Attleboro Area NEC Section On-time Performance /Capacity Improvement - Part 1	MBTA	Amtrak	Implement first phase improvements including the wiring of both Track 4 and Track 3 Thatcher to Holden, as well as the raising of the speed to 80 mph and the addition of commuter station sidings.	NE PG 3: Attleboro
NE	MA	Attleboro Area NEC Section On-time Performance/ Capacity Improvement - Part 2	Amtrak	MBTA	Implement second phase improvements including the addition of 21 crossover for full universal interlocking at Hebronville and Holden.	NE PG 3: Attleboro
NE	MA	MBTA Station Improvements - Attleboro Station	MassDOT		Implement station accessibility upgrades at Attleboro Station to ensure the safety of customers.	NE PG 3: Attleboro
NE	MA	MBTA Station Improvements - South Attleboro Station	MBTA	MassDOT	Implement station upgrades at South Attleboro Station to ensure the safety of customers.	NE PG 4: South Attleboro
NE	RI	MBTA Layover Facilities - Pawtucket Layover Facility	MBTA	MassDOT, RIDOT	Execute improvements to the existing Pawtucket Layover Facility to allow fueling and light equipment maintenance to be handled at the site, relieving pressure on other MBTA facilities.	NE PG 5: Pawtucket
NE	RI	Pawtucket / Central Falls Station	RIDOT	MBTA	Build a new infill commuter rail station along MBTA's Providence Line in Pawtucket, RI to provide one of Rhode Island's densest urban communities with access to commuter rail service.	NE PG 5: Pawtucket
NE	RI	Providence Station	RIDOT	Amtrak	Construct interior layout changes, emergency platform egress, and pedestrian access improvements at Providence Station (1986).	NE PG 5: Pawtucket

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New England (NE)						
NE	RI	Providence Station On-Time Performance/ Capacity Improvement	Amtrak	MBTA	Reconfigure Providence Station Interlocking (Atwells, Brayton, Orms and new Ash) to bring the infrastructure capabilities in line with the service needs and improve capacity and on-time performance for both Amtrak and MBTA.	NE PG 5: Pawtucket
NE	CT	New England Grade Crossing Elimination Program: Elihu Island Rd. Grade Crossing Closure	Amtrak	CTDOT	Permanently remove Elihu (Freeman's) Island Road Grade Crossing, one of the last highway-rail at-grade crossings on the NEC, by building a connection to an upgraded Walker's Dock Grade Crossing or a Locally Preferred Alternative.	NE PG 6: Mystic
NE	CT	New England Grade Crossing Elimination Program: Wamphassuc Rd. Grade Crossing Closure	Amtrak	CTDOT	Permanently remove Wamphassuc Rd. Grade Crossing, one of the last highway-rail at-grade crossings on the NEC, by building a connection to Joy Ave or Locally Preferred Alternative.	NE PG 6: Mystic
NE	CT	Mystic, CT Interlocking Improvements	Amtrak		Design and install a new universal interlocking VELTRI in Mystic, CT. Provides operating flexibility; improves reliability; allows for future maintenance outages and track possessions; and subdivides an 18-mile interlocking-to-interlocking segment into two shorter segments.	NE PG 6: Mystic
NE	CT	New England Grade Crossing Elimination Program: Latimer Point Rd. Grade Crossing Closure	Amtrak	CTDOT	Build a bridge or a Locally Preferred Alternative to close Latimer Point Road Grade Crossing, one of the last highway-rail at-grade crossings on the NEC.	NE PG 6: Mystic

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New England (NE)						
NE	CT	New London Station Safety Improvements (Grade Crossing elements included in the New England Grade Crossing Elimination Program)	Amtrak	CTDOT	Reduce the risk of train-vehicle collisions through enhanced grade crossing warning devices and the relocation of platforms at New London Station.	NE PG 7: New London
NE	CT	New England Grade Crossing Program: Miner Lane Grade Crossing Closure	Amtrak	CTDOT	Close Miner Lane Grade Crossing, one of the last highway-rail at-grade crossings on the NEC, by building connection to CT 213 or a Locally Preferred Alternative.	NE PG 7: New London
NE	CT	Connecticut River Bridge Replacement	Amtrak	CTDOT	Replace the existing Connecticut River Bridge (1907) between Old Saybrook and Old Lyme, CT, which is over 100 years old, with a new modern structure that improves reliability and offers higher speeds for Amtrak and Shore Line East trains.	NE PG 8: Brook
NE	CT	Brook Interlocking Improvement	Amtrak	CTDOT	Add a westbound Track 2 to Track 1 right hand crossover at Brook Interlocking which, when combined with the existing Saybrook Interlocking, will provide full universal interlocking functionality.	NE PG 8: Brook
NE	CT	Fitter Interlocking	Amtrak	CTDOT	Construct a new, wired universal interlocking in Clinton, CT to subdivide a 16-mile segment (Guilford and View Interlockings) into two and allow single track operation over a shorter distance during maintenance with less operational disruption.	NE PG 9: Fitter

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New England (NE)						
NE	CT	Clinton, CT Station NEC On-Time Performance/ Capacity Improvement	CTDOT	Amtrak	Add a new Track 1 platform at the Clinton, CT station to allow two trains to pass unimpeded at all times, improve passenger accessibility, increase station capacity, and enhance on-time performance.	NE PG 9: Fitter
NE	CT	Madison, CT Station NEC On-Time Performance/ Capacity Improvement	CTDOT	Amtrak	Add a new Track 1 platform at the Madison, CT Station to allow two trains to pass unimpeded at all times, and improve passenger accessibility, station capacity, and on-time performance.	NE PG 9: Fitter
NE	CT	Hartford Line: Hartford Station Relocation	CTDOT	Amtrak	Relocate and improve Hartford Station (1889, rebuilt in 1914 and 1987) to increase speeds from 20 to 45 mph, eliminate bottlenecks, and improve on-time performance.	NE PG 10: Hartford
NE	CT	Hartford Line: CTrail Hartford Line Rail Program: Windsor Locks Station and Interlocking	CTDOT	Amtrak	Add a new station and interlocking at Windsor Locks to improve reliability and allow for increased service of up to 25 round trips per day between New Haven, CT and Springfield, MA on the CTrail Hartford Line service.	NE PG 10: Hartford
NE	CT	Hartford Line: Connecticut River Bridge Replacement	Amtrak	CTDOT	Replace the existing single track Connecticut River Bridge with a new double track bridge to increase speeds for both commuter and intercity trains, eliminate capacity bottlenecks, and enhance on-time performance.	NE PG 10: Hartford
NE	CT	Hartford Line: Hartford Line Rail Program Phase 3B - 5	CTDOT	Amtrak	Rebuild and upgrade infrastructure between New Haven, CT and Springfield, MA to improve reliability and allow for increased service of up to 25 round trips per day between New Haven and Springfield on the CTrail Hartford Line service.	NE PG 10: Hartford
NE	CT	Hartford Line: CTrail North Haven Commuter Station Improvements	CTDOT	Amtrak	Add an additional station stop between New Haven, CT and Springfield, MA in North Haven, CT to support the CTrail Hartford Line service.	None

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New England (NE)						
NE	CT	Hartford Line: CT <i>rail</i> Newington Commuter Station Improvements	CTDOT	Amtrak	Add an additional station stop between New Haven, CT and Springfield, MA in Newington, CT to support the CT <i>rail</i> Hartford Line service.	None
NE	CT	Hartford Line: CT <i>rail</i> West Hartford Commuter Station Improvements	CTDOT	Amtrak	Add an additional station stop between New Haven, CT and Springfield, MA in West Hartford, CT to support the CT <i>rail</i> Hartford Line service.	None
NE	CT	Hartford Line: Hartford Line New Stations - Windsor Locks / Bradley Airport Connection	CTDOT		Facilitate a connection to Connecticut's Bradley Airport from a new Windsor Locks Station.	None
NE	CT	Hartford Line: CT <i>rail</i> Enfield Commuter Station Improvements	CTDOT		Add an additional station stop between New Haven, CT and Springfield, MA in Enfield, CT to support the CT <i>rail</i> Hartford Line service.	None
NE	MA & RI	NEC Regional Rail Plan (RI-MA)	RIDOT / MBTA	MassDOT, Amtrak	Study the capital investments required to increase capacity and reduce travel times along the NEC between Wickford Junction, RI and Boston, MA.	NE PG 11: NE Planning
NE	MA	Boston - Route 128 Capacity Study & Implementation: Fairmount Line	MBTA	Amtrak	Study the value of upgrading the Fairmount Line with electric power supply, interlocking, and track improvements including the installation of a 4th main track between Route 128 and Boston, MA to address capacity constraints and expand service.	NE PG 11: NE Planning
NE	RI & CT	New Haven - Providence Capacity Planning Study	Amtrak	RIDOT, CTDOT	Study of investment options to accommodate future capacity and service needs between New Haven, CT and Providence, RI.	NE PG 11: NE Planning
NE	RI	RIDOT Stations: Warwick/ T.F. Green Airport	RIDOT	Amtrak	Expand the Warwick/T.F. Green Airport rail station with additional track and platform capacity to accommodate intercity rail and commuter rail turnback operations.	NE PG 12: Warwick

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New England (NE)						
NE	MA	MBTA Yard Expansion and Electrification - Southampton Street	MassDOT		Expand and electrify the MBTA yard at Southampton St (Boston, MA).	NE PG 13: MBTA Yards
NE	MA	MBTA Yard Expansion and Electrification - Readville	MassDOT		Expand and electrify the MBTA yard in Readville, MA.	NE PG 13: MBTA Yards
NE	CT	Shore Line East Power Supply Upgrade	Amtrak	CTDOT	Add an additional utility supply point in the 40+ mile segment between Branford and New London, CT.	NE PG 14: Shore Line East
NE	MA	Boston-Canton Junction High Capacity Signaling System	MBTA	Amtrak	Upgrade the existing wayside/cab signal system to increase capacity on existing Tracks 1, 2, and 3 between "Cove" and "Junction" interlockings. Provides support for the MassDOT/ MBTA Commuter Rail Transformation operating plan.	NE PG 15: Boston-Canton
NE	MA & RI	Providence-Boston Traction Power Upgrades	MBTA	Amtrak	Implement additional substation capacity and construct additional substations and paralleling stations between Providence and Boston to accommodate increased future train volumes.	NE PG 15: Boston-Canton

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Connecticut-Westchester (CTW)						
CTW	CT	NEC New Haven Line Signal System Replacement CP261 (Stratford) – CP274 (New Haven) (Phases 1–3)	CTDOT	Metro-North, Amtrak	Redesign the New Haven Line cab/no wayside signal system from Stratford to New Haven to support higher capacity. Higher capacity in this area will reduce the minimum supportable headway between trains and enhance reliability.	CTW PG 1: New Haven
CTW	CT	New Haven Line Network Infrastructure Upgrade	CTDOT	Metro-North	Upgrade the communications infrastructure with fiber optic cable/ equipment to support closed circuit television safety cameras at vulnerable passenger stations and bridges. This is critical to passenger safety and to the resiliency of the overall system.	CTW PG 1: New Haven
CTW	CT	New Haven Line Yard and Facility Program	CTDOT	Metro-North	A multi-year initiative to implement the new facilities necessary to store and maintain the upgraded Connecticut commuter fleet and spare parts. This is critical to CTDOT's fleet strategy.	CTW PG 1: New Haven
CTW	CT	New Haven Line Stations Improvements: New Haven Station	CTDOT	Metro-North	Construct a new parking garage for New Haven Union Station to address passenger demands and allow for continued safe operation.	None
CTW	CT	CP 261 (Devon) to CP 266 (Woodmont) 4th Track Project	Amtrak	Metro-North, CTDOT	Restore four-track configuration by reinstalling the main track 3 between Devon and Woodmont (CP266 to CP261) and reconfiguring Milford station platforms. This will allow simultaneous overtakes by Amtrak of Metro-North trains in both directions, improving operational flexibility, capacity, and on-time performance.	CTW PG 2: Devon
CTW	CT	Devon Bridge Replacement	CTDOT	Amtrak, Metro-North	Replace Devon Bridge (1906), one of the most critical movable bridge replacements on the NEC New Haven Line. This will reduce a source of long-term major disruptions of service.	CTW PG 2: Devon

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Connecticut-Westchester (CTW)						
CTW	CT	Bridgeport Speed Improvements	CTDOT	Amtrak, Metro-North	Upgrade a three mile stretch of track in Bridgeport, including the replacement of five fixed undergrade bridges, to improve the track speed from 70mph to 90mph and address the backlog of state of good repair bridge replacements. This sets the stage for a future Devon Bridge replacement.	CTW PG 2: Devon
CTW	CT	NEC New Haven Line Movable Bridge Speed Upgrades	Amtrak	Metro-North, CTDOT	Install Heavy Gauge Miter Rail on Devon, Saga, Walk and Cos Cob movable Bridges to improve trip times on the southern half of the NEC, producing greater intercity ridership and revenue.	Split into different Bridge PGs (CTW-PG2, CTW-PG3, CTW-PG4, CTW-PG5)
CTW	CT	Saugatuck River Bridge Replacement	CTDOT	Amtrak, Metro-North	Replace the aging Saugatuck River Bridge (1905) to improve reliability for Amtrak and Metro-North riders, as well as maritime traffic.	CTW PG 3: Saugatuck
CTW	CT	New Haven Line Station Platform Replacement Program (Westport, Darien)	CTDOT	Amtrak, Metro-North	Replace station platforms at both Westport and Darien Stations. This is necessary due to the platforms' deteriorated conditions.	None
CTW	CT	NEC New Haven Line Signal System Replacement CP241 (South Norwalk)-CP261 (Stratford) (Phases 1-3)	CTDOT	Metro-North, Amtrak	Redesign the cab/no wayside signal systems from South Norwalk to Stratford, CT to support higher capacity, reduce minimum supportable headway between trains, and enhance reliability especially when recovering from service disruptions.	CTW PG 4: Walk
CTW	CT	Walk Bridge Program	CTDOT	Amtrak, Metro-North	Replace the functionally obsolete Walk Bridge (1896), which has experienced increasing deterioration of electrical and mechanical components. This will reduce a source of long-term major disruptions of service.	CTW PG 4: Walk

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Connecticut-Westchester (CTW)						
CTW	CT	NEC New Haven Line Signal System Replacement CP216 (New Rochelle) to CP234 (Stamford) (Phases 1-3)	CTDOT	Metro-North, Amtrak	Redesign the cab/no wayside signal systems from Stratford, CT to New Rochelle, NY to support higher capacity, reduce minimum supportable headway between trains, and enhance reliability especially when recovering from service disruptions.	CTW PG 5: Stamford
CTW	CT	New Haven Line Stations Improvements: Stamford Station	CTDOT	Amtrak, Metro-North	Implement upgrades and repairs to ensure safe operation and improve passenger experience. This will increase canopy and windscreen coverage; provide additional pedestrian paths and parking; repair and replace platforms; and ensure ADA compliance.	CTW PG 5: Stamford
CTW	CT	Cos Cob Bridge Replacement	CTDOT	Amtrak, Metro-North	Replace the existing Cos Cob Bridge (1904), the busiest movable bridge on the New Haven Line which requires substantial investment to address challenges caused by aging components and deferred maintenance.	CTW PG 5: Stamford
CTW	CT	NEC New Haven Line Signal System Replacement CP234 (Stamford) – CP241 (South Norwalk) (Phases 1-3)	CTDOT	Metro-North, Amtrak	Redesign the cab/no wayside signal systems on the NEC from Stamford to Stratford, CT to support higher capacity, reduce minimum supportable headway between trains, and enhance reliability especially when recovering from service disruptions.	CTW PG 6: Darien
CTW	CT & NY	New Haven to New Rochelle NEC Capacity & Trip Time Planning Study	Amtrak	Metro-North, CTDOT	Study investment options to accommodate future segment capacity and performance requirements. Includes investigation of on-NEC vs off-NEC alignment options for feasibility and highest value.	CTW PG 7: NHL Planning
CTW	CT	NEC New Haven Line Track and Speed Improvements	CTDOT	Metro-North, Amtrak	Implement improvements, including new electrified tracks, interlockings, and freight sidings. Improves the maximum speed profile for passenger trains, reduce trip times, enhance mobility, and promote economic growth for Connecticut's urban centers.	CTW PG 8: New Haven Line Improvements

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Connecticut-Westchester (CTW)						
CTW	CT	New CP 228	CTDOT	Metro-North, Amtrak	Construct a new interlocking (New CP 228) west of Greenwich, CT. This improves capacity by allowing trains to serve high-ridership Greenwich Station but then use the express track to the west.	CTW PG 9: Greenwich
CTW	CT	Harrison-Greenwich Local Tracks Passing Sidings	CTDOT	Metro-North, Amtrak	Add new electrified passing sidings for "Track 5" and "Track 6" and associated turnouts/crossovers to enhance capacity and operational flexibility by allowing overtakes of slower trains by faster trains in the reverse-peak direction.	CTW PG 9: Greenwich
CTW	CT & NY	New Rochelle Turnback Track/ Yard	Amtrak	Metro-North, CTDOT	Add Turnback Pocket Tracks at New Rochelle (CP 217) to allow turning trains from New York City's Grand Central and Penn Station New York (future) to change direction. This will add additional capacity, reduce congestion, increase reliability, and improve Metro-North scheduling flexibility.	CTW PG 9: Greenwich
CTW	CT	Bridgeport Area New Turnback Track	CTDOT	Metro-North	Construct a new electrified "Track 5" (connecting to Track 3) or "Track 6" (connecting to Track 4) west of Bridgeport's CP 255 interlocking to support increased levels of Waterbury Branch shuttle service by allowing the shuttle trains to pull off the mainline while waiting for a slot.	CTW PG 10: Bridgeport

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New York City Metro (NYM)						
NYM	NY	Penn Station Access	MTA	Amtrak	Provide new Metro-North New Haven Line service to Penn Station New York and construct four new stations in the Bronx (Co-op City, Morris Park, Parkchester/Van Nest, and Hunts Point). This also brings Amtrak's Hell Gate Line to a state of good repair, improves reliability and on-time performance for Amtrak.	NYM PG 1: Bronx
NYM	NY	Pelham Bay Bridge Replacement	Amtrak	Metro-North	Replace Pelham Bay Bridge (1907), which crosses the Hutchinson River in the Bronx, with either a new, low-level movable, mid-level movable, or a high-level fixed bridge with clearance for marine traffic.	NYM PG 1: Bronx
NYM	NY	Harold Interlocking	MTA	Amtrak	Construct new conflict-free train routes through Harold Interlocking in Queens, NY, the busiest switch point on the NEC, improving reliability, on-time performance, and travel time for all rail services operating through the Harold Interlocking.	NYM PG 2: Harold
NYM	NY	Sunnyside Yard/Loop Track Capacity Improvements	Amtrak	NJ TRANSIT, LIRR	Conduct capacity improvements at Sunnyside Yard, including upgrades to loop tracks, improvements to signaling, and the conversion of principle turnouts from hand-thrown to power. This will increase average speeds and reduce travel times for trains using Sunnyside Yard.	NYM PG 2: Harold
NYM	NY	East River Tunnel Rehabilitation	Amtrak	MTA, NJ TRANSIT	Rehabilitate the aging and deteriorating East River Tunnel tubes 1 and 2 (1908) which connect Penn Station New York to Queens, NY and carry 25 percent of LIRR trains. This includes the replacement of the track and drainage systems; safety and security renovations; and the upgrade of all signal and communication systems.	NYM PG 2: Harold

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New York City Metro (NYM)						
NYM	NY	River-to-River Rail Resiliency Projects (R4)	LIRR	Amtrak	Implement resiliency related improvements to protect the East River Tunnels (1908) and the West Side Yard against flood hazards. This includes West Side Yard perimeter protection and drainage improvements; hardening the Queens Portals of the East River Tunnels; and resiliency improvements within the East River Tunnels.	NYM PG 2: Harold
NYM	NY	East River Tunnel High Density Signaling	MTA	Amtrak	Shorten average signal block length and improve ERT capacity by implementing either small-scale cab/wayside signaling changes or a complete redesign using Amtrak Rule 562 (LIRR Rule 410) cab/no wayside signal architecture.	NYM PG 2: Harold
NYM	NY	Gateway: Penn Station Expansion	MTA	Amtrak, NJ TRANSIT	Expand Penn Station New York (1910 -- rail infrastructure; 1968 -- station building) to add new tracks, platforms, and concourse space to accommodate the expected growth facilitated by the Gateway Program.	NYM PG 3: Penn Station
NYM	NY	Penn Station New York: Reconstruction Master Plan	MTA	Amtrak, NJ TRANSIT	Reconstruct Penn Station New York to relieve overcrowding, improve passenger experience; rationalize station operation; increase revenue; unify the existing Penn Station with the with the Moynihan Train Hall and Penn Expansion; and address other deficiencies.	NYM PG 3: Penn Station
NYM	NY	Penn Station NY - NJT Projects	NJ TRANSIT	Amtrak	Renovate Penn Station New York (1968 -- station building) by extending the existing Central Concourse; improving the existing Hilton Corridor; and improving signage and wayfinding to facilitate the safe and efficient movement of visitors.	NYM PG 3: Penn Station

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New York City Metro (NYM)						
NYM	NY & NJ	Gateway: Hudson Tunnel Project	Amtrak	Gateway Program Development Corporation, Port Authority of NY & NJ, NJ TRANSIT	Construct a new two-track rail tunnel beneath the Hudson River; rehabilitate and modernize the existing two-track North River Tunnel (1906); and construct the third and final rail right-of-way preservation section beneath Hudson Yards. This will provide increased reliability and operational flexibility for Amtrak and NJ TRANSIT.	NYM PG 4: Gateway East
NYM	NJ	Gateway: Secaucus Station and Loop Tracks	NJ TRANSIT	Amtrak, Port Authority of NY & NJ, Gateway Program Development Corporation	Expand the Secaucus Station platform system and add loop tracks at Secaucus Junction, working towards the four-track right-of-way between Newark, NJ and Penn Station New York needed to accommodate the ongoing and forecasted growth.	NYM PG 4: Gateway East
NYM	NJ	Replace Secaucus Switches	Amtrak	NJ TRANSIT	Replace the existing 26.5 Secaucus switches with 24 switches. This will resolve issues for NJ TRANSIT caused by a lack of maintenance for the current 26.5 switches.	NYM PG 4: Gateway East
NYM	NJ	Gateway: Portal North Bridge	NJ TRANSIT	Amtrak, Gateway Program Development Corporation, Port Authority of NY & NJ, NJ Tpk Auth	Replace the century-old swing-span Portal Bridge (1910) over the Hackensack River with a new two-track, fixed-span bridge, allowing a modest expansion of capacity. This will significantly reduce maintenance and operating costs while increasing reliability and on-time performance.	NYM PG 4: Gateway East
NYM	NJ	Gateway: Portal South Bridge	NJ TRANSIT	Amtrak, Port Authority of NY & NJ, Gateway Program Development Corporation	Construct new tracks and systems over the Hackensack River, including a two-track Portal South Bridge working towards the four-track right-of-way between Newark, NJ and Penn Station New York needed to accommodate the ongoing and forecasted growth.	NYM PG 4: Gateway East

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New York City Metro (NYM)						
NYM	NJ	Newark Penn Station to EWR Station NEC Section Capacity Improvement (Short-term)	Amtrak	NJ TRANSIT	Implement capacity improvements from Newark Penn Station to Newark Liberty International Airport Station (EWR), including a parallel move (WB 4 to 3 at Haynes Interlocking), and the addition of crossovers at EWR.	NYM PG 5: Newark
NYM	NJ	Newark Penn Station: Amtrak Projects	Amtrak	NJ TRANSIT, Port Authority of NY & NJ	Improve the condition, appearance, and functionality on Platforms A, B, and C (E is already completed) at Newark Penn Station where both Amtrak and NJ TRANSIT have responsibility to maintain to a state of good repair.	NYM PG 5: Newark
NYM	NJ	Newark Penn Station: NJT Projects	NJ TRANSIT	Amtrak, Port Authority of NY & NJ	Bring Newark Penn Station into a state of good repair by rehabilitating Platform D; installing new vertical circulation units; replacing the roof; upgrading passenger amenities; improving the HVAC system; upgrading display boards; and any needed structural improvements.	NYM PG 5: Newark
NYM	NJ	Hunter Flyover	NJ TRANSIT	Amtrak	Construct an elevated viaduct to allow for NJ TRANSIT's Newark-bound Raritan Valley Line trains to cross above and then merge with NEC before continuing towards Newark. This eliminates at-grade crossings, thereby reducing conflict between trains and increasing capacity.	NYM PG 5: Newark
NYM	NJ	Hunter Yard Maintenance of Way Facilities Upgrades	Amtrak	NJ TRANSIT	Create a new consolidated facility at Hunter Yard to increase efficiency of production activities, including a greater ability to store equipment for work gangs and staging for nearby projects. This includes resiliency improvements to protect against flooding.	None

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New York City Metro (NYM)						
NYM	NJ	Gateway: Highline Renewal and State of Good Repair	Amtrak	NJ TRANSIT, Port Authority of NY & NJ, Gateway Program Development Corporation	Replacement of several assets between Newark, NJ and Penn Station New York to bring the NEC Highline infrastructure to a state of good repair. Includes the replacement of short span bridges; electric catenary, aerial structures, and transmission lines; and Newark Penn Station pedestrian facilities.	NYM PG 6: Gateway West
NYM	NJ	Gateway: Sawtooth Bridge	Amtrak	NJ TRANSIT, Gateway Program Development Corporation, Port Authority of NY & NJ	Replace Amtrak's Sawtooth Bridges (1907) with new structures to achieve a four-track segment with improved speeds; increasing efficiency and reliability.	NYM PG 6: Gateway West
NYM	NJ	Gateway: Dock Bridge Rehabilitation	Amtrak	NJ TRANSIT, Port Authority of NY & NJ, Gateway Program Development Corporation	Rehabilitate Dock Bridge to restore it to a state of good repair, maintain reliable operation, and preserve safety. Required repairs include structural steel painting, pier repairs, mechanical and electrical upgrades, and fender replacement.	NYM PG 6: Gateway West
NYM	NJ	Choke point relief: Westbound Waterfront Connection	NJ TRANSIT		Construct a new connection for westbound trains from Hoboken Terminal to the NEC, and enhance the existing eastbound connection. This would offer greater access to/from Manhattan via PATH rapid transit and ferry services at Hoboken.	NYM PG 6: Gateway West
NYM	NJ	Gateway: NJT Storage Yard	NJ TRANSIT	Amtrak, Gateway Program Development Corporation, Port Authority of NY & NJ	Locate a new rail yard in New Jersey to support the layover storage and maintenance facilities needed for the Gateway Program.	NYM PG 6: Gateway West

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New York City Metro (NYM)						
NYM	NJ	Gateway: Harrison Fourth Track Phase 1	Amtrak	NJ TRANSIT, Gateway Program Development Corporation, Port Authority of NY & NJ	Design and construct approximately 2,000 ft. of additional main track through the city of Harrison, NJ, as well as the changes necessary to connect the new track with the existing infrastructure and PATH's on-going Harrison Station replacement project.	NYM PG 6: Gateway West
NYM	NJ	Delco Lead Project	NJ TRANSIT	Amtrak	Construct a storage facility south of New Brunswick station to provide resilient storage for rail cars and service and inspection (S&I) capabilities to facilitate the rapid return to service of stored rolling stock equipment following an extreme weather event.	NYM PG 7: Adams
NYM	NJ	Mid-Line Loop	NJ TRANSIT	Amtrak	Construct a new above-grade connection between train storage facilities and the NY-bound local track to eliminate conflicts and provide the increased capacity necessary to enable the New Jersey High-Speed Rail Program's goal of 160-mph speeds on Acela, and support future express service patterns.	NYM PG 7: Adams
NYM	NJ	Adams Substation	NJ TRANSIT	Amtrak	Construct a new substation in Adams, NJ to provide the additional transformation capacity needed to properly operate electric trains in this area.	NYM PG 7: Adams
NYM	NJ	North Brunswick Station	NJ TRANSIT	Amtrak	Build a new rail station in North Brunswick, NJ which included two center island platforms 1,020 feet in length to support 12-car trains; parking facilities; and all related building systems.	None

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New York City Metro (NYM)						
NYM	NJ	Elizabeth Station	NJ TRANSIT		Reconstruct two high-level passenger platforms and two station buildings at Elizabeth station. These needed upgrades would bring the station up to current ADA compliance standards, provide longer platforms, and accommodate a proposed future fifth track along the NEC.	NYM PG 8: Elizabeth
NYM	NJ	Metuchen Station	NJ TRANSIT		Extend the existing outbound high-level platform at Metuchen Station by 360 feet. Additional funding is required for design and construction. The extended platform will result in smoother passenger boarding and deboarding as well as shorter dwell times.	None
NYM	NJ	Edison Station	NJ TRANSIT		Relocate an existing freight turn-out switch to a location north of Plainfield Avenue by Edison Station and extend the existing outbound high-level platform. This will result in smoother passenger boarding and deboarding as well as shorter dwell times.	None
NYM	NJ	New Jersey HSR Improvement Program (New Brunswick to Newark)	Amtrak	NJ TRANSIT	Upgrade electrical power, signal systems, tracks and overhead catenary wires from New Brunswick to Newark, NJ to increase safety, reliability, passenger service, and connectivity, while decreasing environmental impact.	NYM PG 9: New Brunswick
NYM	NJ	New Brunswick Station Improvements	NJ TRANSIT	Amtrak	Improve New Brunswick Station by extending the current eastbound platform by approximately 230 feet; rehabilitating the exterior brick facade; installing new lighting, windows, HVAC system, and escalator; and painting. This will extend the useful life of this major commuter rail station, and contain future maintenance costs.	NYM PG 9: New Brunswick

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
New York City Metro (NYM)						
NYM	NJ	Jersey Avenue Station	NJ TRANSIT		Reconstruct the existing Jersey Avenue station, including new high-level eastbound and westbound platforms, elevators, and the addition of a new commuter parking lot and connecting pedestrian overpass. The implementation of these improvements will make this station ADA accessible.	None
NYM	NJ	NJ TRANSITGRID	NJ TRANSIT	Amtrak	Create a redundant microgrid power generation and distribution system, allowing transit systems to function when the centralized power grid is compromised. Incorporates renewable energy, distribution generation, and other technologies to provide resilient power.	NYM PG 10: NJ TRANSITGRID

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic North (MAN)						
MAN	PA	Morrisville Yard	SEPTA	NJ TRANSIT	Implement the infrastructure necessary to accommodate the storage of six 4-car SEPTA trains (24 cars total) at Morrisville Yard while also reducing congestion. Includes the construction of new tracks and the removal of all SEPTA storage at Trenton Transit Center.	MAN PG 1: Morrisville
MAN	PA	Trenton Line: Parking Expansion	SEPTA	Amtrak	Increases parking capacity at four NEC Main Line Stations. The stations include Cornwells Heights, which serves both Amtrak and SEPTA, as well as the SEPTA only stations Holmesburg, Tacony, and Levittown.	None
MAN	PA	Trenton Line: Station Accessibility Program	SEPTA		Implement the infrastructure necessary to make two NEC Main Line Stations (Bristol and Cornwells Heights) ADA accessible through a series of improvements including the addition of high-level platforms. Additionally, capacity will also be improved by providing high-level platforms.	MAN PG 2: Bristol
MAN	PA	New Interlocking between Cornwells Heights and Eddington	SEPTA	Amtrak	Add a new interlocking with 4-track right hand universal crossovers and, if feasible, a tail/side/pocket track off of Track 1 in-between Cornwells Heights and Eddington. This will allow northward/eastward SEPTA trains terminating at Cornwells Heights to reverse direction by crossing from Track 1 to Track 4 at to head southward/ westward.	MAN PG 2: Bristol
MAN	PA	Center City Philadelphia Switch Renewal	SEPTA		Renew three switches in Center City Philadelphia as part of a capital renewal effort. Specific switches to be renewed include: Lehigh, Girard & Mantua.	None

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic North (MAN)						
MAN	PA	30th Street West Catenary Replacement	SEPTA		Replace and modernize the SEPTA overhead catenary system from 30th Street Station to K and Zoo Interlockings. This will rehabilitate assets beyond their useful life and improve system reliability.	MAN PG 3: Philadelphia
MAN	PA	Philadelphia 30th Street Station District Plan Implementation	Amtrak	SEPTA, NJ TRANSIT	Conduct immediate and long-term improvements to passenger and rail facilities at Philadelphia 30th Street Station (1933, rebuilt in 1984), to enhance the customer experience and expand the capacity of the concourse to accommodate anticipated growth in Amtrak ridership.	MAN PG 3: Philadelphia
MAN	PA	SEPTA Airport Line Separation Project	SEPTA	Amtrak	Conduct an Alternatives Analysis to determine the preferred strategy to address SEPTA's Airport Line dispatch separation and facilitate premium airport service. Options under consideration are: (1) expand existing flyover; (2) add new 50th St interlocking to allow Airport trains to bypass Phil Interlocking.	MAN PG 3: Philadelphia
MAN	PA	Phil Interlocking Replacement	Amtrak	SEPTA, PennDOT	Replace the signal system, track, and catenary at Phil Interlocking which has exceeded its useful life. Phil Interlocking is served by Amtrak's Northeast Corridor Line and SEPTA's Wilmington and Airport Regional Rail project.	MAN PG 3: Philadelphia
MAN	PA	Wilmington Line Station Improvements/ ADA Improvements	SEPTA		Make four Wilmington Line Stations ADA accessible through a series of improvements. Stations included in this project are Marcus Hook, Highland Ave, Curtis Park, and Sharon Hill.	MAN PG 4: Hook

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic North (MAN)						
MAN	PA	Baldwin Interlocking Improvements	Amtrak	SEPTA, DelDOT	Improve Baldwin Interlockings by replacing the #15 crossover between tracks 2 & 3 with a #20 and installing #20 "43" and "21" crossovers. This improves capacity, supports Zone Express service and maintenance outages, and stays within existing home signal location.	MAN PG 4: Hook
MAN	PA	Hook Interlocking Improvements	Amtrak	SEPTA, DelDOT	Move the SEPTA Marcus Hook turnbacks off the main line to improve on-time performance and scheduling flexibility. This includes the replacement of the "23" & "32" #15 crossovers with #20's, the addition of a Track 5 turnback pocket to Hook west/south of Marcus Hook Platform, and the repositioning of Hook NB Home signal for Tracks 3 & 4 south of the Marcus Hook Station.	MAN PG 4: Hook
MAN	DE	Claymont Regional Transportation Center	DelDOT	Amtrak, SEPTA	Replace and relocate the existing Claymont, DE train station. The new station will meet all current ADA standards; be a multi-modal transportation center with improved access for bus transit, bicycles, and pedestrians; include the construction of a parking garage; and provide rail and bus riders with state-of-the-art amenities.	MAN PG 5: Claymont
MAN	DE	Holly - Bell - Landlith Improvement Project	Amtrak	SEPTA, PennDOT	Reconfigure Holly interlocking, remove Bell Interlocking, rebuild Landlith Interlocking, upgrade track 1 to 110 mph from Holly to Landlith interlockings, and upgrade tracks 1F and 2F between Holly and Bell. This reduces delays by lowering the need to hold SEPTA trains at Holly and Wilmington, boosting on-time performance.	MAN PG 6: Wilmington

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic North (MAN)						
MAN	DE	Landlith Interlocking - Wine Interlocking NEC Section Improvement Project	Amtrak	SEPTA, DelDOT	Address a 2-track section by adding a 3rd Main track from Landlith to Wine, finishing Landlith Interlocking as a universal, retiring Wine Interlocking, and restoring Track 1 from Landlith to Wine. This eliminates a significant bottleneck; reducing delays, improving on-time performance, and increasing scheduling flexibility.	MAN PG 6: Wilmington
MAN	DE	Wilmington Station Improvement Project: Track Geometry Work	Amtrak	SEPTA, DelDOT	Conduct track geometry improvements to improve ride quality and reduce maintenance at Wilmington Station (1908, rebuilt in 2011). This includes the extension of Wilmington Center Island Platform, the removal of Brandy Interlocking, and the widening and replacement of four bridges.	MAN PG 6: Wilmington
MAN	DE	Wilmington Maintenance of Equipment Facility - Complex Replacement	Amtrak		Replace the Maintenance of Equipment Repair Shop (Buildings 1 & 2) at the Amtrak Maintenance Complex in Wilmington, DE, allowing for proper maintenance of Amtrak's maintenance-of-way equipment.	None
MAN	DE	Wilmington Station Improvement Project: High Level Platform Extension	Amtrak	SEPTA, DelDOT	Extend the Track 1 high level platform to 900-1000 ft. to improve flexibility, support maintenance outages, and create greater ADA accessibility at Wilmington Station (1908, rebuilt in 2011).	None
MAN	DE	Ragan Turnback Track	SEPTA	DelDOT	Add a #15 or #20 right hand turnout to Track 3 at Ragan Interlocking to allow for more reliable and more frequent SEPTA service and decrease trip times versus the sequential crossover moves needed to access Track 1.	MAN PG 7: Ragan
MAN	DE	Newark (DE) Regional Transportation Center	DelDOT	Amtrak, SEPTA	Construct an updated and ADA-compliant transportation center to increase capacity and permit expansion of regional and commuter service, including the construction of a station house, platform, freight track connection, pedestrian bridge, and new/replaced interlocking.	MAN PG 7: Ragan

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic North (MAN)						
MAN	PA	Harrisburg Line: Parking Expansion	SEPTA	Amtrak	Implement additional parking at three Harrisburg Line Stations (Ardmore, Paoli and Exton).	None
MAN	PA	Harrisburg Line: Conestoga to Royalton Electric Traction Supply Transmission Line Replacement	Amtrak	NJ TRANSIT, SEPTA, DelDOT, MARC	Provide needed upgrades to the main power feeding the NEC south of New York through the replacement of electric power supply transmission lines from Conestoga to Royalton.	MAN PG 8: Royalton
MAN	PA	Harrisburg Line: West of Exton Commuter Service and Infrastructure Alignment (Park Interlocking)	Amtrak	SEPTA, PennDOT	Align the infrastructure on the western end of the Paoli Thorndale Commuter Zone with future planned service. This includes the construction of a turnback track at Park Interlocking, the completion of Coatesville Station, the rationalization of Thorn and Caln Interlockings, and potential alterations at Parkesburg/Park Interlocking.	MAN PG 9: Coatesville
MAN	PA	Harrisburg Line: Coatesville Passing Siding	PennDOT	Amtrak	Complete the Coatesville Passing Siding by constructing a freight passing siding, a new Lukens interlocking, and a new Graham interlocking. High-level platforms at Coatesville necessitates this as freight dimensional loads will not have the clearance to pass.	MAN PG 9: Coatesville
MAN	PA	Harrisburg Line: Atglen Turnback	SEPTA		Construct a siding at Atglen as part of the "Harrisburg Line: Passing Siding at Coatesville (MP 38.2 to 39.2 -- new Lukens to new Graham) project. This work is needed to accommodate freight if SEPTA runs service to Coatesville.	MAN PG 9: Coatesville
MAN	PA	Harrisburg Line: Station Accessibility Program -- PennDOT Led Stations	PennDOT	Amtrak, Federal Transit Administration, SEPTA	Make all Harrisburg Line stations ADA-accessible with high-level platforms. Stations covered under this project include: Downingtown, Coatesville & Middletown.	MAN PG 10: PennDOT ADA

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic North (MAN)						
MAN	PA	Harrisburg Line: Upgrade Track 2, Glen to Thorndale & Interlockings	SEPTA	Amtrak, PennDOT	Rehabilitate and upgrade 10 miles of the Harrisburg Line's Track 2 from Glen to Thorn Interlocking in Chester County, PA. The project will eliminate a choke point, reduce congestion, and enhance rail capacity and reliability while also improving operational flexibility.	MAN PG 11: Potts
MAN	PA	Harrisburg Line: Potts Interlocking Improvements	PennDOT	Amtrak, SEPTA	Implement a new interlocking to turn trains at Exton at Potts interlockings. This is a state of good repair initiative that will improve operational efficiencies by replacing or reconfiguring the functionally obsolete interlockings on Amtrak's Keystone Corridor and SEPTA's Paoli-Thorndale Line.	MAN PG 11: Potts
MAN	PA	Harrisburg Line: Station Accessibility Program -- SEPTA Led Stations	SEPTA		Make all Harrisburg Line stations ADA-accessible with high-level platforms. Stations covered under this project include: Villanova, Malvern, Devon & Wynnewood.	MAN PG 12: Bryn Mawr
MAN	PA	Harrisburg Line: Villa - Nova - Bryn Mawr Project (Phase 1)	Amtrak	SEPTA, PennDOT	Construct new Villa Interlocking with turnback track 5 and reconfigure Bryn Mawr Interlocking with one left-hand #20 crossover between Tracks 2&3. This is "Phase 1" of the two phase Harrisburg Line: Villa - Nova - Bryn Mawr Project and will increase on-time performance while maintaining Keystone running times.	MAN PG 12: Bryn Mawr
MAN	PA	Harrisburg Line: Paoli to Thorndale Overhead Contact System Replacement	Amtrak	SEPTA, PennDOT	Replace and upgrade the overhead contact system along SEPTA's Paoli-Thorndale Regional Rail Line and Amtrak's Keystone Corridor from Paoli to Thorndale. The project will rehabilitate assets beyond their useful life and improve system reliability.	MAN PG 12: Bryn Mawr

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic North (MAN)						
MAN	PA	Harrisburg Line: Restore Track 2 from Paoli to Frazer	SEPTA	Amtrak, PennDOT	Reinstall a third track on the 4-mile segment from Paoli to Frazer. In addition to the track work, the project will include the overhead contact system, signal, interlocking modifications, and right-of-way work needed to operate on the new track.	MAN PG 12: Bryn Mawr
MAN	PA	Harrisburg Line: Paoli Interlocking Improvements	PennDOT	Amtrak, SEPTA	Modernize and reconfigure Paoli Interlocking as it has far exceeded its useful life and is functionally obsolete.	MAN PG 12: Bryn Mawr
MAN	PA	Harrisburg Line: Zoo to Paoli Signal Upgrade	SEPTA	Amtrak, PennDOT	Replace the outdated single-direction signal system on Amtrak's Keystone Line with bi-directional signaling from Zoo Interlocking to State Interlocking. The project will rehabilitate infrastructure that is beyond its useful life while providing operations enhancements by allowing for bi-directional train movements.	MAN PG 13: Zoo
MAN	PA	Harrisburg Line: Zoo Interlocking Improvements	PennDOT	Amtrak, SEPTA	Implement a variety of improvements at Zoo Interlocking to create a through movement for westbound trains, improve trip time, and increase train speed. This includes the replacement of two stone masonry retaining walls, the modernization of the Track 2, the construction of new concrete tie tracks, the removal of one turnout and 500 feet of existing track, and various signal and overhead contact system improvements.	MAN PG 13: Zoo
MAN	PA	Harrisburg Line: Wynnefield Interlocking Improvements	PennDOT	Amtrak, SEPTA	Construct a new interlocking to replace the existing Overbook Interlocking to support existing and future ridership growth. This is a state of good repair initiative that will improve operational efficiencies on Amtrak's Keystone Corridor and SEPTA's Paoli-Thorndale Line.	MAN PG 13: Zoo

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic North (MAN)						
MAN	PA	Harrisburg Line: Automatic Block Signal System – Park to Paoli	Amtrak	SEPTA, PennDOT	Design and construct/install a new automatic block signal system between Park Interlocking and Paoli Interlocking. This will bring the signaling system into a state of good repair initiative, while enhancing the safety on the corridor.	MAN PG 13: Zoo
MAN	PA	Harrisburg Line: Paoli Transportation Center: Phase 2 Station & Intermodal Improvements	SEPTA	Amtrak, PennDOT	Reconstruct Paoli Intermodal Station on SEPTA's Paoli-Thorndale Regional Rail Line and Amtrak's Keystone Corridor to improve accessibility, passenger amenities, and intermodal connections. Work includes an intermodal station complex with an additional high-level platform and passenger amenities; enhanced bus facilities; and a parking garage.	None

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic South (MAS)						
MAS	MD	Susquehanna River Bridge Replacement (Phase 1)	Amtrak	MDOT Secretary's Office	Replace the existing low speed, two-track movable Susquehanna River Bridge (1906) with a modern high-level, fixed structure, with two tracks. "Phase 1" of a two phase project, this would increase speeds and benefit commuter and intercity rail as well as Norfolk Southern.	MAS PG 1: Susquehanna
MAS	MD	Susquehanna River Bridge Replacement (Phase 2)	Amtrak	MDOT Secretary's Office, MARC, MTA	Construct an additional 160 mph "East" bridge, complete Grace Interlocking, extend Track 1, and upgrade Oak Interlocking. This is "Phase 2" of a two phase project, and will provide high-speed rail capability as well as provide capacity for MARC and improve on-time performance.	MAS PG 1: Susquehanna
MAS	MD	Aberdeen, MD High Level Platforms Project	Amtrak	MDOT, MTA/MARC	Construct High Level side Platforms on Tracks 1 and 4 at Aberdeen Station, which is already ADA accessible through the use of a lift. Construct of Track 1 siding and associated interlocking work.	MAS PG 2: Aberdeen
MAS	MD	Bush River Bridge Major Rehabilitation	Amtrak	MDOT Secretary's Office	Rehabilitate Bush River Bridge (1913), connecting Edgewood and Perryman, Maryland, to resolve the service reliability threat caused by the aging bridge components and continued maintenance.	MAS PG 3: Bush
MAS	MD	Edgewood, MD High Level Platforms Project	MDOT MTA/ MARC	Amtrak	Construct High Level side Platforms at the Edgewood MARC Station which is already ADA accessible through the use of a lift.	MAS PG 4: Edgewood
MAS	MD	Edgewood, MD Capacity Improvement Project	Amtrak	MDOT MTA/MARC	Improve capacity by extending the Edgewood and Magnolia Sidings to the south side of the Bush River Bridge and installing 80 mph turnouts at both ends. This is an enabling project for the Bush River Bridge.	MAS PG 4: Edgewood

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic South (MAS)						
MAS	MD	Gunpowder River Bridge Major Rehabilitation	Amtrak	MDOT Secretary's Office	Rehabilitate the one-mile long Gunpowder River Bridge (1913), to reduce maintenance and costs; increase capacity and reliability; and provide benefits for Amtrak, MARC, and Norfolk Southern.	MAS PG 5: Gunpowder
MAS	MD	Martin Airport Station Accessibility Improvements	MDOT MTA/ MARC	Amtrak	Construct two high level platforms at Martin State Airport Station to provide ADA access to Martin's Airport MARC Station.	MAS PG 6: Martin
MAS	MD	Martin's Yard to Track 1 Crossover and Lead	MDOT MTA/ MARC		Construct a crossover from Track A to Track 1 at the Martin's yard to allow long-term outages of Track A for reconstruction while not isolating the yard.	MAS PG 6: Martin
MAS	MD	Martin's Yard Upgrade	MDOT MTA/ MARC		Replace the Track A switch with a new power-operated interlocked switch and 3 new wayside signals. This increases MARC trainset capacity from 2 to 4, allows faster movements in and out of the yard, and supports traffic locking between the new switch interlocking and both Gunpow and River Interlockings.	MAS PG 6: Martin
MAS	MD	Baltimore Penn Station Infrastructure Improvements	Amtrak	MDOT MTA/MARC	Complete infrastructure improvements to support scheduled increases to the high-speed rail service, specifically overtakes of Northeast Regional and MARC trains at Baltimore Penn Station (1911, rebuilt in 1984). Includes a new Track 8 (F) high-level platform, reconstruction of the Track 3 platform to be high-level, and supporting infrastructure.	MAS PG 7: Baltimore

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic South (MAS)						
MAS	MD	Baltimore Penn Station Capacity Project	Amtrak	Amtrak, MDOT MTA/MARC	Implement capacity improvements including the conversion of Track 1 to a passenger/Freight track and the reconfiguration of Paul Interlocking. Improves ride quality, decreases maintenance needs, and increases the capacity of Baltimore Penn Station (1911, rebuilt in 1984) to bring it in line with the capacity of the proposed B&P tunnel replacement.	MAS PG 7: Baltimore
MAS	MD	Baltimore Penn Station Master Plan	Amtrak	MDOT MTA/MARC	Provide an approach for Baltimore Penn Station (1911, rebuilt in 1984) to advance key near-term state-of-good-repair projects while establishing a development framework to leverage under utilized assets and accommodate future growth and redevelopment, potentially through a public private partnership.	MAS PG 7: Baltimore
MAS	MD	Baltimore & Potomac Tunnel Replacement: Enabling Components	Amtrak	MDOT MTA/MARC	Individually manage and complete a series of necessary enabling components prior to the construction of the Baltimore & Potomac Tunnel (1873) replacement. The list of components may change and individual components may be combined into packages to ensure cost and schedule efficiency.	MAS PG 7: Baltimore
MAS	MD	Baltimore & Potomac Tunnel Replacement: The Tunnel Proper	Amtrak	MDOT Secretary's Office	Replace the functionally obsolete, low speed, two-track Baltimore & Potomac Tunnel (1873) with a modern higher speed tunnel. This will reduce trip-time by increasing speeds; minimize operational conflicts among high-speed, intercity, and commuter passengers; and increase throughput capacity.	MAS PG 7: Baltimore
MAS	MD	MARC Station Improvements - West Baltimore	MDOT MTA/MARC	Amtrak	Reconstruct the West Baltimore MARC Station with high-level platforms to be ADA compliant and improve the passenger experience. This is integral with the staging for the Major Backlog project Baltimore & Potomac Tunnel Replacement: The Tunnel Proper.	MAS PG 7: Baltimore

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic South (MAS)						
MAS	MD	Penn-Camden Connector	MDOT MTA/ MARC		Construct a new rail link that will both enable efficiencies through the consolidation of vehicle maintenance and repair for both the Penn and Camden lines, as well as facilitate access to a new storage and maintenance facility for Penn Line MARC trains.	MAS PG 7: Baltimore
MAS	MD	Wilkins Interlocking Project	Amtrak	MDOT MTA/MARC	Reconstruct Wilkins Interlocking to increase speeds, improve operations, and facilitate construction phasing of the B&P tunnel project including temporary construction crossovers. This is an enabling project for Major Backlog project Baltimore & Potomac Tunnel Replacement: The Tunnel Proper.	MAS PG 7: Baltimore
MAS	MD	Riverside Yard Acquisition and Heavy Maintenance Building	MDOT MTA/ MARC		Construct the facilities needed to maintain and inspect MARC's locomotives, including the most recently procured SC-44 "Charger" locomotives, at Riverside Yard.	None
MAS	MD	New Carrollton Station - Acela 21	Amtrak	MDOT MTA/MARC, Maryland DOT, WMATA	Construct a 1,050-foot side platform; implement modifications to access NCR at ground level; and reinstall a freight gauntlet along Track 2. This supports the Acela 2021 Program and the 2020 NEC Service Plan while improving performance, reducing trip times, increasing reliability, and enhancing passenger experience.	MAS PG 8: New Carrollton
MAS	MD	New Carrollton Station - SOGR & ADA	Amtrak	MDOT MTA/MARC, WMATA	Renovate the existing platform and station to address SOGR and ADA deficiencies throughout the station, including platform repairs, restrooms renovations, passengers' path of travel, and other station improvements.	MAS PG 8: New Carrollton

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic South (MAS)						
MAS	MD	Hanson Interlocking	Amtrak	MDOT MTA/MARC	Construct a new interlocking to allow universal moves, reduce conflicts, and advance a state of good repair. This will expand capacity and reduce congestion by enabling express and local trains to operate simultaneously in both directions.	MAS PG 8: New Carrollton
MAS	MD	Washington-Baltimore High Capacity Signal Project	MDOT MTA/MARC	Amtrak	Implement new higher capacity signal system on all tracks between the northern limits of "C" Interlocking and the southern limits of Bridge Interlocking. This improves minimum intervals between trains, accommodating increased frequencies.	MAS PG 9: Washington
MAS	DC	VRE Midday Storage Facility at New York Avenue	VRE	Amtrak, District Department of Transportation	Plan, design, and construct a permanent midday storage facility for weekday VRE commuter trains between peak hours. This is critical to VRE's continued operations and growth, freeing up space for other agencies at the Ivy City rail complex.	MAS PG 9: Washington
MAS	DC	Washington Union Station First Street Tunnel Improvement Project	Amtrak	VRE	Improve the tunnel by installing Cab No Wayside 562 signaling between "A" Interlocking and CP Virginia. This maintains safety; increases capacity and train speed; and helps facilitate Washington Union Station rebuilding and daily operations.	MAS PG 9: Washington
MAS	DC	Washington Union Station: Claytor Concourse Modernization Program	Amtrak	MDOT MTA/MARC, VRE, Union Station Redevelopment Corporation, Federal Railroad Administration, WMATA	Design and construct operational, safety, and passenger experience improvements to the existing passenger concourse (Claytor Concourse). This supports the improvement of critical building infrastructure needed to enable the concourse expansion, correct egress issues, increase capacity, and improve passenger experience.	MAS PG 9: Washington

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic South (MAS)						
MAS	DC	Washington Union Station: Near Term Rail Program	Amtrak	MDOT MTA/MARC, VRE, Union Station Redevelopment Corporation, Federal Railroad Administration	Design and construct critical rail and infrastructure projects to enhance current operational flexibility and provide for the phasing and capacity expansion of the Long Term Program. Projects include: (1) Substation 25A Relocation and Catenary Sectionalizing; (2) Crew Base Renovation; and (3) Satellite Commissary Relocation.	MAS PG 9: Washington
MAS	DC	Washington Union Station: Subbasement Program	Amtrak	MDOT MTA/MARC, VRE, Union Station Redevelopment Corporation, Federal Railroad Administration	Provide Amtrak and VRE with an additional revenue track by which to board and alight trains, and then replace the bridging structure at the north portal of the First Street Tunnel spans rail tracks over a back of house station area (known as the Subbasement).	MAS PG 9: Washington
MAS	DC	Washington Union Station: Long Term Station Expansion	Amtrak	MDOT MTA/MARC, VRE, Union Station Redevelopment Corporation, District Department of Transportation, Federal Railroad Administration	Expand and redesign Washington Union Station's rail terminal including the construction of Burnham Place. This is necessary to reach a state of good repair and meet growing demand for commuter and intercity rail.	MAS PG 9: Washington
MAS	DE & MD	Bayview to Newport, DE NEC Section Capacity & Performance Planning Study	Amtrak		Conduct a study of investment options to accommodate future segment capacity and performance requirements and to determine the need for a new segment between Bayview and Newport as defined in NEC FUTURE.	MAS PG 10: MAS Planning
MAS	MD	Closed Circuit Television (CCTV) - MARC Stations	MDOT MTA/MARC		Improve security by installing closed circuit television at all MARC stations throughout the system.	None
MAS	MD	Penn Line Station Renovations	MDOT MTA/MARC		Continue to make improvements consistent with the lifecycle of each of the Penn Line stations, including enhancements with improved technology, security, communication systems, and wayfinding.	None

Territory	State	Project Name	Project Sponsor	Partner Agency(ies)	Description	Project Group (PG)
Mid-Atlantic South (MAS)						
MAS	MD	Train Approaching Warning System - MARC Penn Train Line	MDOT MTA/MARC		Install Train Approaching Warning Systems throughout MARC Penn Line stations to reduce the risk of injury for waiting passengers on platforms.	None
MAS	MD & DC	Anacostia Interlocking	Amtrak	MDOT MTA/MARC	Construct a universal interlocking with 80 mph crossovers north of Anacostia River to divide the track segment between Washington Union Station and New Carrollton. This new interlocking would provide operational flexibility to reduce service impacts.	MAS PG 11: Potts

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CONNECT 2035

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