Chapter 1: Purpose and Need

A. INTRODUCTION

The Federal Railroad Administration (FRA) and the Maryland Department of Transportation (MDOT) are preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts for the Susquehanna River Rail Bridge Project (also referred to herein as "the Proposed Project"). The EA is prepared in accordance with the National Environmental Policy Act (NEPA) (42 United States Code [USC] §4321 *et seq*.), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] parts 1500–1508), and FRA's *Procedures for Considering Environmental Impacts* (64 Federal Register [FR] 28545 [May 26, 1999] and 78 FR 2713 [January 14, 2013]). The EA also documents compliance with other applicable Federal environmental laws and regulations, including Section 106 of the National Historic Preservation Act, as amended (NHPA) (54 USC § 306108) and the Clean Air Act (42 USC § 7401 *et seq*.).

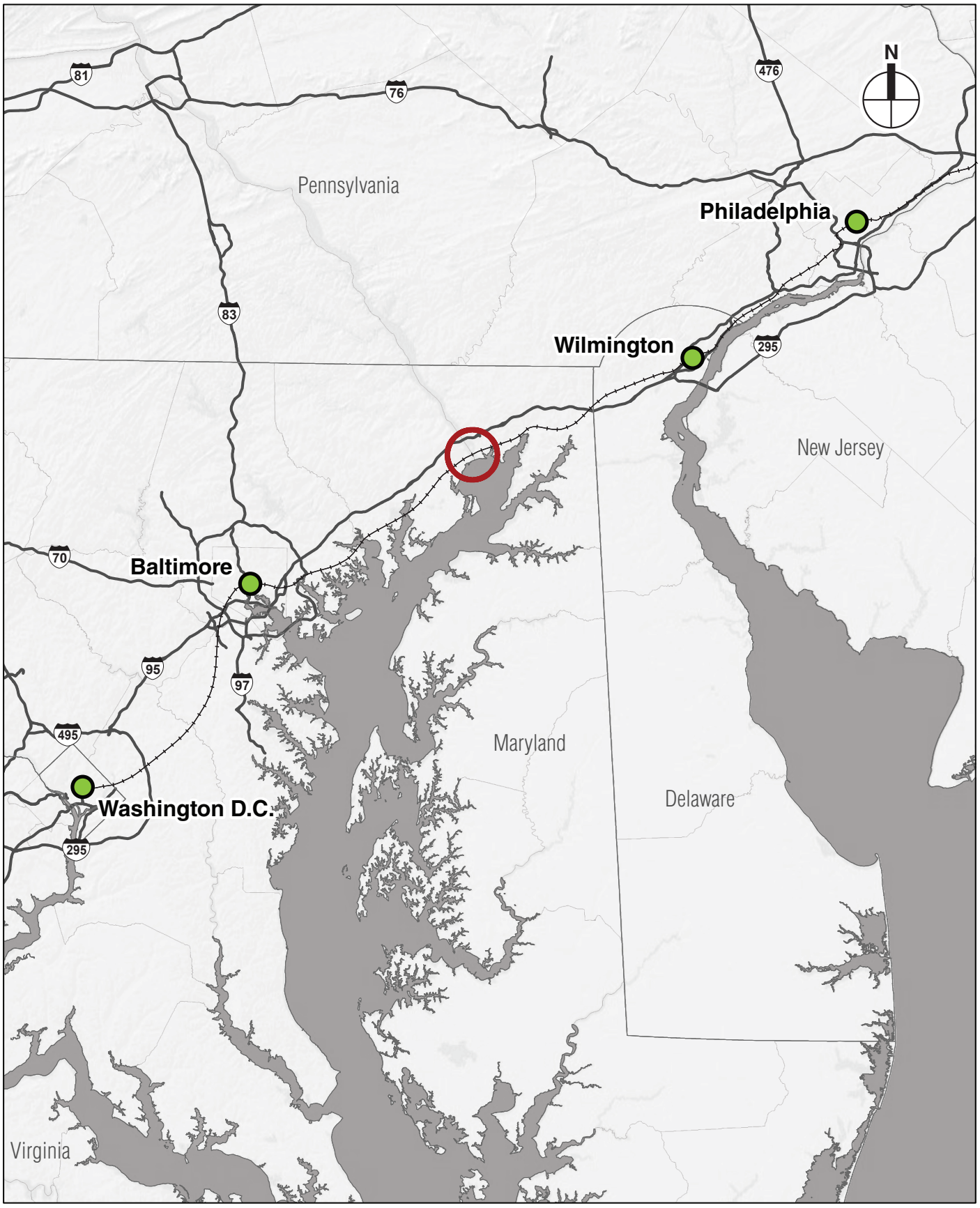
MDOT, project sponsor, is proposing to improve the Susquehanna River Rail Bridge between the City of Havre de Grace in Harford County, Maryland and the Town of Perryville in Cecil County, Maryland to provide continued rail connectivity along the Northeast Corridor (NEC). In 2011, FRA selected MDOT for a grant award of $22 million in federal funding available through the High-Speed Intercity Passenger Rail (HSIPR) Program and the parties entered into a cooperative agreement for the NEPA and preliminary engineering phases of the Proposed Project. FRA and MDOT are the joint lead agencies and the National Railroad Passenger Corporation (Amtrak), the bridge owner and operator, is providing conceptual and preliminary engineering designs and is acting in coordination with MDOT and FRA.

B. EXISTING CONDITIONS

The existing two-track Susquehanna River Rail Bridge is located on Amtrak's NEC at Milepost (MP) 60 (see **Figure 1-1**). This rail bridge is a critical link along the NEC, one of the U.S. Department of Transportation's (USDOT) designated high-speed rail corridors. The NEC is the most heavily used passenger rail line in North America, both in terms of ridership and service frequency, and one of the most heavily traveled rail corridors in the world.[1,2] The existing bridge is roughly 0.75 mile in length and is the longest bridge with a movable span on the NEC. It is a swing-span type bridge; the movable span opens by rotating horizontally using a center pivot mounted on a pier in the river (see **Figure 1-2** and **Figure 1-3**). The existing bridge allows for a 52-foot vertical clearance for marine traffic. The swing span must be opened to allow for taller marine traffic, which disrupts rail operations. Amtrak,

[1] https://www.amtrak.com/ccurl/998/601/Amtrak-National-Fact-Sheet-FY2015.pdf, accessed April 22, 2016.

[2] Source: BGL Rail Associates, for the Amtrak Reform Council, "A Recommended Approach to Funding the Estimated Capital Investment Needs of the Northeast Corridor Rail Infrastructure," April 2002.

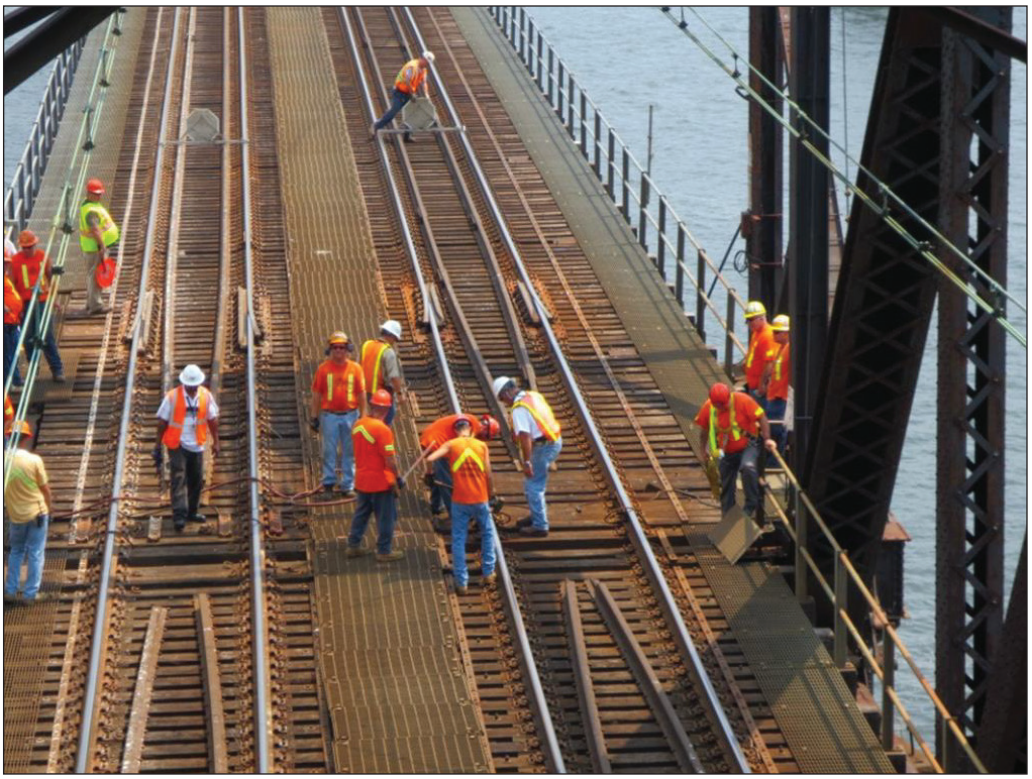


Project Location

Figure 1-1

Existing Susquehanna River Bridge

Figure 1-2



Amtrak crew manually opening the movable bridge span to accommodate marine traffic **1**

Opening swing span to accommodate marine traffic **2**

Existing Susquehanna River Swing Span
Figure 1-3

the Maryland Area Regional Commuter (MARC), and Norfolk Southern Railway (NS) use the bridge to carry intercity, commuter, and freight trains across the Susquehanna River.

PROJECT SETTING

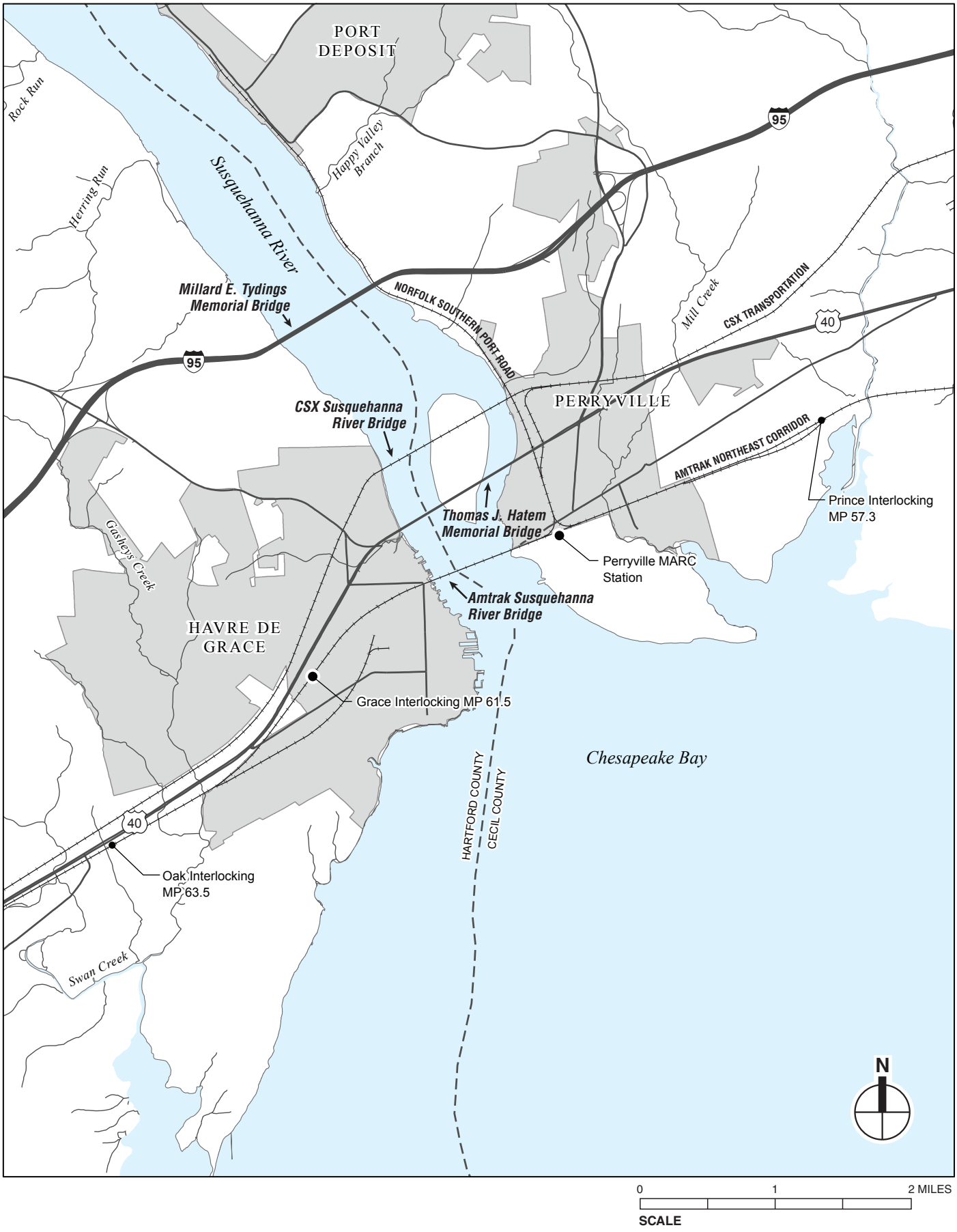
The approaches to the existing rail bridge and the NEC right-of-way extend through the City of Havre de Grace and the Town of Perryville. The Proposed Project is located between the "Oak" Interlocking at MP 63.5 south of Havre de Grace and the "Prince" Interlocking at MP 57.3 north of Perryville (see **Figure 1-4**).

The existing Susquehanna River Rail Bridge is located within Maryland's Chesapeake Bay watershed near the mouth of the Susquehanna River. The adjacent communities of Havre de Grace and Perryville are dominated by a mixture of dense, water-oriented residential and commercial zoning, including historic districts and recreational facilities. Additional railroad infrastructure also supports industrial properties in the vicinity.

BRIDGE CHARACTERISTICS

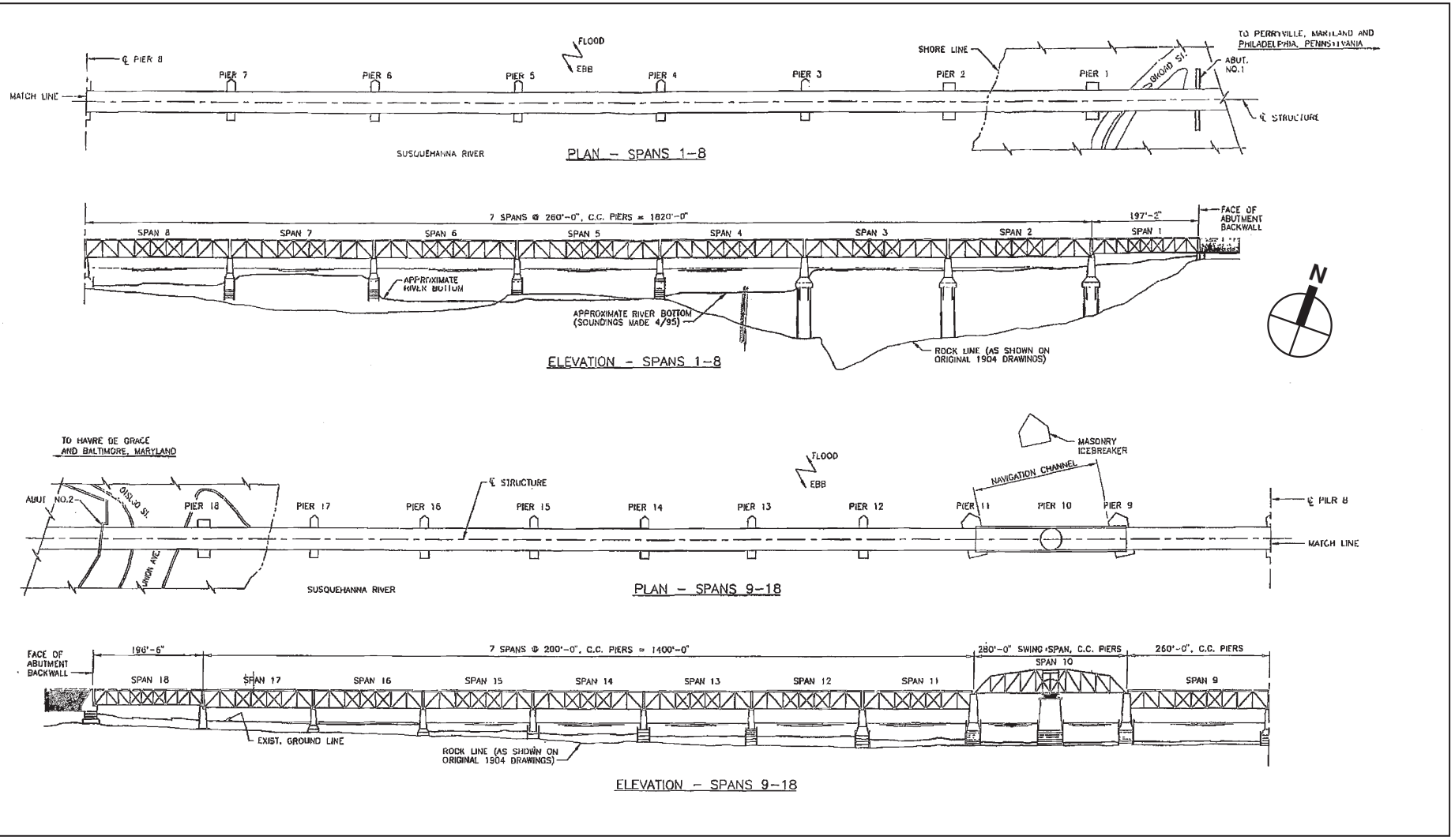
The Pennsylvania Railroad built the bridge in 1906 to replace an original 1860s parallel structure to the south. The remnant piers of the original 1860s bridge remain visible in the Susquehanna River above the water line. Several of these remnant piers were subject to extensive scour that have exposed the footings and piles. The remaining remnant piers show signs of steel plates, masonry, and concrete deterioration. Congress conveyed the existing bridge to Amtrak in 1976 along with other NEC infrastructure elements.

The existing Susquehanna River Rail Bridge is approximately 4,154 feet long from abutment to abutment and comprises 18 spans, which are numbered from north to south. The movable swing span (Span No. 10) is approximately 280 feet long; see **Figure 1-5** for visualization. The existing 110-year-old Susquehanna River Rail Bridge, despite major rehabilitation and repairs, continues to deteriorate, as evidenced by rust, ineffective bearings, cracks in steel members, and wear at pins and eyebars.



Project Site

Figure 1-4



Existing Susquehanna River Bridge Plan and Elevation

Figure 1-5

C. PROJECT PURPOSE AND NEED

PROJECT PURPOSE

The increasing age of the bridge, its structural condition, and its two tracks curtail speeds and capacity on the bridge. This inhibits the rail operators' goals to provide reliable service, MDOT's plans to increase MARC commuter rail service, and Amtrak's plans to increase high-speed passenger rail service on the NEC.

The bridge's functionally obsolete design and age require major rehabilitation and repairs, which result in increasing maintenance costs and conflicts with the need to maintain continuous rail operations. The primary purpose of the Proposed Project is to provide continued rail connectivity along the NEC. The Proposed Project goals include:

- Improving rail service reliability and safety;
- Improving operational flexibility and accommodating reduced trip times;
- Optimizing existing and planned infrastructure and accommodating future intercity passenger, high-speed rail, freight, and commuter rail; and
- Maintaining adequate navigation[3] and improving safety along the Susquehanna River.

PROBLEMS WITH EXISTING BRIDGE

Demand for rail service along the NEC is at record levels. This growth is due to population and employment growth in urban centers along the NEC, increasing delays in highway and air travel, and the growing convenience of intercity and local rail travel.[4] The NEC, however, cannot continue to accommodate rising demand with aging infrastructure that is highly constrained and in need of repair. The Proposed Project is critical to MDOT, Amtrak, and other NEC users.

OBSOLETE DESIGN AND AGING INFRASTRUCTURE

The existing bridge is 110 years old, beyond the 100-year design lifespan typical for steel railroad bridges. While it has undergone major rehabilitation and repairs (1960s, 1985, 1991, and most recently 1998), the bridge structure continues to deteriorate from age and use. Amtrak's most recent bridge inspection in the summer of 2013 indicated that the bridge superstructure is in poor to fair structural condition. The 2013 inspection also determined that many of the structural bridge components are below the load ratings required by American Railway Engineering and Maintenance-of-Way Association (AREMA) and Amtrak criteria.

The structural condition, coupled with the movable-span design, requires extensive effort to open the bridge for marine traffic. Each opening of the swing span requires approximately an hour and a crew of more than 30 workers which is far more labor-intensive and expensive than a modern day movable bridge. While the existing bridge is safe for current and near term operations, it is wearing out and approaching the end of its service life. Replacing aging movable

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[3] Adequate navigation can be maintained by increasing navigational clearances, as discussed in Susquehanna River Rail Bridge Reconstruction and Expansion Project Navigation Study, dated January 21, 2014, HNTB Corporation.

[4] http://www.nec-commission.com/wp-content/uploads/2013/01/necc_cin_20130123.pdf, accessed April 22, 2016.

bridges such as the Susquehanna River Rail Bridge is one of Amtrak's central strategies to improve the reliability and travel times on the NEC.

SPEED AND CAPACITY CONSTRAINTS

The existing two-track bridge creates service conflicts between Amtrak's passenger service, MARC trains, and freight trains operated by NS. It also poses a capacity constraint on planned increases in service frequency by all three railroads. The segment of the NEC south of the bridge comprises three tracks and the segment north comprises four. The existing two-track bridge reduces the on-time performance for Amtrak, MARC trains, and NS traffic. The open deck construction limits the maximum authorized speed to 90 mph. Amtrak passenger trains can travel up to 135 mph on the adjacent NEC segments and have to slow down to cross the bridge. Freight trains crossing the bridge must travel at 30 mph or slower.

The limited number of tracks across the bridge, combined with the variety of trains utilizing the bridge and the need for continual maintenance, results in tightly managed and restrictive operations, little flexibility in scheduling, and train delays. The existing bridge requires that the slow freight trains and the MARC commuter trains share track with higher-speed Amtrak trains, creating congestion conflicts. Because of the geometry of the freight alignment in the Perryville station area, both freight and commuter trains approach and leave the NEC at just 15 mph.

NS attempts to operate its trains at night to minimize conflicts with passenger rail service, although daytime freight service is increasing as marine and refinery operators reduce terminal times for high-value cargo. When the southbound NEC track is in use by an intercity or commuter train approaching the Susquehanna River Rail Bridge (in either direction), NS freight trains coming from the west must stop and wait for an appropriate window to enter the NEC. Similarly, NS trains coming from the south must wait their turn to cross the bridge occupying one of the main tracks. The resulting delays have impacts to the Port of Wilmington, the Port of Baltimore, and rail service destined for the Delmarva Peninsula. These delays create ripple effects in cargo shipments throughout the region and the nation.

MAINTENANCE DIFFICULTIES

Because of the frequency of train service on the bridge, few repairs and/or inspections can be made without disrupting rail operations. The bridge will require more scheduled and unscheduled maintenance as it continues to age.

CONFLICTS WITH MARITIME USES

Opening the existing bridge's movable swing span for marine traffic causes train delays and takes large crews to operate. Each bridge opening introduces risks of significant train delays if a breakdown of the operating mechanisms were to occur. Amtrak performed a Navigation Study in 2013[5] and found that the existing Susquehanna River Rail Bridge opens approximately ten times per year to accommodate marine traffic. The Navigation Study concluded that the existing navigation channel (both height and width) addresses the needs of most mariners and vessels, but, while the existing horizontal clearance is sufficient, further widening of the horizontal clearance could increase sight distance, reduce vessel congestion, and aid tug boat and barge

[5] Susquehanna River Rail Bridge Reconstruction and Expansion Project Navigation Study, dated January 21, 2014, HNTB Corporation.

navigation through the bridge opening, increasing safety and resilience against potential bridge and fender system strikes.

EXISTING RAIL TRAFFIC

As shown in **Table 1-1**, the existing Susquehanna River Rail Bridge is used by Amtrak trains (approximately 89 trains per weekday), MARC commuter service (18 trains per weekday), and NS freight rail traffic (approximately eight trains per day, mostly at night). Amtrak routes utilizing the bridge include the Acela, Northeast Regional, and long-distance trains.

REGIONAL PASSENGER RAIL

Amtrak's NEC is the busiest rail line in North America.[6,7] It includes a 457-mile rail transportation system extending from Boston's South Station to Washington D.C.'s Union Station. In 2011, USDOT designated the NEC as a high-speed rail corridor. Amtrak owns and operates over much the NEC, running regional service, long distance service, and high-speed Acela Express service along the line. In Fiscal Year 2013, Amtrak carried a record 11.4 million passengers on the NEC between Washington-New York-Boston.

Table 1-1
Existing Weekday Volumes Across the Susquehanna River Rail Bridge

Types of Service		Daily	Peak*
Amtrak	Northeast Regional and Long Distance	57	7
	Acela	32	2
	High-Speed Rail	0	0
MARC Commuter		18	3
NS Freight		8	4
TOTAL		**116**	

Notes: *"Peak" is defined as the weekday hour with the maximum train volume. For Amtrak, the daily peak occurs between 4:10 and 5:10 PM. For MARC the daily peak occurs 5:40-6:40 AM . For freight, the timing of the peak hour varies but it generally occurs at night.
Based on 2016 data, considered to be representative of the existing condition.
Sources: Service volumes provided by Amtrak.

Amtrak currently operates approximately 89 trains over the Susquehanna River Rail Bridge each weekday and nine trains during the peak hour period (4:10 PM to 5:10 PM weekdays). Approximately 17,900 Amtrak passengers travel over the Susquehanna River Rail Bridge each weekday. This volume has grown by 26 percent since 2003.

[6] https://www.amtrak.com/ccurl/998/601/Amtrak-National-Fact-Sheet-FY2015.pdf, accessed April 22, 2016.
[7] Source: BGL Rail Associates, for the Amtrak Reform Council, "A Recommended Approach to Funding the Estimated Capital Investment Needs of the Northeast Corridor Rail Infrastructure," April 2002.

COMMUTER RAIL

MARC is a 202-mile, 42-station, commuter rail system operating among multiple stations in Maryland, West Virginia, and the District of Columbia. MARC is managed by the Maryland Transit Administration (MTA), an agency within MDOT. The MARC Penn Line has the greatest ridership and runs from Union Station in Washington D.C., over the Susquehanna River Rail Bridge, to Perryville. MARC currently operates 18 trains over the bridge each weekday and three trains during the peak hour (5:40-6:40 AM weekdays). Limited weekend service is also provided. In 2015, the Penn Line averaged 23,430 riders daily.[8]

FREIGHT RAIL

Norfolk Southern operates between Harrisburg, Pennsylvania, and Baltimore, Maryland, using its "Port Road" route along the Susquehanna River to Perryville, and using trackage rights along the NEC between Perryville and Baltimore. The NS freight connection from the Port Road is critical to servicing the Port of Baltimore and is located within the existing bridge approach limits.

The Port of Baltimore is the closest Atlantic port to major Midwestern population and manufacturing centers.[9] During 2014, the port handled 29.5 million tons of foreign commerce (imports and exports), valued at $52.5 billion. [10]

The Port of Wilmington is becoming an increasingly major port and distribution center for liquid bulk petroleum products. Approximately eight trains per day cross the bridge moving between the Port Road and the Port of Baltimore. Commodities transported by these trains include coal, grain, autos, and intermodal container cargo.[11]

NAVIGABLE WATERS

The Susquehanna River stretches for 444 miles from upstate New York through Pennsylvania to Maryland, where it drains into the Chesapeake Bay. In the vicinity of the project site, the river is technically navigable as far up as the Conowingo Hydroelectric Dam at approximately River Mile 9.9; however, parts of the river south of the dam are too shallow to navigate with larger vessels.

The existing Susquehanna River Rail Bridge is located at Susquehanna River Mile 1.0. The movable swing span provides a 52-foot vertical clearance above mean high water (MHW) in the closed position and a 127-foot vertical clearance in the open position (limited by overhead electric transmission lines). The horizontal clearance for navigation consists of two 100-foot-wide channels.

Three fixed-height Susquehanna River crossings are located to the north of the Susquehanna River Rail Bridge, between the bridge and the Conowingo Dam:

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[8] Maryland Open Data Portal, https://data.maryland.gov/Transportation/MTA-Average-Weekday-Ridership-by-Month/ub96-xxqw/data, accessed October 27, 2016.

[9] http://mpa.maryland.gov/content/port-information.php, accessed April 22, 2016.

[10] http://mpa.maryland.gov/misc/2014ForeignCommerceStatReport.pdf, accessed April 22, 2016.

[11] Rail Projects Impacting the Delmarva, Presentation to the Delmarva Freight Summit, June 20, 2012, Nicole Katsikides, Director, MDOT Office of Freight and Multimodalism.

- The Thomas J. Hatem Memorial Bridge, carrying U.S. Route 40, approximately 0.5 mile north of the Susquehanna River Rail Bridge. That bridge provides an 87-foot vertical clearance and a 320-foot horizontal clearance in the navigation channel.
- The CSX Susquehanna River Rail Bridge, approximately 0.9 mile north of the Susquehanna River Rail Bridge. The CSX Bridge, which carries rail freight, provides an 85-foot vertical clearance and a 500-foot horizontal clearance.
- The Millard E. Tydings Memorial Bridge, carrying Interstate 95, is located approximately 2 miles north of the Susquehanna River Rail Bridge and provides a 90-foot vertical clearance and a horizontal clearance between 119 and 245 feet through its spans.

D. MASTER PLAN CONSIDERATIONS

A number of recent programs and planning studies outline and support the need for an upgraded and expanded railroad crossing over the Susquehanna River Rail.

HIGH-SPEED INTERCITY PASSENGER RAIL (HSIPR) PROGRAM

FRA's *High-Speed Rail Strategic Plan (April 2009)*[12] documented the administration's vision for establishing high-speed rail. Through this program, USDOT awarded a $22 million grant to the State of Maryland for preliminary engineering and environmental studies (of which this EA is a part) for the Proposed Project.

NORTHEAST CORRIDOR

The NEC, the most heavily traveled rail corridor in North America,[13,14] is vital to the sustained economic growth of the region, which includes the economic and political centers of the United States.

NORTHEAST CORRIDOR INFRASTRUCTURE MASTER PLAN

The *Northeast Corridor Infrastructure Master Plan (May 2010)*[15] identified a baseline of infrastructure improvements needed to provide expanded service and reliability to accommodate forecasted demand. It focused on increasing NEC capacity and reliability, including bridges with additional tracks and replacement of movable bridges with high-level fixed structures, where feasible, to eliminate the delays. This plan identifies the Susquehanna River Rail Bridge expansion as a critical priority.

[12]https://www.fra.dot.gov/eLib/Details/L02833, accessed April 22, 2016.
[13]https://www.amtrak.com/ccurl/998/601/Amtrak-National-Fact-Sheet-FY2015.pdf, accessed April 22, 2016.
[14]Source: BGL Rail Associates, for the Amtrak Reform Council, "A Recommended Approach to Funding the Estimated Capital Investment Needs of the Northeast Corridor Rail Infrastructure," April 2002.
[15]http://www.amtrak.com/servlet/ContentServer?c=Page&pagename=am%2FLayout&p=123760 834501 8&cid=1241245669222, accessed April 22, 2016.

NORTHEAST CORRIDOR INFRASTRUCTURE AND OPERATIONS ADVISORY COMMISSION

The Northeast Corridor Infrastructure and Operations Advisory Commission (the NEC Commission) , in its January 2013 report, *Critical Infrastructure Needs on the Northeast Corridor* identified 32 specific critical needs along the NEC to reduce delays, achieve a state of good repair, and build capacity for growth on the corridor.[16] The report names the Susquehanna River Rail Bridge replacement as one of those critical needs.

NEC FUTURE

NEC FUTURE is a comprehensive planning effort to define, evaluate, and prioritize future investments in the 457-mile NEC from Union Station in Washington, D.C. to South Station in Boston.[17] NEC FUTURE represents a long-term vision and investment program for the NEC, as reflected in the Tier 1 Final Environmental Impact Statement (Tier 1 FEIS) and Service Development Plan. The Proposed Project is within the NEC FUTURE study area and is consistent with the service goals considered in the NEC FUTURE Tier 1 FEIS along this section of the NEC, so that it does not preclude improvements proposed as part of the NEC FUTURE Preferred Alternative.

STATE OF MARYLAND

The State of Maryland has identified the Susquehanna River Rail Bridge Project as one of its most critical rail infrastructure projects. It is critical not only to improving MARC commuter service, but also to optimizing freight and intercity passenger rail service and helping the broader Maryland economy.

MARC GROWTH AND INVESTMENT PLAN

The *MARC Growth and Investment Plan* discusses challenges to future MARC growth and the agency's desired ability to expand service currently constrained by infrastructure and other operators.[18]The plan's long-term timeframe (2020-2029) includes construction of a new station at Elkton, MD; an upgrade at the Perryville Station to handle northbound trains; new stations in Baltimore; and a focus on improved service to/from Washington D.C. The plan's future timeframe (2030-2050) discusses a new and expanded Susquehanna River crossing and mentions the addition of a fourth track between Baltimore's Penn Station and Perryville as a key component to meet and anticipate demand.

MARYLAND STATEWIDE FREIGHT PLAN

The *State of Maryland's Freight Plan* (2009) states that output among Maryland's freight-intensive industries, is expected to grow by 120 percent statewide between 2000 and 2030. As a result, the tonnage of freight transported through Maryland is estimated to increase by

[16]http://www.nec-commission.com/wp-content/uploads/2013/01/necc_cin_20130123.pdf, accessed on April 22, 2016.
[17]http://www.necfuture.com/, accessed on April 22, 2016.
[18]http://mta.maryland.gov/sites/default/files/mgip_update_2013-09-13.pdf, accessed April 22, 2016.

approximately 105 percent by 2035, as compared with the 2006 tonnage.[19] The plan identifies the replacement of the Susquehanna River Rail Bridge as a high-priority freight improvement project. In addition, the plan states that the State of Maryland must prepare for the expansion of East Coast ports (including the Port of Baltimore) as motivated by the expansion of the Panama Canal, which is being widened to allow for larger container ships.

AMTRAK

AMTRAK'S STATE OF GOOD REPAIR

On April 15, 2009, Amtrak issued the *Northeast Corridor State of Good Repair Spend Plan.*[20] Amtrak's planned state of good repair projects include replacement of infrastructure elements such as: track, bridges, tunnels, overhead catenary wire, power supply systems, cable, transformers and converters, signals, communications and dispatching systems, stations, and facilities. This report references the need to repair the Susquehanna River Rail Bridge and notes the need to expand two-track structures to accommodate projected growth.

AMTRAK'S 2012 UPDATE REPORT

Amtrak's summary document, *The Amtrak Vision for the Northeast Corridor, 2012 Update Report*[21] reaffirmed the Susquehanna River Rail Bridge as one of the critical components for improving NEC operations from Washington D.C. to Boston. The plan noted that the approach of the NEC Capital Investment Program going forward will be to integrate suites of state of good repair projects—designed to repair the network and increase reliability—with capacity enhancements that will allow next-generation initiatives such as high-speed rail service.

FREIGHT RAIL

Freight traffic volume is steady or gradually increasing for most commodities. NS's only practical access to the Ports of Baltimore and Wilmington, as well as to the entire Delmarva Peninsula, is via its Port Road route to Perryville, Maryland, and then along the NEC. For Class I railroads, like NS, the boom in petroleum bulk shipping is replacing shrinking commodity markets such as coal.

The Proposed Project is consistent with FRA, State of Maryland and Amtrak plans and high-speed rail program criteria. Elements to accommodate improved freight service and MARC commuter service are integral, and the Proposed Project could also improve the navigation channel for marine users. The Proposed Project is intended to maintain connectivity along the NEC and to provide future improvements to capacity, trip time, and safety for commuter, freight, and intercity passenger rail services on the NEC consistent with FRA, State, and Amtrak plans. ✷

[19] http://www.mdot.maryland.gov/Office_of_Planning_and_Capital_Programming/Freight_Planning/Documents/ Freight_Plan_Final.pdf, accessed April 22, 2016.

[20] http://www.amtrak.com/servlet/ContentServer?c=Page&pagename=am%2FLayout&p=1237608345018& cid=1241245669222, accessed April 22, 2016.

[21] http://www.amtrak.com/ccurl/453/325/Amtrak-Vision-for-the-Northeast-Corridor.pdf, accessed on April 22, 2016.