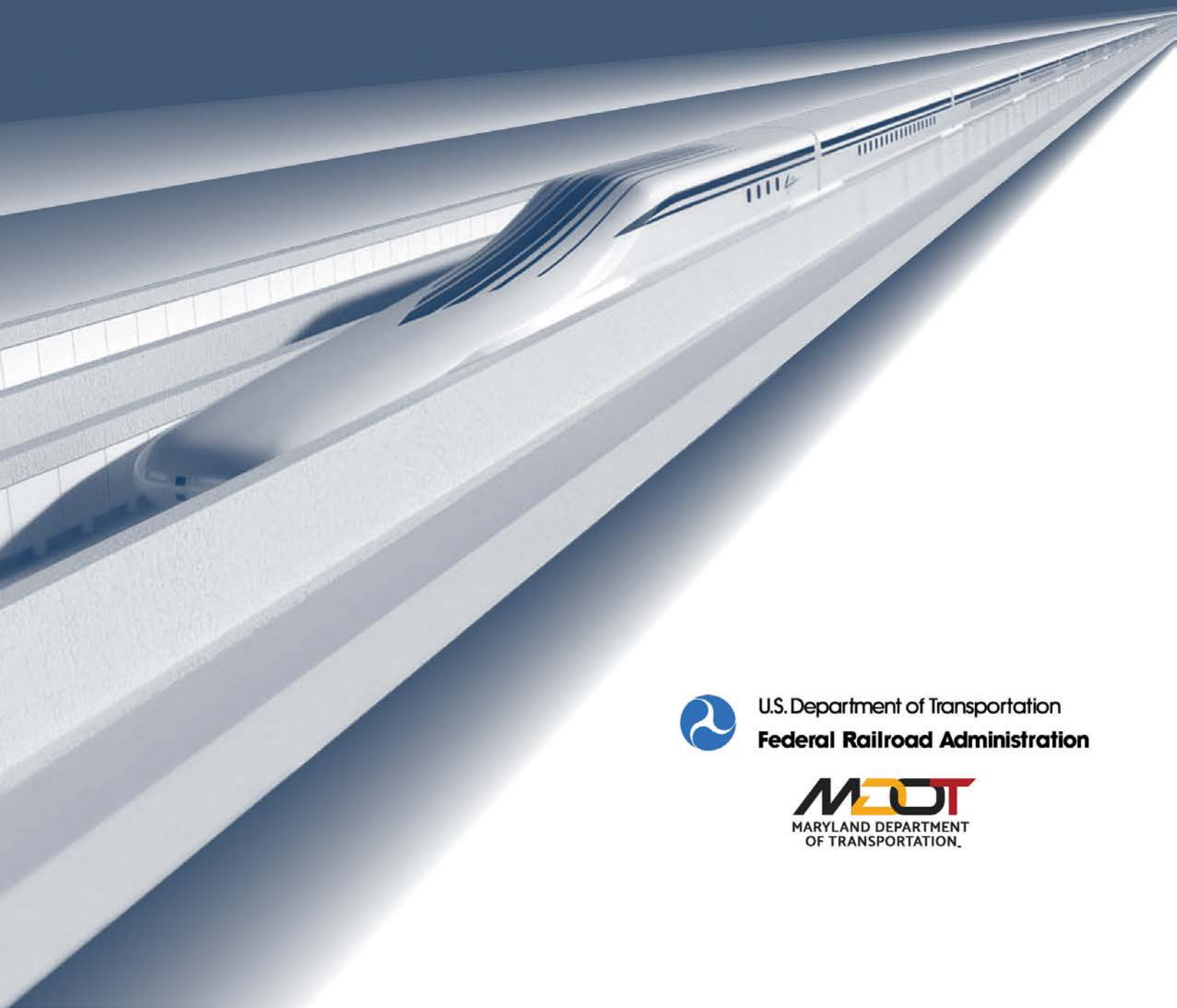
Chapter 2

Purpose and Need

BALTIMORE-WASHINGTON SUPERCONDUCTING MAGLEV PROJECT

DRAFT ENVIRONMENTAL IMPACT STATEMENT AND SECTION 4(f) EVALUATION



U.S. Department of Transportation
Federal Railroad Administration

MARYLAND DEPARTMENT OF TRANSPORTATION

Chapter 2: Purpose and Need

As discussed in Chapter 1, the Proposed Action includes the construction and operation of a Superconducting Magnetic Levitation Project (SCMAGLEV Project) system between Baltimore, MD and Washington, D.C. The SCMAGLEV Project is a high-speed rail technology that can operate at speeds of over 300 miles per hour on a grade-separated, fixed guideway powered by magnetic forces. The evaluation of the SCMAGLEV technology in the Washington, D.C. to Baltimore corridor is the result of Congressional direction in annual appropriations relating to Maglev technology, and previous studies that have identified this corridor as the location for development of a project under the Maglev Deployment Program (MDP).

Note to reader – this section has been augmented to include any pertinent data that has been updated since the Purpose and Need document was concurred upon in October 2017. All data updates are included for informational and comparative purposes only.

2.1 Project Purpose

The purpose of the SCMAGLEV Project is to evaluate, and ultimately construct and operate, a safe, revenue-producing, high-speed ground transportation system that achieves the optimum operating speed of the SCMAGLEV technology to significantly reduce travel time in order to meet the capacity and ridership needs of the Baltimore-Washington region. To achieve the operational and safety metrics, the SCMAGLEV Project must include:

- Infrastructure, vehicles, and operating procedures required for the SCMAGLEV system.
- An alignment which allows the highest practical speed that can be attained by SCMAGLEV technology at a given location and which avoids the need for reduction in speed other than that imposed by the normal acceleration and braking curves into and out of stations.
- A system that complies with Federal safety requirements.
- Avoidance, minimization, and mitigation of impacts to the human and natural environment.

The objectives of the SCMAGLEV Project are to:

- Improve redundancy and mobility options for transportation between the metropolitan areas of Baltimore and Washington, D.C.
- Provide connectivity to existing transportation modes in the region (e.g., heavy rail, light rail, bus, and air).
- Provide a complementary alternative to future rail expansion opportunities on adjacent corridors.

- Support local and regional economic growth.

2.2 Project Need

In 2005, Congress passed the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), authorizing funding to study magnetic levitation transportation projects (Section 1307 of the SAFETEA-LU Act (P.L. 109-59, 2005). The Federal Railroad Administration (FRA) identified the Baltimore-Washington corridor as the location for FRA's evaluation of a magnetic levitation (Maglev) project due to the area's high level of congestion, economic importance, increased development, and the need for connectivity between the two cities. The SCMAGLEV Project is needed to address the following transportation issues and challenges:

- Increasing population and employment: The Baltimore-Washington region makes up one of the largest and densest population centers in the United States. Between 2015 and 2040, the population in this region is projected to increase 20 percent along with an approximately 25 percent increase in employment workforce.[1] Since publication of the Purpose and Need, MWCOG has updated their forecast to Round 9.1[2]. As of December 2020, the population in this region is projected to increase 23 percent between 2015 and 2045, along with a 33 percent increase in employment workforce.
- Growing demands on the existing transportation network: Travel demand will continue to increase in the Project Study Area along major roadways and railways, including Interstate 95 (I-95), the Baltimore-Washington Parkway (BWP), MD 295, I-295, US 29, US 1, and the Northeast Corridor (NEC).
- Inadequate capacity of the existing transportation network: All of the major roadway corridors between Baltimore and Washington, D.C. include roadway segments that operate at level of service (LOS) E/F (heavy congestion) or LOS F (severe congestion) during AM and PM peak hours. Heavy congestion within the peak AM and PM hours is likely to spill over to non-peak hours because travelers shift their departure times to avoid peak period congestion. With the increased demand on the roadway network, the number of severe congestion segments is projected to increase.[3]

Likewise, the Northeast Corridor FUTURE (NEC FUTURE) Tier 1 Final Environmental Impact Statement (FEIS) documented the increasing demand for improved rail service between Baltimore and Washington, D.C. The FEIS also demonstrated that multiple

[1] 2015 to 2040 population and employment forecasts are based on the Baltimore Metropolitan Council (BMC) Round 8A Forecast and Metropolitan Washington Council of Governments (COG) Round 9.0 Cooperative Forecasts

[2] 2015 to 2045 population and employment forecasts are based on the BMC Round 9 Forecast and Metropolitan Washington COG Round 9.1 Cooperative Forecasts.

[3] Maryland Department of Transportation, State Highway Administration. (January 2015). Congestion Assessment Maps. These county wide maps show levels of congestion on all major state roadways in Maryland, on an average weekday, during the AM and PM peak hours.

portions of the NEC, including those in the Project Study Area, are experiencing congestion and delays due to capacity constraints and maintenance activities.

- Increasing travel times: According to the 2015 Maryland State Highway Mobility Report, 14 of the 30 most unreliable roadway segments in Maryland are located between Baltimore and Washington, D.C. These segments experience travel time delays totaling more than 50 minutes per trip between Baltimore and Washington.[4]

Transit travel time between Baltimore and Washington, D.C. is more consistent than vehicular travel based on scheduling and the dedicated transit right-of-way (ROW). However, emergency repairs, deferred maintenance, and heavy use of the NEC have affected on-time performance.[5] Bus service in the corridor, specifically Metrobus B30 from Greenbelt Metrorail Station to Baltimore-Washington International Thurgood Marshall Airport Station (BWI Marshall Airport Station), has less consistent travel times, related to congestion issues along the BWP.[6]

For transit and airport users, trips to and from transit stations, park and ride lots, or airports are also impacted by travel time delays. As congestion on the roadway network increases, transportation planners expect the total travel time for all modes to increase.

- Decreasing mobility: The increase in demand, travel time delays, and worsening levels of service directly impact the reliability of transportation options and the mobility of travelers within the Baltimore-Washington region.
- Maintaining economic viability: The Baltimore-Washington area is an important economic engine in the Mid-Atlantic region. Improvements to the transportation network would help support the predicted population and employment growth and sustain the economic health of the region.

2.2.1 Increasing Population and Employment

The increasing population and employment, as well as tourism, will have a direct effect on increasing traffic congestion levels and transportation demand in the Baltimore-Washington region. The Baltimore-Washington region is comprised of two Metropolitan Planning Organizations (MPOs), the National Capital Region Transportation Planning Board (TPB) and the Baltimore Regional Transportation Board (BRTB). The Metropolitan Washington Council of Governments (MWCOG) and Baltimore Metropolitan Council (BMC) staff and coordinate the TPB and BRTB, respectively.

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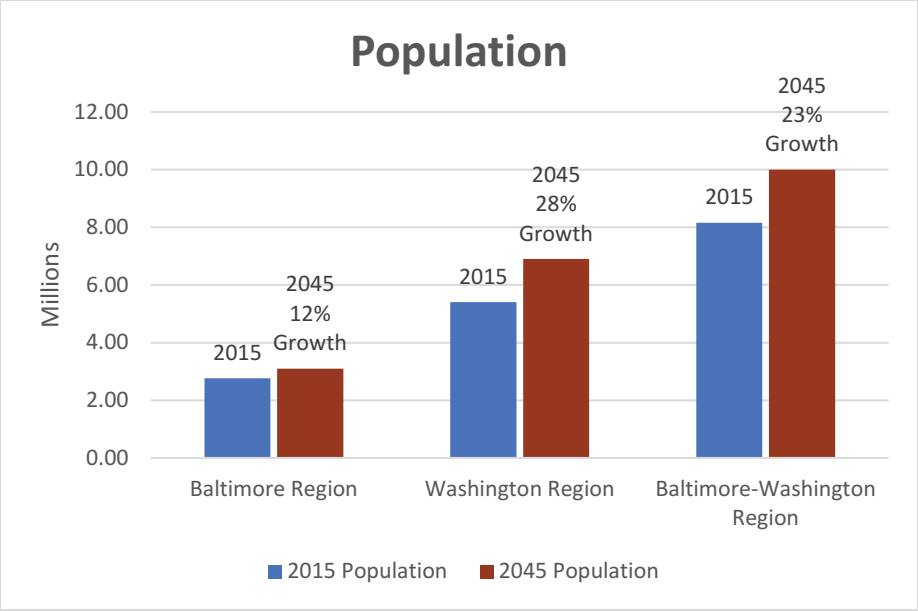
[4] Maryland Department of Transportation, State Highway Administration. (December 2015). *Maryland State Highway Mobility Report*.

[5] AMTRAK. (September 2015). *AMTRAK: Top Management and Performance Challenges – Fiscal Year 2016 and Beyond* and *AMTRAK: Top Management and Performance Challenges for Fiscal Year 2021*

[6] Washington Metropolitan Area Transit Authority. (May 2011). Metrobus Service Evaluation Studies 2011: Display Boards for Public Meetings.

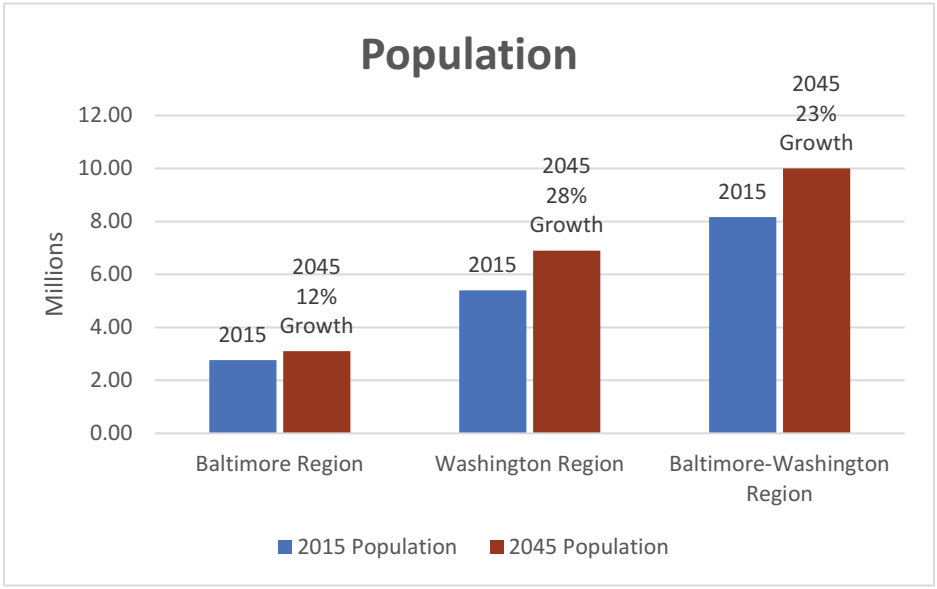
Figures 2.1-1 and **2.1-2** forecast growth in population and employment in the Baltimore-Washington area between 2015 and 2045. Population growth rates range from 12 percent in the Baltimore region to 28 percent in the Washington region.[7] Employment growth rates range from 28 percent in the Baltimore region to 35 percent in the Washington region.

Figure 2.1-1: Population



Source: BMC Round 9 Forecast and Metropolitan Washington COG Round 9.1 Cooperative Forecasts

Figure 2.1-2: Employment



Source: BMC Round 9 Forecast and Metropolitan Washington COG Round 9.1 Cooperative Forecasts

[7] 2015 to 2045 population and employment forecasts are based on the BMC Round 9 Forecast and Metropolitan Washington COG Round 9.1 Cooperative Forecasts.

The continued growth in population and employment in the Baltimore-Washington region can be attributed to the presence of many diverse and stable employers, and the highest concentration of Federal Government civilian employment in the country.[8] Washington, D.C., the Nation's Capital, is the seat of the Federal Government, and contains a myriad of supporting services and agencies. In addition, the Baltimore-Washington region is home to dozens of major industries in different sectors, including, but not limited to, higher education, health care, information technology and defense, retailers and distributors, finance and insurance, manufacturers, transportation, wholesale and utilities.

There are also several active and/or planned major development and redevelopment projects in the Baltimore-Washington region. The Washington, D.C. Economic Partnership[9] estimates more than $11.8 billion worth of projects are under construction in Washington, D.C. and an additional $34.8 billion worth of projects are planned to be completed by 2020. A 2019-2020 update performed by the D.C. Economic Partnership now estimates $13.9 billion worth of projects under construction in Washington, D.C. and an additional $36.6 billion worth of projects in the near-term (2019) and long-term (2022 and beyond) planning pipeline.[10] For example, northern Prince George's County, within the Project Study Area, is attracting new development, particularly in College Park, Laurel, and Bowie. One such development is the University of Maryland Research Park (now known as the Discovery District) located in College Park. When complete, it will be the largest research park in the state and one of the largest in the country.

Development activities in the Baltimore portion of the Project Study Area include, but are not limited to, the Penn Station redevelopment, Port Covington redevelopment, expansion of the Port of Baltimore, and various projects at BWI Marshall Airport. Similarly, Fort George G. Meade in Anne Arundel County continues to expand and could add an additional 3,000 jobs by 2020.[11]

Tourism is a significant driver of the economy in both the City of Baltimore and Washington, D.C. In Washington, D.C., tourism totaled 21.3 million visitors in 2015 (24.6 million total visitors in 2019 based on updated information[12]), which included two million international travelers (down to 1.8 million in 2019), most of whom utilize the three major airports in the region (BWI Marshall Airport, Ronald Reagan Washington National Airport, and Washington Dulles International Airport). According to the Washington, D.C., Economic Partnership, 2015 was the sixth consecutive year of record-level visitation to the Nation's Capital (according to the update, 2019 is the tenth consecutive year of record-level visitation). In Baltimore, tourism totaled 25.2 million visitors in 2015, according to the *Visit Baltimore Annual Report.*[13] Annual tourism in

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[8] Economic Alliance of Greater Baltimore. (2012). Statistics for Government: Federal, State & Local.

[9] Washington D.C. Economic Partnership. (2016). *Washington, DC Development Report*

[10] Washington D.C. Economic Partnership. *2019-2020 DC Development Report*.

[11] Maryland Department of Business and Economic Development. (April 2014). *BRAC and Related Jobs Summary*.

[12] Washington, D.C. Visitor Research available at www.washington.org.

[13] Visit Baltimore. (Fiscal Years 2016 and 2017). *Visit Baltimore Annual Report & Business Plan*.

Baltimore has increased by 2.9 million visitors since 2012. The 2019-2020 annual report notes 26.7 million visitors in 2018, an increase of 14.6 percent since 2012.[14]

As a result, a need exists for additional transportation capacity in the Project Study Area.

2.2.2 Growing Demand on the Existing Transportation Network

The Project Study Area includes major transportation facilities that are currently operating at or near capacity.[15] Interstate 95 between the Baltimore Beltway (I-695) and the Capital Beltway (I-495) is one of the most travelled sections of highway in the country. Other major parallel roadway corridors include the BWP, MD 295, US 1, and US 29. In 2014, various segments of I-95 and the BWP ranked within the top ten bottleneck locations in Maryland. As of the 2018 MDOT SHA Mobility Report update, these segments remain "some of the most congested freeways/expressway sections (average weekday)".[16] Transit passengers in the corridor are served primarily by the NEC, which includes both Amtrak for regional travel and Maryland Area Regional Commuter (MARC) for intercity and local service. In addition, MDOT MTA operates commuter bus service from several destinations throughout the Baltimore-Washington corridor. The BWI Marshall Airport – also located within the corridor – is the 22nd busiest US airport, based on passenger boarding[17]. Subsequent sections describe the demand for each mode.

2.2.2.1 Roadway Network

The State of Maryland is ranked first in the nation in terms of longest commuting times of 32.5 minutes each way, according to the 2016 U.S. Census American Community Survey. Washington, D.C., which includes many Maryland commuters, is fourth in the nation with commuting times on average of 29.9 minutes each way. American Community Survey 2019 data indicates Maryland is ranked second in the nation at 33.7 minutes each way (note that while the ranking has moved down, the commuting time has increased), and Washington, D.C. is still ranked fourth at 31.7 minutes each way.

In 2014, the Washington, D.C. area was ranked as the most congested metropolitan area in the country for yearly delay per auto commuters, according to the Texas Transportation Institute's 2015 Urban Mobility Scorecard.[18] The Baltimore metropolitan area was also ranked among the 25 most congested areas. According to the 2019

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[14] Visit Baltimore. (Fiscal Years 2019 and 2020). *FY2019-2020 Visit Baltimore Annual Report & Business Plan*.

[15] Maryland Department of Transportation, State Highway Administration. (December 2015). *Maryland State Highway Mobility Report*.

[16] Maryland Department of Transportation, State Highway Administration. (2019). *Maryland State Highway Mobility Report*.

[17] 2019, FAA Airports ACAIS data.

[18] Sharnk, D., Eisele, B., Lomax, T., & Bak, J. (August 2015). *2015 Urban Mobility Scorecard*. Published jointly by The Texas A&M Transportation Institute and INRIX.

Urban Mobility Scorecard, the Washington, D.C. area is now ranked as the third-most congested metropolitan area in the country.[19]

On average, an automobile commuter in the Washington, D.C. metropolitan area spends 63 hours per year in traffic, incurring $1,433 in additional annual expenses, including the cost of 35 gallons in excess fuel. This translates to $4.5 billion of annual cost due to congestion, more than 100 million gallons of excess fuel, and associated emissions and air quality degradation. The 2019 report indicates an automobile commuter in the Washington, D.C. metropolitan area spends 102 hours per year in traffic, incurring $2,015 in additional annual expenses, including the cost of 38 gallons in excess fuel. This translates to $5.0 billion of annual cost due to congestion, more than 89 million gallons of excess fuel.

In the Baltimore region, the 2015 Urban Mobility Scorecard[18] (conducted by the Texas A&M Transportation Institute and INRIX) estimates the annual cost due to congestion at more than $2 billion. The 2019 Urban Mobility Report[19] states that the cost of congestion in the Baltimore region is $1.9 billion.

Maryland roadways in the Baltimore-Washington region have some of the highest traffic volumes in the state and these volumes, along with crashes, have increased in the last 25 years.[12] The growth in vehicle miles traveled (VMT) in the area is surpassing the ability of state agencies to improve or expand the roadway network. The 2015 *Maryland State Highway Mobility Report*[15] notes that the 2014 VMT for the Baltimore region was 25.2 billion vehicle miles, and for the Washington region it was 19.2 billion vehicle miles. VMT for the Washington region is lower than the Baltimore region due to higher transit usage and more modal options. The Mobility Report also notes that many sections of the highways between Washington and Baltimore have heavy to severe congestion, especially in the afternoon peak period. According to the 2019 *Maryland State Highway Mobility Report*[16], the total VMT of Maryland roadways was 59.6 billion in 2018.

In addition, roadway congestion in the region is so severe, MDOT SHA is currently investigating Public-Private Partnership (P3) opportunities to expand capacity on the Capital Beltway and I-270 as part of the *I-495 & I-270 Managed Lanes Study*.

2.2.2.2 Rail and Transit Network

The NEC runs parallel to I-95 in the Project Study Area. It is the busiest rail network in the U.S., with trains carrying passengers and goods north and south through Boston, New York City, Philadelphia, Baltimore, Washington, D.C., and beyond. Amtrak, MARC, CSX and Norfolk Southern Railway all compete for track usage on the NEC. According to the 2010 NEC Infrastructure Master Plan prepared by the NEC Master Plan Working Group, almost half of the passenger rail segments on the NEC from Boston to Washington, D.C. exceed 75 percent of practical capacity, and the plan estimates that

[19] Sharnk, D., Eisele, B., & Lomax, T. (August 2019). *2019 Urban Mobility Report*. Published jointly by The Texas A&M Transportation Institute and INRIX.

by 2030, passenger rail between Baltimore and Washington, D.C. could realize capacity utilization higher than 100 percent.[20]

Amtrak Service

Amtrak, which owns the NEC, operates intercity passenger rail service on the corridor and has long-term lease agreements with MDOT MTA for operation of MARC commuter rail service and with CSX and the Norfolk Southern Railway for operation of freight rail service on portions of the NEC. Each of these services competes for operational times for service in the corridor, and the demand for additional transit and freight service continues to increase.

The Washington, D.C. region will have approximately 18 million annual regional rail trips, while the Baltimore region will have 4.6 million regional trips in 2040.[21] Anticipated Amtrak intercity ridership between Baltimore and Washington, D.C. for 2040 is projected to be 167,800 annual passenger rail trips.

Today, Amtrak provides weekday service southbound from Penn Station in Baltimore to Union Station in Washington, D.C., with 12 trains in the AM and 26 trains in the PM. Amtrak provides weekday service northbound from Union Station to Penn Station with 18 trains in the AM and 20 trains in the PM. On weekends, Amtrak provides service between Penn Station and Union Station with 26 trains each direction on Saturday and 28 trains in each direction on Sunday. As of 2020, the weekday Amtrak schedule now shows five southbound trains in the AM and 14 southbound trains in the PM, which could be a COVID-19 related reduction in service due to changes in demand. Amtrak services include both local and limited stop trains between Penn and Union Stations. The implications of COVID-19 on the existing transportation system have been evolving and are anticipated to continue into the future. At present, this has resulted in reduced daily train schedules. A number of initial predictions regarding the long-term impacts of COVID-19 on the transportation system have been made and continue to be made, but there is not yet a consensus regarding those long-term impacts.

On-time performance is becoming more challenging on the NEC. Endpoint on-time performance for 2016 for the Northeast Regional and Acela Express service was 82 percent and 83 percent, respectively. As noted earlier, the deferred maintenance and heavy usage of the infrastructure continues to cause degradation and emergency repairs to become more common. Train interference from freight, commuter, and other Amtrak trains cause approximately 27.5 percent of delays on the Northeast Regional service. Approximately 32 percent of delays on the Acela Express service are related to

[20] The NEC Master Plan Working Group consisted of FRA, Amtrak, 12 northeast states, and the District of Columbia. *Northeast Corridor Infrastructure Master Plan*.

[21] US Department of Transportation, Federal Railroad Administration. (December 2016). *NEC FUTURE: A Rail Investment Plan for the Northeast Corridor. Tier 1 Final Environmental Impact Statement*.

problems with railroad infrastructure, including tracks or signals, or delays associated with maintenance or reduced speeds to allow for safe operations.[22]

According to the NEC FUTURE FEIS Purpose and Need, rail and track infrastructure has fallen short of the improvements necessary to maintain system reliability and meet growing demand. Intercity and commuter rail service quality is constrained by numerous state-of-good-repair needs throughout the NEC, including the following critical infrastructure needs identified in the Washington, D.C. - Baltimore segment: Washington Union Station Improvements; Ivy City Yard Facilities Renewal/Service & Inspection Expansion; Grove to Hanson Fourth Track; BWI Marshall Airport Station Improvements and Fourth Track; and Baltimore and Potomac (B&P) Tunnel Replacement.

Freight Service

One of the busiest CSX freight lines runs through the Project Study Area, parallel to the NEC corridor. This line carries freight from the west and south to terminals in Baltimore, Philadelphia, and New York. The volume of freight is expected to grow due to the expansion of the Panama Canal in July 2016 and the ability of Panamax container ships to access the Port of Baltimore.[23] As freight volumes along this CSX line grow, the corridor uses additional capacity by occupying the tracks between Baltimore and Washington, D.C.

MARC Service

MARC commuter trains share the NEC with Amtrak passenger rail and freight operations. In 2014, the Baltimore Metropolitan Council estimated MARC commuter rail would serve 9.2 million riders.[24] MDOT MTA estimates expected growth to be in line with historic trends. Current growth over the past 10 years has been 23 percent and that includes the addition of weekend service and extra trains. Additionally, the MARC Penn line (NEC) continues to grow at about 3 percent per year, and the other two lines (Camden and Brunswick) are growing at lower rates; hence, the overall average is below 3 percent.

MDOT MTA expects at least 70 percent of all MARC system stations to be at capacity by 2025.[25] MARC currently provides weekday service southbound on the NEC from Penn Station in Baltimore to Union Station in Washington, D.C. with 15 trips in the AM and 12 trips in the PM, and service northbound from Union Station to Penn Station with

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[22] AMTRAK. (February 2017). Amtrak Train Route On-Time Performance. Retrieved March 2017 from https://www.amtrak.com/historical-on-time-performance.

[23] Maryland Port Administration. (July 2016). State Officials Welcome First Big Container Ship to Arrive at Port of Baltimore through the Newly Expanded Panama Canal.

[24] The Baltimore Metropolitan Council. (October 2015). *The Transit Question: Baltimore Regional Transit Needs Assessment*.

[25] Maryland Department of Transportation, Maryland Transit Administration. *MARC Growth and Investment Plan Update 2013 to 2050.* Retrieved March 2017 from https://mta.maryland.gov/sites/default/files/mgip_update_2013-09-13.pdf.

11 trips in the AM and 17 trips in the PM. On weekends, MARC provides service between Penn Station and Union Station with nine trains in each direction on Saturday and six trains in each direction on Sunday. As noted previously, the implications of COVID-19 on the existing transportation system have been evolving and are anticipated to continue into the future. Initial impact predictions have been made, but there is not yet a consensus regarding those long-term impacts.

Because of the high volume of Amtrak trains, the number of MARC trips that can be provided on the NEC is limited without additional capacity improvements. These capacity constraints mean that the number of MARC trips will remain stagnant even as demand for MARC service grows.

MARC also currently provides weekday service on the Camden Yards Station Line southbound from Camden Yards Station to Union Station with six trains in the AM and four trains in the PM. MARC provides weekday service northbound from Union Station to Camden Yards Station with four trains in the AM and six trains in the PM. COVID-19 has and may continue to affect service at the time of publication of this document. There are no current estimates on when service will return to full function.

The MARC Camden line service utilizes the CSX line parallel to the NEC corridor in the two peak periods, but because of heavy CSX freight volumes, expansion of the MARC service on this line to relieve pressure on the NEC corridor is not currently feasible.

Regional Transportation Agency of Central Maryland

The Regional Transportation Agency of Central Maryland (RTA) provides transit services to the jurisdictions of Anne Arundel County, Howard County, northern Prince George's County and the City of Laurel. Services include bus service to and from BWI Marshall Airport Station.

MDOT MTA Commuter Bus Service

MDOT MTA provides commuter bus service within the Baltimore-Washington region. In 2015, this service had an approximate annual ridership of 4.0 million[26]; and between 2006 and 2015, experienced a 26 percent growth. The increase in ridership is an indicator of the demand for transportation choices in the Baltimore-Washington corridor. However, buses must operate in mixed traffic and experience the same congestion factors as cars. According to MDOT MTA, annual ridership in 2019 was 3.6 million, which is slight reduction from 2015. COVID-19 has, and may continue to, affect service at the time of publication of this document.[27] There are no current estimates on when service will return to full function nor how it may impact ridership.

[26] Maryland Department of Information Technology, Open Data Portal. (November 2016). Total MDOT MTA Public Transit Ridership by Fiscal Year.

[27] Maryland Department of Transportation, Maryland Transit Administration. MDOT MTA Performance Improvement.

WMATA Services

The Washington Metropolitan Area Transit Authority (WMATA) provides bus service, the B30 line, between the Greenbelt Metrorail Station and BWI Marshall Airport Station. In 2014, this service had an approximate average weekday ridership of 444[28]; and between 2011 and 2014, experienced a 33 percent reduction in average daily ridership.[29] The decrease in ridership is likely an indicator of long travel times and delays experienced by buses running in heavy traffic on the BWP and MD 295 corridors. These conditions result in the need for more reliable transportation choices in the Baltimore-Washington corridor. The 2019 data shows 186 daily ridership, between 2011 and 2019 ridership decreased from 765 riders to 186 riders each day (76 percent reduction).[26]

WMATA Metrorail does not extend to the BWI Marshall Airport Station or Baltimore. However, commuters could use Metrorail to get to a SCMAGLEV station in Washington D.C. or to travel to Greenbelt and New Carrollton Stations and transfer to MARC trains destined to Baltimore and the BWI Marshall Airport Station.

2.2.2.3 Airports

The number of air passengers who begin their trips in the Baltimore-Washington region is at the highest level since 2005.[30] Baltimore and Washington, D.C. are major hubs for domestic and international air travel. Three major airports serve the Baltimore-Washington region: BWI Marshall Airport, Ronald Reagan Washington National (Reagan National) Airport, and Washington Dulles International (Dulles) Airport. Travelers must have reliable ground transportation options to and from the airports.

Commercial passenger trips at BWI Marshall Airport increased by 5.5 percent between 2015 and 2016, based on the BWI Marshall Airport summary of air traffic and passenger statistics.[31] In 2016, BWI Marshall Airport served over 25.1 million commercial passengers (including both enplaned and deplaned passengers), with an average of 68,829 passengers per day. The Federal Aviation Administration (FAA) forecasts upwards of 22.2 million enplanements (number of revenue passengers boarding a plane) in 2045 compared to 12.2 million enplanements in 2016, or an 82 percent growth.[32] As the demand for air travel continues to grow at BWI Marshall Airport, there is a need for a reliable transportation network supporting passenger ingress and egress.

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[28] Washington Metropolitan Area Transit Authority. WMATA Data Viewer.

[29] WMATA. (May 2011). Metrobus Service Evaluation Studies 2011: Display Boards for Public Meetings. Published May 2011.

[30] National Capital Region Transportation Planning Board. (April 2019). 2017 Washington-Baltimore Regional Air Passenger Survey Geographic Findings Report.

[31] Maryland Department of Transportation, Maryland Aviation Administration. (December 2016). *Monthly Statistical Report Summary for the month of December 2016*. Maryland Department of Transportation, Maryland Aviation Administration. December 2016. 2015 BWI General Passenger Statistics, Maryland Department of Transportation Maryland Aviation Administration.

[32] Federal Aviation Administration. (January 2017). *APO Terminal Area Forecast Detail Report: Forecast Issued January 2017*. Terminal Area Forecast Summary is available for FY 2019–2045.

The latest numbers show that there has been a 42 percent decrease in passengers at BWI Marshall Airport during the twelve-month period between September 2019 and September 2020.[33]

According to the *2014 State of NEC Report*[34], the flight delay-per-passenger is 14 minutes at BWI Marshall Airport, 20 minutes at Reagan National Airport, and 23 minutes at Dulles Airport. Flight delays result in economic losses to many groups including airport passengers, operators and owners.

2.2.3 Inadequate Capacity of the Existing Transportation Network

As demand on the existing roadway, transit and rail networks continues to increase, the levels of service of systems that operate near, or above capacity also continue to worsen. Additional infrastructure capacity would improve the LOS.

2.2.3.1 Roadway Network

According to MDOT State Highway Administration's (SHA) 2013 Congestion Assessment Maps[35], all four of the main roadway corridors (US 29, I-95, US 1 and BWP) between the Baltimore and Washington, D.C. area experience heavy and/or severe congestion during peak hours. US 29 is a major travel corridor between the Baltimore and Washington, D.C. region. The corridor is located outside the Project Study Area but travel in the corridor is impacted by many of the same factors described for Project Study Area roadways.

2.2.3.2 Rail and Transit Network

As identified by the NEC Commission in 2014, multiple segments of the NEC are experiencing critical infrastructure challenges due to capacity constraints. The NEC FUTURE Selected Alternative, set forth in the NEC FUTURE EIS Record of Decision (ROD) (July 2017), includes infrastructure improvements in Maryland and Washington, D.C. in the Project Study Area that support operations necessary to meet market growth. These projects include chokepoint relief at New Carrollton, Odenton and BWI Marshall Airport stations; new track from New Carrollton to Halethorpe; and the B&P Tunnel replacement. Projects also include Washington Union Station expansion, Odenton station modifications, BWI Marshall Airport Station expansion and high density signaling from Washington, D.C. to New Carrollton and from Seabrook to West Baltimore.

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[33] https://www.bwiairport.com/sites/default/files/Sep2020.pdf

[34] Northeast Corridor Infrastructure and Operations Advisory Commission. (February 2014). *State of the Northeast Corridor Region Transportation System*.

[35] Maryland Department of Transportation, State Highway Administration. (January 2015). Congestion Assessment Maps. These county wide maps show levels of congestion on all major state roadways in Maryland, on an average weekday, during the AM and PM peak hours.

2.2.4 Increasing Travel Time

Travel time between Baltimore and Washington, D.C. continues to increase on the roadways within the Project Study Area, adding to commuting time as well as travel time to and from transit stations and BWI Marshall Airport Station. This increase in travel time is directly related to the degradation in LOS on the transportation network.

2.2.4.1 Roadway Network

According to the 2015 *Maryland State Highway Mobility Report*[15], several segments in the Baltimore-Washington corridor were ranked among the top 30 unreliable segments in Maryland in 2014. This ranking is based on the Travel Time Index (TTI), which represents how much longer, on average, travel times are during congestion compared to free flow conditions. For example, a TTI of 2.0 indicates a trip that takes 10 minutes in light traffic takes twice as long in congested conditions.

Roadways with TTI values between 1.3 and 2.0 experience heavy congestion; and roadways with a TTI higher than 2.0 experience severe congestion. Fourteen of the 30 most unreliable segments in Maryland are located between Baltimore and Washington, D.C. These segments have TTI values greater than 5.0, which represents a significant travel time delay.

Travel times can range from 45 minutes to well over an hour during peak hours for the 30-mile trip from Washington to BWI Marshall Airport Station. Due to non-recurring congestion, (i.e., an unexpected incident) travel times by automobile could range from 90 minutes to two hours. Congested and unreliable roadways also likely result in more congested and unreliable travel during off-peak periods, due to travelers shifting their departure times to avoid peak period congestion.

2.2.4.2 Transit Travel Time

The BMC has estimated that travel from Baltimore to Washington in a single-occupancy vehicle takes, on average, 50.7 minutes. For transit riders driving to existing rail stations, trips to and from the stations add to overall travel time. The mean travel time to work for Baltimore region residents to the Washington region is 83.2 minutes for MARC riders and 71.5 minutes by bus, which includes travel to and from the stations.

2.2.4.3 MDOT MTA Commuter Bus Service

MDOT MTA provides eight commuter bus routes within the Baltimore-Washington area[36], which use major roadways such as I-95 and US 29, as well as local roadways. In 2015, the average weekday daily ridership for individual commuter bus routes ranged between 111 and 689 passengers or a total of 5,179 MDOT MTA commuter bus

[36] Maryland Department of Transportation, Maryland Transit Administration. (2017). Maryland Transit Administration Commuter Bus Website.

passengers in the corridor on an average weekday.[37] COVID-19 has and may continue to affect service at the time of publication of this document and current numbers may rebound, but future ridership is uncertain.

Currently, there are no dedicated busways along major corridors in Maryland. As a result, the travel time of the MDOT MTA service is dependent on the operations of the existing roadway network. As the travel time increases on the roadway network, the efficiency of MDOT MTA commuter service worsens as well.

2.2.4.4 Airports

Based on the results of the Air Passenger Regional Surveys, BWI Marshall Airport continues to have the highest proportion of regional enplanements (compared to Dulles and Reagan National Airports) and experiences record-high passenger volumes.[38] As a result, BWI Marshall Airport attracts travelers from throughout the Mid-Atlantic region, most arriving by automobile. For Washington-area passengers seeking to fly out of BWI Marshall Airport and arriving by automobile or bus, travel times could range from 45 minutes to well over an hour. During non-recurring congestion, (i.e., an unexpected incident), travel times from Washington, D.C. to BWI Marshal Airport by automobile sometimes approach 90 minutes or more. Similar to the NEC and MDOT MTA Commuter Bus services, as demand on the supporting transportation network increases, the travel time to and from BWI Marshall Airport is projected to increase.

2.3 Decreasing Mobility

As indicated in the previous sections, the demand on the roadway and transit infrastructure in the Baltimore-Washington corridor will continue to increase. This increase in demand, increase in travel times and decrease in LOS have a direct relationship to the reliability and predictability of travel and mobility within the Baltimore-Washington region.

Given the diverse population and employment needs within the Baltimore to Washington, D.C. corridor, the need for transportation choices is important. With increased demand on the existing transportation network that comprises of a variety of choices exposed to physical, operational and other constraints, mobility in the Baltimore-Washington corridor is jeopardized.

Reliability is often measured by the consistency in travel time between Point A to Point B over time. Even with congestion, travel time that includes consistent and predictable delay helps travelers and commuters make choices and plan their trips. Given the

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[37] Maryland Department of Transportation, Maryland Transit Administration. (Fiscal Year 2015). Transit Ridership Weekday Averages.

[38] Transportation Planning Board. (December 2016). 2015 Washington-Baltimore Regional Air Passenger Survey. December 2020 - 2019 MWCOG Washington-Baltimore Regional Air Passenger Survey - General Findings Report (April 2020)

volume and congestion along the major corridors such as I-95, the BWP, MD 295, US 29 and US 1, any incident can contribute to a breakdown of the system, resulting in unreliable and unpredictable estimated travel times, thereby complicating transportation mode decisions.

Capacity chokepoints along the NEC have repercussions throughout the NEC because they limit overall system capacity. Other chokepoints on the NEC include locations where physical constraints, such as geometry, or curvature of the tracks, require reduced-speed operations.

2.4 Maintaining Economic Viability

A direct relationship exists between transportation infrastructure and economic viability. Economic development and growth opportunities are restricted without commensurate transportation improvements and choices in the Baltimore-Washington corridor. A transportation system that provides options for reliable, efficient, and cost-effective movement of passengers and goods is needed to support continued economic growth[39], including the retention of, and an increase in jobs in the region.

[39] The National Economic Council and the President's Council of Economic Advisers. (July 2014). *An Economic Analysis of Transportation Infrastructure Investment*.