CHAPTER 5 – THE EXISTING TRANSPORTATION SYSTEM

5.1 REGIONAL TRANSPORTATION NETWORK

The existing transportation system in the FAMPO Region is comprised of a variety of modes, the most prevalent and widely used being the roadways. From 1990 to 2020 the Region's population has more than doubled, from 137,666 to an estimated 324,941 persons. This dramatic rise in population has strained transportation infrastructure pushing the Region's roadway system to maximum capacity. Traffic congestion and safety issues on the interstate, primary, and portions of the secondary road system throughout the urbanized area are plentiful and growing worse each year.

Other less prevalent modes of transportation for people, freight, and services in the FAMPO Region include: passenger rail, public transportation (buses) for local and commuter purposes, car and van pooling programs, bicycle and walking facilities, and airports. While these still comprise a small share of through-movement in the region, their use is growing and will continue to do so with smart planning.

5.1.1 SAFETY

Crashes and fatalities in the Region are detailed in the two tables below. Table 5.1 and 5.2 show the number of highway fatalities and injuries from 2016 to 2020 for each jurisdiction in the region, and Table 5.3 lists the highway crashes. Both tables are based on data received from the Virginia Department of Motor Vehicles (DMV). In 2020, traffic crashes and injuries dropped significantly but fatalities generally remained in line with recent averages.

Table 5.1: FAMPO Region Highway Fatalities

Jurisdiction	Fatalities				
	2016	2017	2018	2019	2020
City of Fredericksburg	1	2	1	2	2
Spotsylvania County	14	12	16	22	13
Stafford County	9	9	14	7	7
FAMPO Region Total	**24**	**23**	**31**	**31**	**22**

Table 5.2: FAMPO Region Highway Injuries

Jurisdiction	Injuries				
	2016	2017	2018	2019	2020
City of Fredericksburg	873	992	971	1,040	809
Spotsylvania County	1,010	927	963	937	695
Stafford County	752	768	851	859	581
FAMPO Region Total	**2,635**	**2,687**	**2,785**	**2,836**	**2,085**

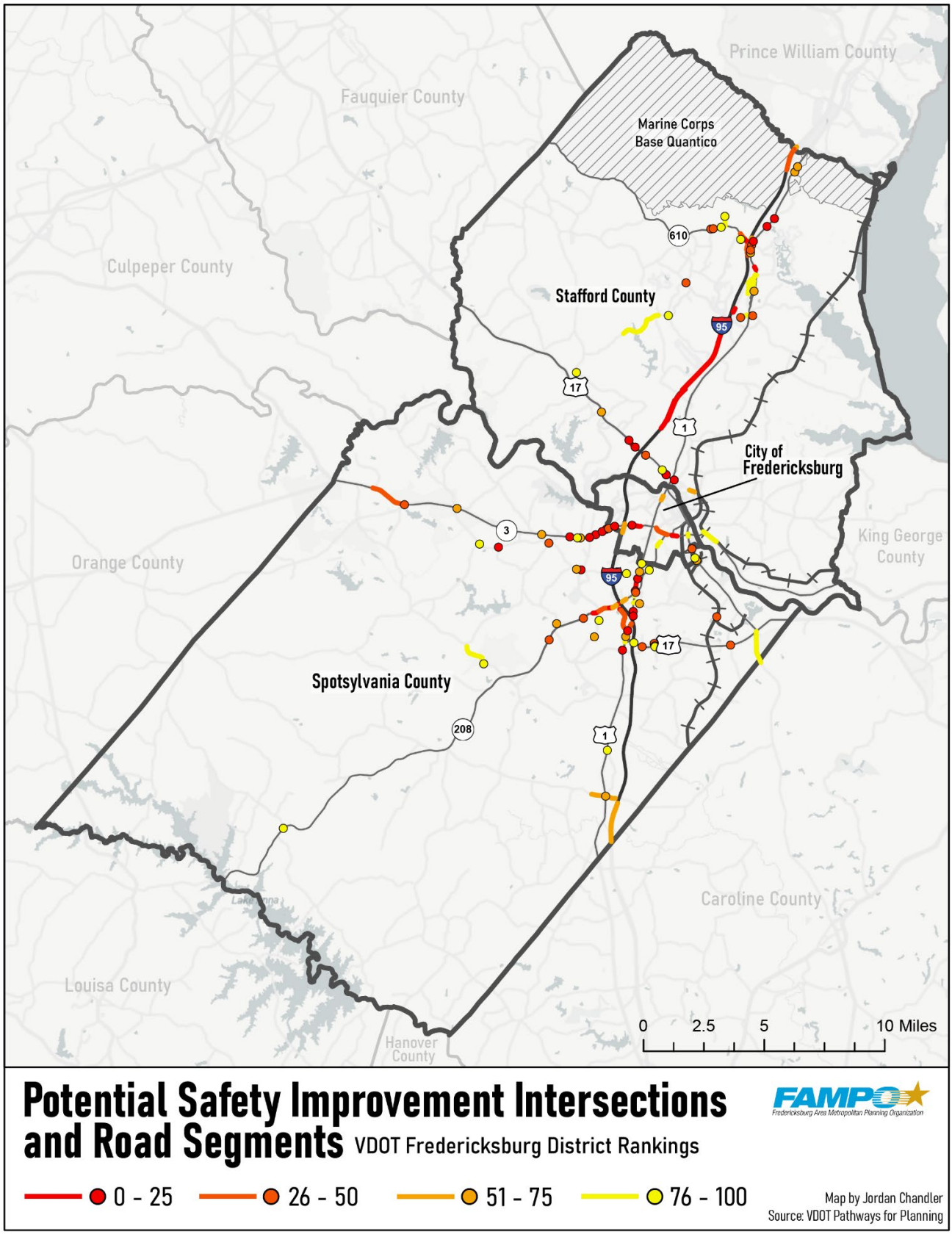
Table 5.3: FAMPO Region Highway Crashes

Jurisdiction	Crashes				
	2016	**2017**	**2018**	**2019**	**2020**
City of Fredericksburg	993	994	1,041	999	884
Spotsylvania County	2,165	2,272	2,266	2,217	1,868
Stafford County	2,164	2,372	2,296	2,263	1,697
FAMPO Region Total	**5,322**	**5,638**	**5,603**	**5,479**	**4,449**

In 2019, there were 36,096 fatalities in motor vehicle traffic crashes according to the USDOT's National Highway Traffic Safety Administration. Roadway safety is an often-overlooked public health crisis, but there have been considerable developments in recent years to improve the safety of transportation system. VDOT is currently updating their Strategic Highway Safety Plan 2022-2026. This plan's goal is to have zero transportation-related deaths and has the slogan "Arrive Alive." Other statewide safety planning efforts include Virginia's Transportation Plan (VTrans 2045), Department of Motor Vehicles (DMV) Highway Safety Plan, and the Commercial Vehicle Safety Plan (CVSP). These plans create strategies, recommendations, and actions that are implemented throughout the state and the Fredericksburg region. In order to implement the outputs several funding sources are available specifically related to safety: grants for behavioral safety and vehicle programs, funding for infrastructure projects such as SMART SCALE, Transportation Alternatives Program (TAP), Revenue Sharing, Locality Revenue, and lastly Private Sector/Associations.

VDOT maintains a data set of Potential Safety Improvements (PSI) which is made available to local and regional agencies to assist in planning and programming decisions. These locations are identified through Virginia specific highway Safety Performance Functions (SPF) using the most recent Highway Safety Manual (HSM) methods. Locations that have more crashes than expected based on the SPF have PSI values greater than zero. PSIs indicate that an engineering review is recommended for possible mitigation countermeasures. The abnormal values are then ranked, most dangerous (near zero) to least dangerous (near one hundred) for the Commonwealth and the VDOT Fredericksburg Construction District. These locations, made up of roadway segments and nodes, can be seen for the FAMPO Region in Map 5.1.

Map 5.1: Potential Safety Improvements (PSI)



5.1.2 CONGESTION

When demand for a transportation facility outstrips available capacity for that facility, congestion occurs. It can affect all modes of travel, including highway passenger and freight vehicles, freight rail, commuter rail, metro rail, bus, air traffic and airport ground traffic, ports, and waterways. Demands can vary significantly, depending on the season of the year, the day of the week, and even the time of day.

Roadway congestion is often measured by Volume to Capacity (V/C) Ratios. Typically, the V/C Ratio is translated into Level of Service (LOS) which provides a letter designation to easily understand roadway segment or intersection performance. Table 5.4, below, describes generalized LOS and their associated V/C Ratios.

Table 5.4: Level of Service

LOS is defined by the Highway Capacity Manual as a "qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers". A LOS definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. Six levels of service are defined, and they are given letter designations from A to F, with LOS "A" representing the best operational conditions and LOS "F" the worst. The following is a list of the various levels of service with abbreviated definitions quoted directly from the Highway Capacity Manual.		
LOS	**Description**	**Associated V/C**
LOS "A"	Represents free flow; individual users are virtually unaffected by the presence of others in the traffic stream	0.0 – 0.6
LOS "B"	In the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable	0.61 – 0.70
LOS "C"	In the range of stable flow, but it marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream	0.71 – 0.80
LOS "D"	Represents high-density, but stable flow; speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort or convenience	0.81 – 0.90
LOS "E"	Represents operating conditions at or near the capacity level; all speeds are reduced to a low, but relatively uniform value; freedom to maneuver within the traffic stream is extremely difficult	0.91 – 1.0
LOS "F"	Used to define forced or breakdown flow; this condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point; queues form behind such locations	>1.01

Congested conditions are characterized by the breakdown in the flow of vehicles, leading to slower speeds and lower vehicle throughput. Congested conditions are also highly sensitive to disruption; a minor incident or adverse weather conditions can exacerbate the underlying capacity problem and lead to more extreme delays. Several problems contribute to traffic congestion beyond too many vehicles competing for too little space. These problems include the following:

- **Bottlenecks** - points where the roadway narrows or where regular traffic demands cause traffic to backup due to a lack of needed capacity are the largest source of congestion.
- **Traffic incidents** - crashes, stalled vehicles, and debris on the road cause about 1/4 of congestion problems.

- **Work zones** - work zones for new road building and maintenance activities like filling potholes.
- **Bad weather** - cannot be controlled, but travelers can be notified of the potential for increased congestion.
- **Poor traffic signal timing** - the faulty or inefficient operation of traffic signals or green/red lights where the time allocation for a road does not match the volume on that road are a source of congestion on major and minor streets.
- **Special events** - cause "spikes" in traffic volumes and changes in traffic patterns, and either cause delay on days, times, or locations where there usually is none, or add to regular congestion problems.

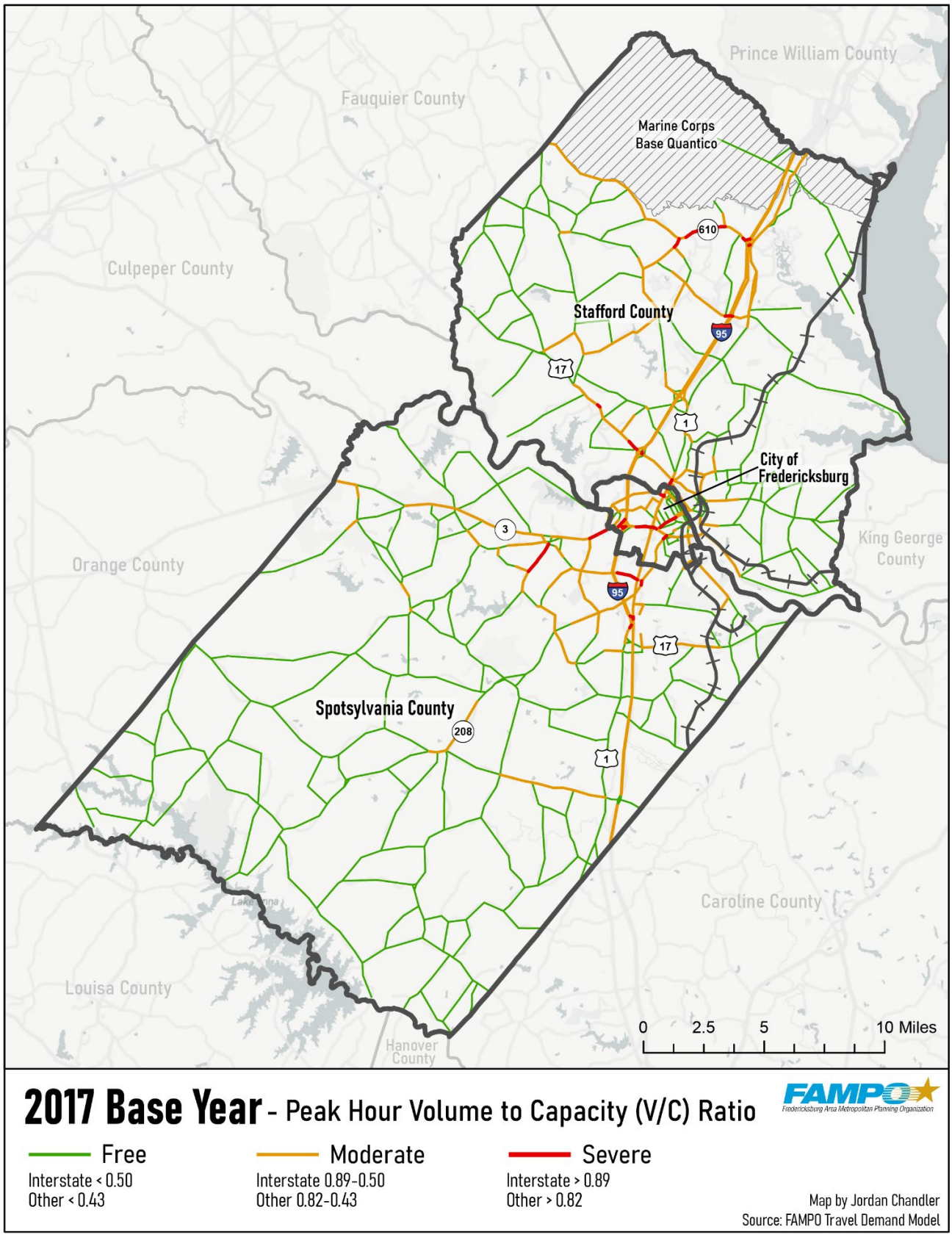
Congestion, road and structural condition play a role in the safety of Virginia's roadways. Motor vehicle crashes are considered a transportation issue within the Commonwealth of Virginia; thus, VDOT is charged with identifying measures to improve the safety of the state's roadway infrastructure.

The Commonwealth has identified the following key measures to reduce injuries and deaths in Virginia:

- Raise public awareness and develop a safer driving culture;
- Focus on young drivers, aggressive drivers, impaired drivers and seat belt use through legislation, education, enforcement and adjudication;
- Improve intersection safety for all users in congested areas;
- Minimize consequences in cases of roadway departure;
- Incorporate transportation safety planning into all levels of government; and
- Improve traffic records system to be more accurate and up to date.

Map 5.2 depicts the current V/C Ratios and LOS of the Region's highway system in the 2017 base year. The current LOS shows that portions of the interstate and arterial roadway network in the Region are failing in the urbanized area around the City of Fredericksburg, as well as in northern Stafford County. This map was derived from FAMPO's Travel Demand Model.

Map 5.2: 2017 Peak Hour Volume to Capacity (V/C) Ratio



5.1.3 TOURISM

One of the federal planning factors under the FAST Act that MPOs must consider within the scope of the planning process is enhancing travel and tourism. The FAMPO Region is rich in cultural and natural heritage. From the storied Civil War battlefields to the fantastic local food and wine scene and the picturesque Rappahannock flowing in the heart of it all, there is something for everyone here. Tourism is integral to our region's economy and character. According to the Tourism Advisory Council the current impact of tourism on the region's economy is roughly $550 million and coordinated regional efforts could grow that total to $1 billion by 2028. But there's a problem: congestion, especially on I-95. If it's miserable to travel to and within our region, fewer tourists will bother visiting. To grow our regional viability as a tourism destination, we must address these issues comprehensively. Several of our Constrained Long Range Projects will help meet that goal; a few are highlighted here:

Rappahannock River Crossing Projects:

This project, divided into northbound and southbound, will provide local traffic in the region with a route to cross the Rappahannock without merging into I-95's general purpose lanes, making it much easier for people to travel back and forth locally across the river and greatly helping to ease congestion on I-95 itself. Projects at the 130 and 133 exit interchanges in Fredericksburg and Stafford County will make getting around the region much easier for tourists and locals alike.

95 Express Lanes Extension to Fredericksburg:

This project will extend the 95 Express Lanes 10 miles south from their Garrisonville terminus to U.S. 17 (Exit 133) and connect them to the Rappahannock River Crossing Projects, facilitating travel from our Region to Northern Virginia and beyond.

Lafayette Boulevard Improvements:

Lafayette Blvd in downtown Fredericksburg is a major route for travel to the train station and into the city itself from Spotsylvania County and because of this it experiences congestion and at present is not a safe place for cyclists and pedestrians, although the Lafayette Boulevard Multimodal Improvements project – funded in SMART SCALE Round 4 – will improve safety and accessibility. The planned suite of improvements along Lafayette Boulevard will provide for two roundabouts at Charles Street and Kenmore Avenue to facilitate the flow of traffic and includes several bicycle and pedestrian safety and connection upgrades. Crosswalks will be improved along the Lafayette Blvd corridor; a new shared-use path will connect Jackson Street and the popular Virginia Central Railway (VCR) Trail with restaurants and historic buildings along Princess Anne St, and the Virginia Railway Express (VRE) Station. These improvements will link this important corridor with other bicycle and pedestrian amenities being developed in downtown Fredericksburg and provide a new way for visitors to experience our area.

Downtown Fredericksburg Pedestrian Enhancements:

Fredericksburg, with its many restaurants, breweries, antique shops, and historic buildings, is an outstanding tourist hub for our region that is best explored on foot. This suite of improvements, completed in 2019-2020, has greatly improved pedestrian experience downtown. ADA-compliant crosswalk upgrades, street light safety improvements, brick sidewalks, and attractive storm water filters, have added both to the safety and to the charm of our historic district for pedestrians strolling our storied city streets.

Regional Bicycle and Pedestrian Improvements:

FAMPO localities have in recent years begun placing greater importance on bicycle and pedestrian connectivity. Over 75 new active transportation projects were submitted for consideration in the 2050 Constrained Long Range Plan project list and of those, 29 were selected based on their scores and the amount of expected revenue through 2050. These projects will provide a multitude of opportunities for travel without the use of a car when tourists visit the Region. The City of Fredericksburg is enhancing its regional trail network, Spotsylvania County has developed a Trailways Master Plan that includes multiple greenway proposals, and Stafford County continues to implement the Belmont-Ferry Farm Trail which enables tourists to access historic sites along the Rappahannock River. Collectively, the Region is in great shape to drive tourism with its planned active transportation projects.

5.1.4 RESILIENCY AND HOMELAND SECURITY

Resiliency and Reliability of the Transportation System

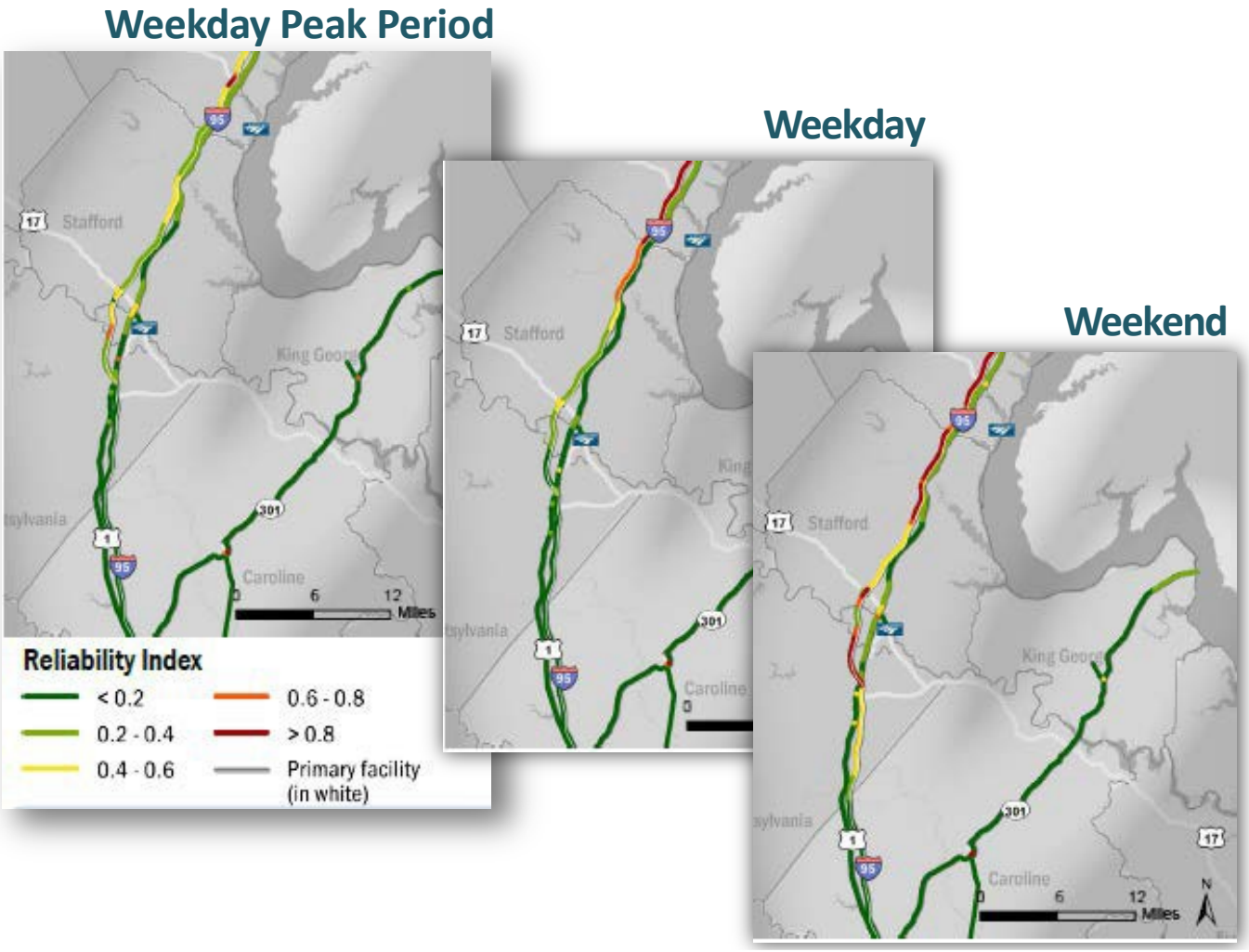
Transportation system reliability is another topic of heightened importance throughout the MAP-21 and FAST Act rulemakings, both from the perspective of metropolitan planning factors and as part of the new federally required performance-based planning process, particularly system performance measures and targets. Unreliable travel conditions are a major concern for the region, particularly for commuters and freight shippers using the I-95 corridor, resulting in substantial economic losses and costs.

The inclusion of system performance measures and targets for the percent of person miles traveled on the interstate and non-interstate National Highway System that are reliable and the truck travel time reliability index can be found in Appendix A – System Performance Report.

Multiple reports have presented compelling information on the challenges related to reliability on the I-95 corridor within the FAMPO region:

- VTrans Multimodal Transportation Plan (VMTP) – 2025 Needs Assessment:
    - VTrans2045 adopted a vision, goals, and objectives for Virginia's transportation system. Within the economic competitiveness goal, two objectives – reduce the amount of travel that takes place in severe congestion, and improve reliability on key corridors for all modes, address transportation system reliability.
    - For the FAMPO region, in the VMTP 2025 Needs Assessment, the Office of Intermodal Planning and Investment compiled 2014 speed data supplied by INRIX to map reliability during the PM peak period. As displayed in Map 5.3, the reliability index (ratio of congested travel time to average travel time) analysis shows poor reliability on I-95, particularly north of Route 3. Other routes have moderated reliability problems in certain areas, such as U.S. 1 near Quantico, U.S. 17 near I-95 and Route 3 near I-95.
    - In 2014, the segment of I-95 from U.S. 17 in Spotsylvania through Prince William County experienced the highest buffer time index (a different measure of reliability presenting the percent extra time to travel the corridor relative to an average trip travel time) across all corridors in Virginia, typically averaging a travel time 80% longer than average, uncongested travel.

Map 5.3: Reliability Index – VMTP 2025 Needs Assessment



- VTrans Annual Performance Report:
  - Within the 2016/2017 VTrans Performance Report, using data supplied by INRIX, which tracks average vehicle speed over 15-minute increments throughout the day, VDOT analyzed the buffer time index on the I-95 corridor and 213 additional miles of U.S. and Virginia routes within the FAMPO Region.
  - Roadway reliability in this report is calculated using the buffer time index. For example, in the I-95 corridor, in weekday peak periods in 2016, travelers needed to add at least 45% more time to their average travel time to ensure an on-time arrival.

The 2050 LRTP includes multiple capacity and operational projects on I-95 that will mitigate these reliability challenges over the coming decades. These projects include:

- The I-95 Rappahannock River Crossing projects from Exit 133 (U.S. 17) to Exit 130 (Route 3) as funded partially through the Atlantic Gateway FASTLANE grant
- The I-95 Express Lanes Fredericksburg Extension from south of Garrisonville Road to connect to the Rappahannock River Crossing project at Exit 133 (U.S. 17)

- Planned improvements at Exits 118, 126, 133, a new interchange at Harrison Road, and widening to four lanes in both directions from Exit 130 to 126

These projects will support guaranteed travel times from Fredericksburg to points in Northern Virginia and Washington D.C. for vanpools, commuter buses, carpools, and single occupant commuters. The Rappahannock River Crossing project will relieve a critical bottleneck on I-95 south of U.S. 17 in Stafford County and help address planned growth that is anticipated to increase traffic volumes over 50% by 2050.

This added capacity on I-95 also enables the transportation system to be more resilient or recover more quickly during crashes or other emergencies on I-95.

Mitigate Stormwater Impacts of Surface Transportation

Metropolitan planning requirements formalized in MAP-21 and the FAST Act requires FAMPO's LRTP to address mitigation of stormwater impacts on surface transportation. Stormwater management is a topic of significant importance to the FAMPO region, given the location adjacent to the Rappahannock and Potomac Rivers and overarching requirements for cleaning and restoring the region's streams, creeks, and rivers flowing into the Chesapeake Bay as part of the U.S. Environmental Protection Agency Total Maximum Daily Load (TMDL) requirements.

On December 29, 2010, the U.S. Environmental Protection Agency established the Chesapeake Bay TMDL, establishing accountability features to guide sweeping actions to restore clean water in the Chesapeake Bay. Despite extensive restoration efforts during the prior 25 years, the TMDL was prompted by insufficient progress and poor water quality in the Chesapeake Bay and its tidal tributaries. The TMDL was required under the federal Clean Water Act and responded to consent decrees in Virginia and the District of Columbia from the late 1990s. It was also a keystone commitment of a federal strategy to meet President Barack Obama's Executive Order to restore and protect the Bay. More information about the Chesapeake Bay TMDL is available here: https://www.epa.gov/chesapeake-bay-tmdl.

In September 2015, VDOT developed a Draft Chesapeake Bay TMDL action plan covering VDOT small municipal separate storm sewer systems (MS4). Municipal separate storm sewer systems include roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains designed to collect or convey stormwater within VDOT right-of-way. Within the Fredericksburg urbanized area, this includes 3,943 acres of VDOT right-of-way and properties.

The action plan includes best management practices (BMPs), consisting of schedules of activities, prohibitions of practices, maintenance procedures, and other management practices, including both structural and nonstructural practices, to prevent or reduce the pollution of surface waters and groundwater systems. These activities will help VDOT meet or exceed pollutant reduction requirements included within the TMDL Watershed Implementation Plan. VDOT regularly updates its practices and programs to reflect changes to regulations and the agency's objectives, including its BMP Design Manual, Drainage Manual, and Stormwater BMP Standards & Specifications.

In September 2021, VDOT released its MS4 Permit Year 2021 Annual Report highlighting the progress made across seven control measures designed to help VDOT meet the TMDL requirements. This includes tracking and confirming requirements associated with maintenance of existing stormwater management facilities, rules of stormwater prevention associated with land disturbing activities (new construction), and best practice designs

for new stormwater facilities. Each VDOT project within the FAMPO LRTP meets design and management standards intended to support VDOT meeting or exceeding the TMDL pollutant reduction requirements.

In 2017, GWRC updated its Regional Green Infrastructure Plan which provides analytical tools and strategies to support local governments' involvement in and response to Virginia's Chesapeake Bay Watershed Implementation Plan. This Plan is advisory in nature and respects local governments' autonomy, while identifying regional assets within each community that, with cooperation among local governments, could be preserved or enhanced to maintain the Region's high quality of life and natural areas, while supporting clean water.

GWRC and FAMPO's regional scenario planning efforts since 2011 have taken a strategic look at the outcomes from different growth patterns within the region. Four scenarios were analyzed in more detail in 2016 through the GWRC Region Scenario Planning Study – Phase 2. The preferred scenario, community plans, follows locally-adopted comprehensive plans which use mixed-use development and higher densities/intensities to reduce the amount of land needed to meet population and employment growth projections for the region, leaving significantly more land in rural or farm conditions. This has significant positive impacts on stormwater, by reducing the spread of impervious surface across the region. It also aligns well with GWRC's Green Infrastructure Plan and the goals of the Chesapeake Bay TMDL. The outcomes of the community plan scenario ultimately supported the 2045 land use and socioeconomic forecasts that are a critical factor in development of the LRTP. The 2050 forecasts build upon the 2045 figures and more details can be found in Appendix B.

Metropolitan Planning Rule Requirements 23 CFR 450.324 (f) (7)

The metropolitan transportation plan shall, at a minimum, include: Assessment of capital investment and other strategies to preserve the existing and projected future metropolitan transportation infrastructure, provide for multimodal capacity increases based on regional priorities and needs, and reduce the vulnerability of the existing transportation infrastructure to natural disasters.

Vulnerability of Transportation Network

Metropolitan planning requirements formalized in MAP-21 and the FAST Act requires FAMPO's LRTP to discuss investments and other strategies to "reduce the vulnerability of the existing transportation infrastructure to natural disasters," in the capital investment portion of the plan. The completion of GWRC's 2017 Hazard Mitigation Plan Update provides an excellent background into ongoing regional planning, policy, and strategy development to address vulnerability to natural hazards. The GWRC 2017 Hazard Mitigation Plan Update (the Plan) focuses on two primary objectives:

- Identify natural hazards that pose a threat to the safety, health, and economy of the region and its member jurisdictions, as well as steps that can be taken to reduce the impact of these natural hazards in the future, helping communities recover quickly.
- Second, this plan ensures the region's compliance with the Disaster Mitigation Act of 2000, which requires that local governments develop natural hazard mitigation plans in order to qualify for both pre-disaster and post-disaster grant opportunities.

The Plan acknowledges a diversity of natural threats, including broad hazards, like drought or winter storms, that are likely to affect the entire region at once and others, like flooding or wildfires that are usually isolated events that are highly dependent on local topography and conditions. The risks posed by these hazards also vary widely, from the temporary traffic hazards of winter snows, to the rare but devastating effects of tornados and earthquakes.

The Plan considers the extent and magnitude of the hazard, past occurrences, and the likelihood of future occurrences. Using data from a variety of local, state, and federal agencies, the plan quantifies the human and economic risks associated with these natural hazards. The risks most applicable to the transportation system in the GWRC region include:

Flooding – The Region is most susceptible to urban flooding and flash flooding. Low-lying areas adjacent to rivers, streams, and creeks are susceptible to riverine flooding. In addition, portions of the Potomac and Rappahannock Rivers in the region are subject to tidal flooding. The Plan references the occurrence of over 20 significant floods in the region over the last twenty years, and four major floods on the Rappahannock River since the early-1970's. Based on historic data from VDOT, there are multiple segments of roadways (on the federal system) in the region susceptible to recurrent flooding, including:

- Stafford County – Rt. 608 from Andrew Chapel Rd. to Marlborough Point Rd.; Rt. 627, from Shelton Shop Rd. to Lightfoot Dr.; Rt. 623, Harrell Rd.; Rt. 607, River Rd.
- Spotsylvania County – Rt. 638 Lansdowne Rd. at Fredericksburg city limits; Rt. 612 at Rt. 608; Rt. 648, Blockhouse Rd.

Hurricanes and Tropical Storms – While the Region is somewhat protected from the full strength of a hurricane, its expansive nature makes the region vulnerable to high winds, flooding, and tornadoes that often accompany these extreme weather events. Historically, hurricanes have come close enough to Virginia to produce hurricane force winds (>74 mph) approximately three times every twenty years. In many cases, tropical storms and tropical depressions can cause significant levels of destruction as well, particularly through flooding and wind damage to power lines and other transportation infrastructure (lighting, signage, and signals).

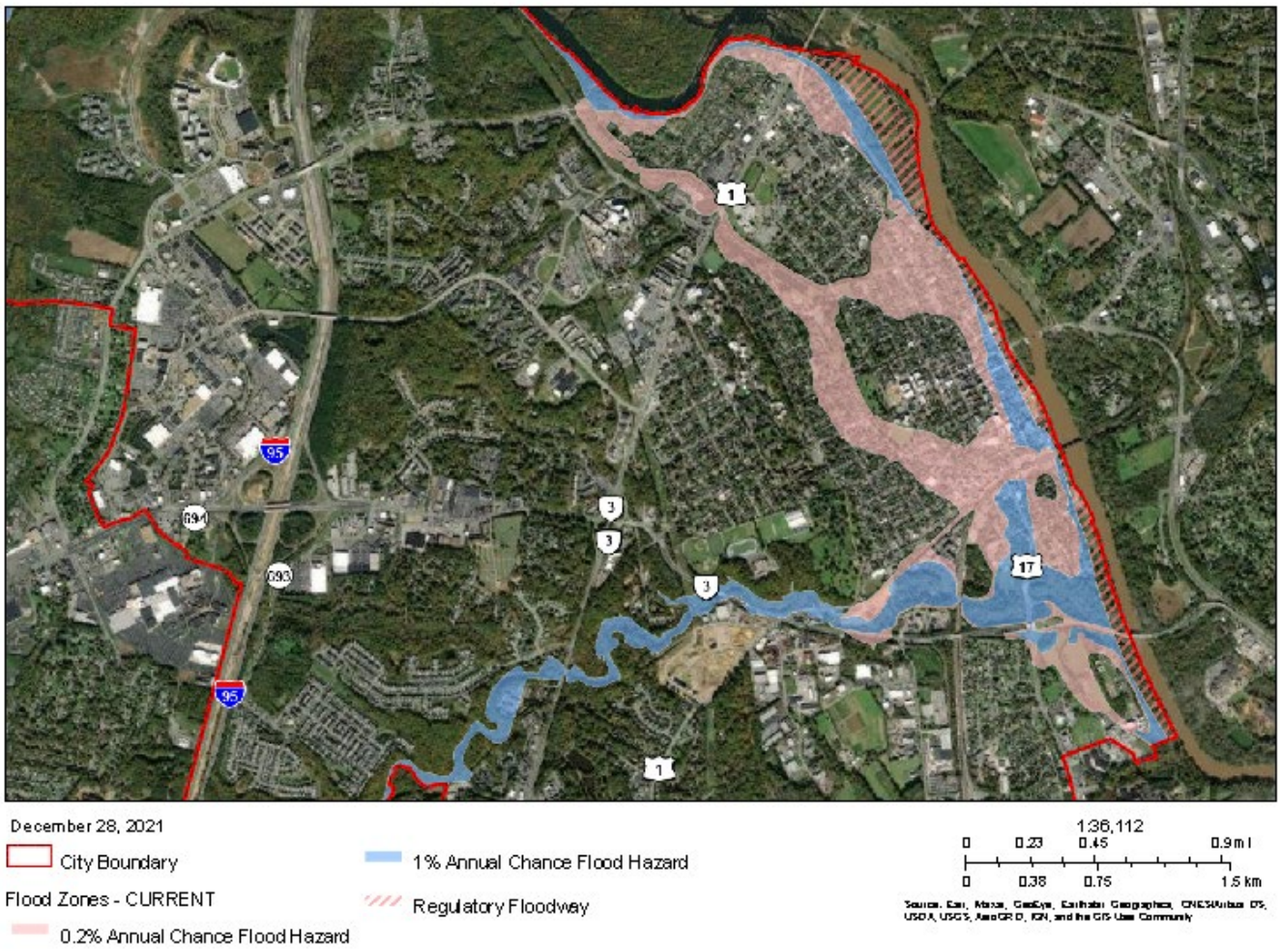
Severe Thunderstorms and Tornadoes – The impacts of these storms are typically isolated, however can be very severe. While flash flooding may be associated with these storms, the greater risk is potentially catastrophic wind damage based on storm severity. The region has experienced 29 recorded tornadoes between 1960 and 2019.

Winter Storms – Winter storms can combine different types of precipitation including snow, freezing rain, and ice, as well as high winds, and cold temperatures. These storms can range from being a minor inconvenience to crippling, and potentially life-threatening events that can disrupt transportation and communication services.

The broader impact of climate change creates the potential for increased frequency and severity of these hazard events in the future. The Virginia Governor's Commission on Climate Change, initially established in 2007, released an updated report in 2015 that included recommendations that Virginia agencies should take to plan for and adapt to climate change impacts.

Even gradual changes in climate have the potential to increase the frequency and severity of natural hazards. Localities in the GWRC region should be aware of these risks, and that past levels of readiness may not be sufficient in the future due to the potential for increased natural disaster frequency as a result of climate change, and local growth that puts more people, businesses, and critical facilities in the path of natural hazards. Multiple resources, including AdaptVA, provide data, forecasts, tools for vulnerability assessments, and adaptation case studies that can help inform planning and policy. Map 5.4 presents an example map from showing flood risks in downtown Fredericksburg from FEMAs National Flood Hazard layer. These tools, among others, can be used to determine vulnerable transportation assets, and they can be overlaid with traffic information and other infrastructure data to determine asset criticality which can inform specific, asset-level mitigation strategies.

Map 5.4: Flood Risks Mapping – Fredericksburg



1% annual flood chance is equivalent to a 100-year storm, and 0.2% flood change is equivalent to a 500-year storm, consistent with definitions in FEMAs National Flood Hazard maps.

Strategies to Preserve Infrastructure and Reduce Vulnerability

To successfully address these hazards, strategies focusing on a complete cycle of mitigation, preparedness, response, and recovery, are recommended in the Plan. FAMPO, GWRC, and their planning partners, through development of the LRTP, primarily focus on capital strategies to support mitigation. Implementing agencies,

including VDOT, while also delivering and maintaining transportation infrastructure, also put in place protocols and best practices for preparedness, response, and recovery. The strategies in the Plan which apply directly to mitigation strategies for transportation infrastructure capital investments include:

- Protection of the built environment – protection measures such as modification of existing infrastructure through flood and stormwater control strategies that can help the built environment better withstand natural hazards.
- Hazard modification through construction – structural mitigation projects that can lessen or eliminate the impact of some hazards by modifying areas through the construction of levees, diversion channels, storm sewers, or other engineering solutions.
- The VDOT Drainage Manual sets standards and guidelines for the design of roadway structures for design storms, flood flow evaluations, and FEMA floodplain compliance. These standards are used to provide continuity in the design and operation of the state highway system, to enhance traffic safety, to ensure the use of technically accepted materials and procedures, to provide the most cost-effective highway facilities, and to ensure the fulfillment of all legal obligations. For example, the I-95 Rappahannock River Crossing projects (FY21-24 TIP), includes a new bridge across the Rappahannock River. With advancement in bridge materials the new bridge will be able to have a longer span and fewer piers than the existing one, helping to mitigate flood risks.

The 2050 LRTP includes several critical projects that will address vulnerability concerns within the region. These projects will help the regional transportation system to be more resilient to natural disasters and other severe weather events through enhancing communication with travelers and increasing the access to and mobility of critical routes.

- The Rappahannock River Crossing projects will provide key additional capacity across the Rappahannock River on the I-95 corridor, enabling I-95 to support additional regional and local trips in the event of bridge closures upstream or downstream resulting from flooding or other impacts.
- Extension of the I-95 Express Lane system approximately 10 miles south of Route 610 (Garrisonville Road) in Stafford County to the vicinity of U.S. 17 (I-95 Exit 133). The facility is proposed to connect to the I-95 Southbound Rappahannock River Crossing project. These two projects provide additional capacity within the I-95 corridor and an alternative route, managed with advanced traffic management system technologies, to direct traffic and management congestion during severe weather events.
- ITS NoVA proposal to expand Advanced Traffic Management (ATM) system southward to Exit 126 – technology is on I-95 Express Lanes and Fred Ex

Homeland Security

A new MAP-21 requirement for metropolitan planning is to reference unique regional strategies and policies that support homeland security, as appropriate, to safeguard the personal security of all motorized and non-motorized users. The FAMPO 2050 CLRP supports improved homeland security by including several projects which support this such as the Atlantic Gateway, I-95 Express Lane extensions, and the I-95 Southbound Rappahannock River Crossing project.

5.2 HIGHWAYS AND BRIDGES

VDOT maintained 128,569 lane miles of roadway and 21,195 bridges and culverts in 2020, the third largest system in the country behind only North Carolina and Texas. This system is comprised of interstate, primary, secondary and frontage roads:

- **Interstate** – 5,450 lane miles of four-to-ten lane highways that connect states and major cities.
- **Primary** – 22,685 lane miles of two-to-eight lane roads that connect cities and towns with each other and with interstates.
- **Secondary** – 99,782 lane miles of local connector or county roads. These generally are numbered 600 and above. Arlington and Henrico counties maintain their own county roads.
- **Frontage** - 652 lane miles of frontage roads.

Due to the population growth that has taken place over the past 30 years, the Region's portion of this network is often congested during weekday peak periods, weekends, and holidays. With the large and growing gap between roadway maintenance needs and transportation funding, these roads frequently fall into disrepair.

5.2.1 FEDERAL FUNCTIONAL CLASSIFICATION OF HIGHWAYS

A roadway's functional classification reflects a balance between providing access versus providing mobility. Providing mobility means there are few opportunities for entry and exit, therefore creating low travel friction from vehicle access/egress. Providing accessibility means there are many opportunities for entry and exit, which creates potentially higher friction from vehicle access/egress. Functional classification is the process by which public streets and highways are grouped into classes according to the character of service they are intended to provide. The U.S. Department of Transportation divides roadways into four broad categories:

A. Principal Arterial

i. Interstate

Interstates are the highest classification of arterials. They are defined as a series of continuous, limited-access routes that have trip lengths and volumes indicative of substantial statewide or interstate travel. This classification is for highways designated as interstate and includes I-95 in the Region.

ii. Other Freeways and Expressways

These roadways look very similar to interstates in that they must be divided with limited access and egress points that are typically grade-separated. They primarily serve through-traffic and major circulation movements.

iii. Other Principal Arterial

These roadways provide long-distance connections, but do not fit the two categories above. Other Principal Arterials are not access-controlled, so abutting land uses can have direct access. Some examples of this classification in the Region include U.S. 17, U.S. 17 Business and portions of U.S. 1 and State Route 3.

B. Minor Arterial

These roadways serve trips of moderate length, provide for relatively high overall travel speeds with minimum interference to through-movement. Examples of Minor Arterials in the Region include State Primary Routes 2, 208, and 218, as well as Secondary Routes 606 (Mudd Tavern Road), 620 (Harrison Road), and 639 (Leavells Road).

C. Collectors

These roadways collect traffic from the local roads and direct it to the Arterials. In rural areas, collectors generally serve intra-county travel, with distances shorter than arterials. In urban areas, they provide both land access and traffic circulation within residential neighborhoods and commercial and industrial areas. Collectors are divided into two categories:

i. Major Collector

The difference between a Major and Minor Collector is very subtle. Major Collectors are typically longer in length than Minor Collectors, with fewer access points, higher speed limits, higher traffic volumes and more travel lanes. Examples of Major Collectors in the Region include: Courthouse Road (Route 630), Brooke Road, Fall Hill Avenue/Bragg Road, Hanover Street, Massaponax Church Road, and Gordon Road.

ii. Minor Collector

Minor Collectors are typically shorter in length, with more access points, lower speeds, lower volumes and fewer travel lanes. Examples of Minor Collector roads in the Region include: Stefaniga Road, Kellogg Mill Road, Hospital Drive, Mary Washington Boulevard, and River Road.

D. Local Roads

This category accounts for the largest percentage of all roadways in terms of mileage. Local roads provide access to adjacent private property or low-volume public facilities. Travel distance on local roads is relatively short when compared to the higher classifications.

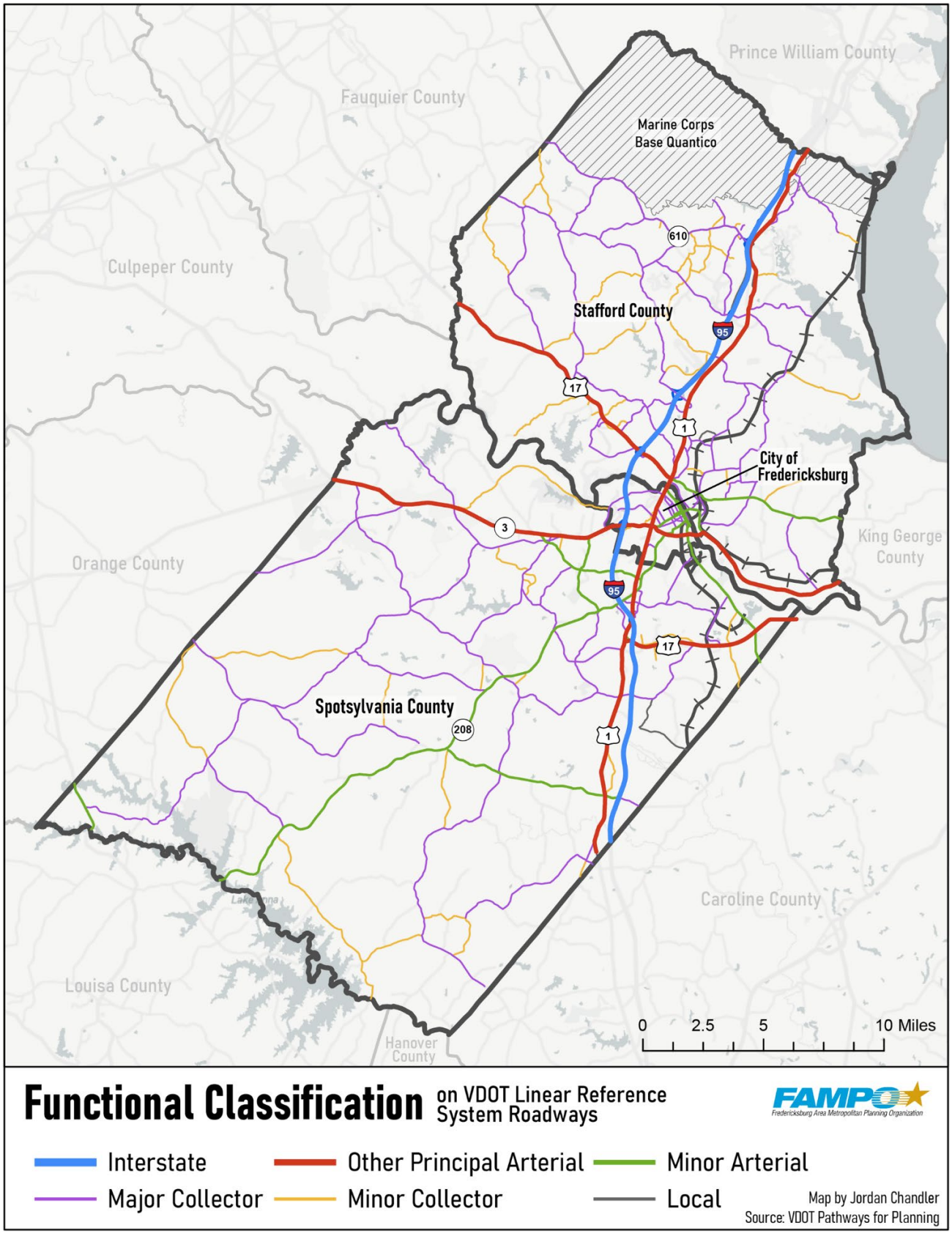
Please refer to Map 5.5 to view the Functional Highway Classifications in the FAMPO Region.

5.2.1.1 Interstate System in the George Washington Region

There are 47 miles of Interstate 95 in the Region, which serves as the primary north/south interstate highway for the movement of people and freight for the eastern United States and traverses all three localities that comprise the FAMPO Region. The roadway generally follows the fall line that separates the Atlantic Plain and the Appalachian Highlands. Interstate 95 carries the majority of the north/south through-traffic in the Region and is the subject of great debate on how to deal with the congestion and safety issues that are associated with an aging highway that carries an average of 160,000 vehicles per day. According to the VDOT I-95 Corridor Improvement Plan (January 2020), I-95 carries 9 million trucks per year, $195 billion in goods moved, and sees over 3,700 incidents per year with an average clearance time of almost two hours.

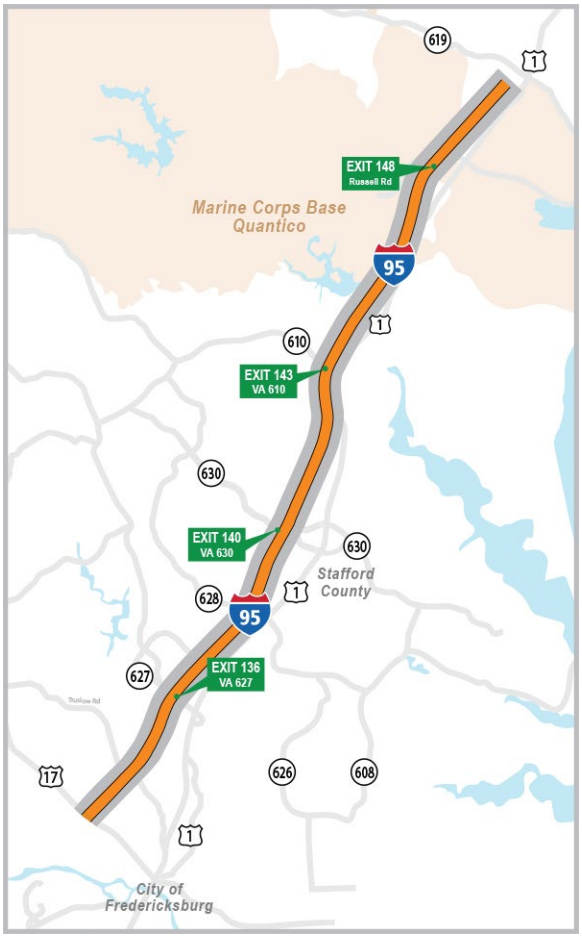
Along approximately five miles of Interstate 95, the Region features express lanes, known as the 95 Express Lanes. Express lanes are dynamically tolled lanes that are free to vehicles with three or more people. The 95 Express Lanes are a one-way facility, and they are scheduled to change directions daily based on the historic flow of traffic.

Map 5.5: Functional Highway Classification



The 95 Express Lanes run from the Garrisonville area in Stafford County to Northern Virginia, where they connect to a network of other express lanes. Additionally, funding has been secured for a southern extension (known as the Fredericksburg Extension, or Fred-Ex) to Exit 133 in Stafford County (Figure 5.1). Construction on this segment is anticipated to be completed in 2023.

Figure 5.1: 95 Express Lanes



Source: VDOT "Improve 95"

Primary System

The primary roadways in the Region include U.S. 1 and 17 as well as State Routes 2, 3, 208, 218. U.S. 1 is a north/south route that connects the Region with Washington D.C. and U.S. 17 serves as an east/west arterial road that connects the region with Northwestern Virginia and Southeastern Virginia.

Being the primary linkages between I-95 and residential areas, many of the Region's primary roads are highly congested. This condition is exacerbated by ever-expanding commercial development along the corridors.

Secondary System

The Region has an extensive network of secondary roads; these are the 600-and-above series roads. Examples of Secondary Roads include Garrisonville Road, Harrison Road, Leavells Road and Deacon Road. These roads serve the purpose of providing access to the interstate and primary systems from the remainder of the Region. Portions

of the secondary system also have direct access to I-95, such as Routes 610 (Garrisonville Road), 630 (Courthouse Road), and 606 (Morris/Mudd Tavern Road).

Route 610 (Garrisonville Road) is one of the busiest I-95 interchanges and corridors in the Region. This road is the main artery of Stafford County's northern commercial/retail corridor and is surrounded by extensive residential development. It is also one of the main access points (via Onville Road) to the western side of Marine Corps Base Quantico.

The secondary system is generally seeing significant residential development with pockets of commercial development along it; this contributes to the overall traffic congestion and is turning once quiet, rural roads into busy suburban thoroughfares.

5.2.1.2 Bridges

In addition to pavement, the Region has bridges and culverts that are maintained annually or replaced by VDOT once they have met the end of their service life. Just like road maintenance and improvements, bridges and culverts use a considerable amount of VDOT's funding allocation each year. VDOT has a target to have no more than 4.5% of its bridges and culverts considered structurally deficient. A structurally deficient bridge or culvert does not imply that it is likely to collapse or is unsafe. It means that there are elements of the facility that need to be monitored and/or repaired. In 2020, 3.4% of bridges were structurally deficient, within VDOT's acceptable range. The anticipated design life of a bridge is approximately 50 years. While technology may increase the life span of bridges, it is anticipated that in the next 20 years the percentage of structures 50 years or older will double from 34% to 71%. This suggests the need for a greater investment in the maintenance of structures to meet the desired performance target. Table 5.5 shows the number of bridges and sufficient bridges by locality in the Region.

Table 5.5: FAMPO Region Bridges

Jurisdiction	Total Bridges	Sufficient Bridges
City of Fredericksburg	18	17
Spotsylvania County	176	167
Stafford County	141	130
Region Total	**335**	**314**

Source: Virginia Department of Transportation, 2018

5.3 PUBLIC TRANSPORTATION AND TRANSPORTATION DEMAND MANAGEMENT

5.3.1 TRANSIT SERVICE

Four transit service providers operate along the I-95 corridor within the FAMPO Region. These are: FREDericksburg Regional Transit (FRED), which provides all local transit service; OmniRide, a commuter bus operator based in Woodbridge that provides AM northbound/PM southbound bus service from Stafford County to and from Northern Virginia and Washington, D.C.; Virginia Railway Express (VRE), which provides commuter rail service between the Fredericksburg region and points in Prince William County, Fairfax County, Alexandria, Arlington County, and Washington, D.C.; and Amtrak, which operates passenger rail service between

Fredericksburg, Prince William County, Alexandria, and Washington, D.C. and between Fredericksburg and points south. Map 5.6 shows the existing transit/TDM system in the Region.

FREDericksburg Regional Transit

FREDericksburg Regional Transit (FRED) provides local transit service in the FAMPO Region. FRED operates 15 local routes throughout the Region that are designed to provide a basic level of mobility. Five routes operate primarily within the City of Fredericksburg, five routes operate in Stafford County, and three routes operate in Spotsylvania County. FRED also operates the "Eagle Express" routes in Fredericksburg that are designed primarily to serve University of Mary Washington University (UMW) students. FRED also provides VRE feeder shuttle service to local VRE stations. As of September 2021, FRED only operates one feeder service due to the slow recovery of VRE ridership as a result of the COVID-19 pandemic.

FRED is a department of the City of Fredericksburg, and FRED's Director of Public Transit reports to the City Manager. The City owns all FRED facilities and equipment, and all FRED employees are City employees. Services outside of the City and for UMW are operated through annual budget agreements with the counties and the University, with those entities funding the net cost of service.

Although FRED operates all services, the decision-making process for service provision is decentralized. The City of Fredericksburg, through FRED, determines the services that are provided in the City, the counties determine the services provided in their areas, and UMW determines the services that are provided to the university.

As seen in Table 5.6, FRED's ridership numbers have continued to decrease in the past few years which is consistent with national and statewide trends. In 2020, COVID-19 accounted for a sudden and severe loss in ridership in the system. Additionally, cheaper gasoline prices and the growth of rideshare companies like Uber and Lyft are cited as potential reasons for this decline. Further, new housing starts in the Region are largely decentralized and do not contribute to the types of transit-friendly land uses that would facilitate increased ridership.

Table 5.6: FREDericksburg Regional Transit Fiscal Year Ridership Figures

2012	2013	2014	2015	2016	2017	2018	2019	2020
545,330	521,735	489,494	450,519	393,633	350,357	306,033	290,728	157,215

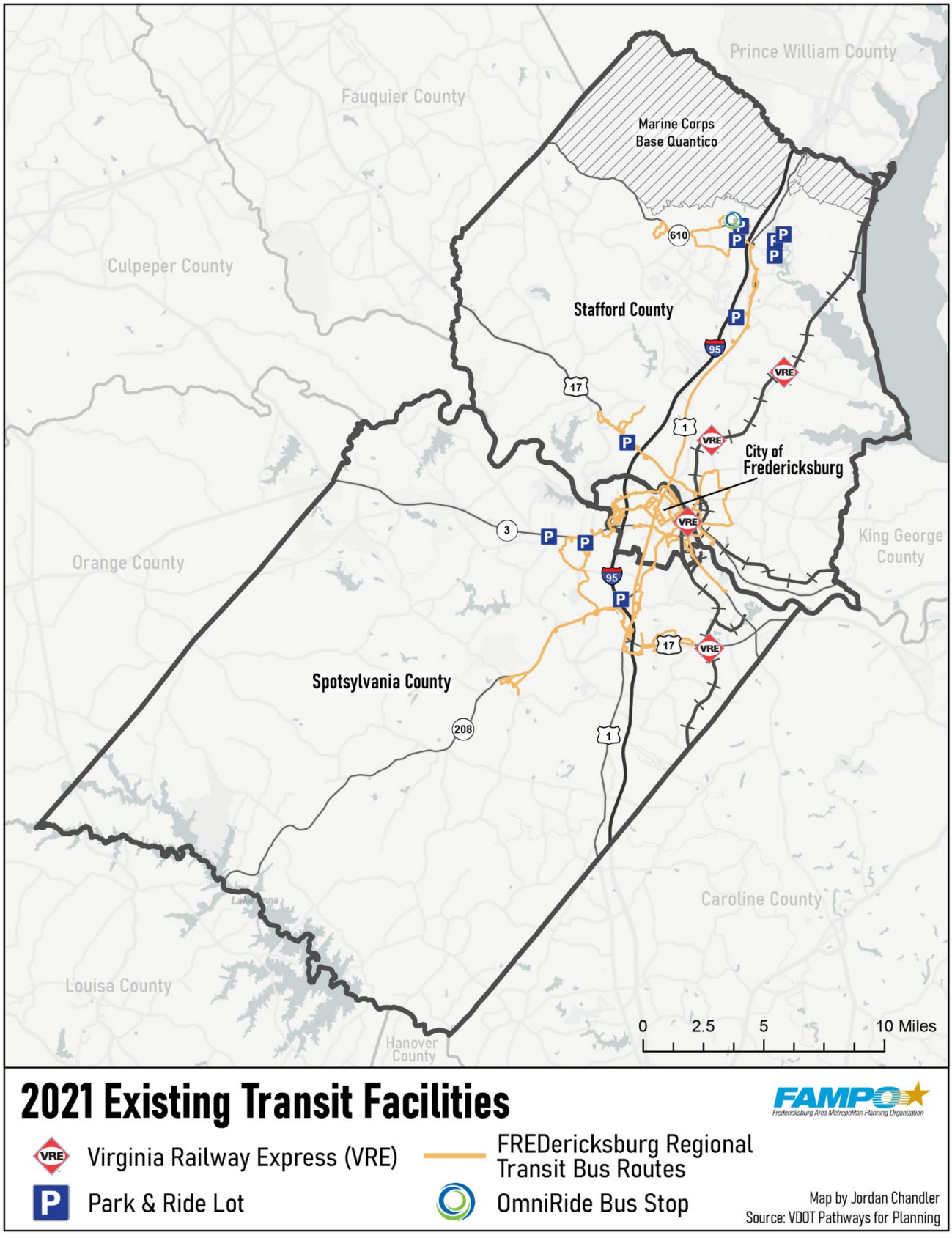
Source: FREDericksburg Regional Transit

POTOMAC AND RAPPAHANNOCK TRANSPORTATION COMMISSION

The Potomac and Rappahannock Transportation Commission (PRTC), through a partnership with the Northern Virginia Transportation Commission (NVTC), manages Virginia Railway Express (VRE) service between Fredericksburg and Washington, D.C. PRTC also provides express bus service from Stafford County to Northern Virginia/Washington, D.C. and between Prince William County and Washington, D.C. called OmniRide. PRTC is also actively involved in transportation planning, ride matching, capital project management, policy analysis and regional coordination, although outside of the FAMPO Region.

PRTC is a transportation district created by the Virginia "Transportation District Act of 1964" and represents the City of Fredericksburg, Stafford and Spotsylvania Counties, as well as Prince William County, Manassas, and Manassas Park.

Map 5.6: Existing Transit Facilities



The major benefits for Fredericksburg, Stafford and Spotsylvania County of PRTC membership are VRE service and the ability to levy the 2.1% sales tax on motor fuels within their jurisdictions. Fredericksburg uses the sales tax revenues to fund FRED, for its VRE assessment (see below) and for a variety of roadway projects. Stafford and Spotsylvania County also use these funds for VRE and FRED assessments and for roadway projects.

PRTC is governed by a board of 17 commissioners, as shown below:

- Fredericksburg – 1
- Stafford County – 2
- Spotsylvania County – 2
- Prince William County – 6
- Manassas – 1
- Manassas Park – 1
- General Assembly – 3 (1 senator and 2 delegates)
- Virginia Department of Rail and Public Transportation (DRPT) – 1

Virginia Railway Express

The Virginia Railway Express (VRE) operates commuter rail service between Fredericksburg and Washington, D.C. (as well as a second line entirely outside of the FAMPO Region between Manassas and Washington, D.C.). Service is provided to four stations in the FAMPO Region: Spotsylvania, Fredericksburg, Leeland Road (Stafford County), and Brooke (Stafford County). This service is provided through a joint venture of PRTC and the Northern Virginia Transportation Commission (NVTC), and it is managed by the two commissions. VRE's Operations Board is comprised of three commissioners who represent PRTC, three who represent NVTC, and one who represents DRPT. Arlington and Alexandria contribute funding but are not represented on VRE's board. Please refer to Map 5.7 for the VRE System Map.

On average, roughly 3,300 riders per day boarded VRE trains in the Region to travel to points north prior to COVID-19, but ridership levels took a drastic drop in March 2020. As of September 2021, only two out of eight northbound trains had a utilization percentage (ridership divided by number of seats) of at least 10%, while three out of eight southbound trains did.

A limited-service agreement with Amtrak increases available VRE capacity and extends operating times by allowing riders using specific types of VRE tickets to ride selected Amtrak trains. Another VRE program through Commuter Connections provides a free ride home in the event of a midday emergency or unscheduled overtime.

Commuter Bus Service

Prior to the COVID-19 pandemic, commuter bus service was provided by Martz Group, a private bus company. It operated between the FAMPO Region and destinations in Arlington County and Washington, D.C.

Rail Transportation

The east coast mainline rail corridor, running 66 miles through the FAMPO Region, is the primary north-south freight corridor on the east coast. CSX owns the track and operates approximately 25 to 30 freight trains a day in both directions along this corridor. In addition, Amtrak operates intercity passenger service with 18 trains per day passing through the Region.

Map 5.7: VRE System Map

In 2020, the Commonwealth of Virginia announced a $3.7 billion deal with Amtrak and CSX to improve passenger rail service in the state which includes planned improvements in the FAMPO region. One of the primary goals of the resulting program – known as Transforming Rail in Virginia – is to separate freight and passenger operations within the congested rail corridor. The program will double Amtrak round-trip service between Washington, D.C. and Richmond, VA and expand VRE service in the Region to include 15-minute intervals at peak periods and add night/weekend trains.

In 2021, the Commonwealth established the Virginia Passenger Rail Authority (VPRA) which is tasked with promoting, sustaining, and expanding the availability of passenger and commuter rail service. According to DRPT, the VPRA will assume all administrative and fiduciary responsibilities for Virginia's state-supported passenger rail services.

Transportation Demand Management (Ridesharing and Vanpools)

GWRideConnect is the transportation demand management (TDM) program operated by the George Washington Regional Commission (GWRC), serving the City of Fredericksburg and the counties of Caroline, King George, Spotsylvania, and Stafford. GWRideConnect promotes ridesharing and TDM techniques to assist persons seeking transportation options to their workplaces and other destinations. It is the goal of the program to promote, plan and establish transportation alternatives to the use of the single occupant vehicle (SOV), improving air quality, reducing congestion, and improving the overall quality of life for the citizens of the region. The GWRideConnect program assists in the creation of new commuter pools (in cars, vans, and buses) and works toward keeping these pools successfully operating. The GWRideConnect website acts as a clearinghouse for

transportation information, providing residents with immediate, 24/7 access to transportation options and solutions. The GWRideConnect program maintains databases focused on matching commuters to non-SOV options. In addition to personalized match letters, GWRideConnect distributes packets containing commuter information to all clients and agencies throughout the region. GWRideConnect is also a member of Commuter Connections.

An FY20 analysis by the Virginia Department of Rail and Public Transportation (DRPT) showed that each day the GWRideConnect program reduces the number of vehicle trips by 501 trips and reduces the number of vehicle miles traveled by 25,977 miles. With a total annual budget of $515,631, GWRideConnect's cost per vehicle trip reduced is $3.96 and cost per vehicle mile traveled reduced is just $0.08. GWRideConnect also generates $1.05 million in transportation capital funds for use in the region each year through its membership in the Vanpool Alliance, for an overall return on investment (ROI) of over 2:1.

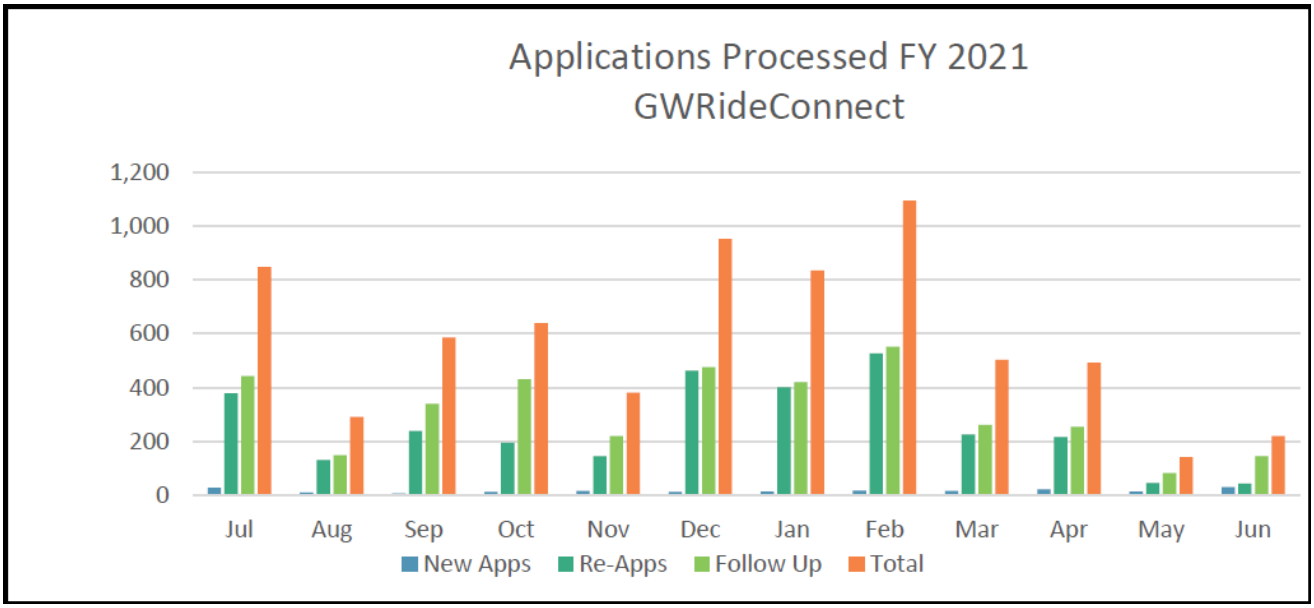
The program has grown and evolved over the years to provide a wide range of TDM programs in addition to ride-matching. GWRideConnect annually conducts the following work elements to achieve the Goals, Objectives, and Strategies set forth in the program's current strategic plan:

- Provide free ride-matching and information on transit solutions/alternatives to driving alone in the region.
- Provide follow-up assistance to all new GWRideConnect clients to track placement and provide additional support.
- Facilitate the formation of vanpools and maintain the existing vanpool fleet.
- Operate the AdVANtage Vanpool Self-Insurance Program for the entire commonwealth.
- Provide financial assistance for vans in danger of ceasing operation through the VanSave program.
- Provide financial assistance to new vanpools through the VanStart Program.
- Assist vanpools with transit benefits.
- Facilitate the formation of carpools and provide support.
- Assist clients with VRE/Amtrak/Metro and help market the programs.
- Assist FRED transit by marketing local routes and serving on the Public Transit Advisory Board (PTAB).
- Promote and assist private commuter buses in the region.
- Work with VDOT, FAMPO and local governments to establish commuter parking lots and lease commuter parking spaces from private property owners.
- Promote teleworking.
- Reduce annual gasoline consumption and motor vehicle emissions.
- Engage local businesses in establishing TDM techniques at their workplaces.
- Advertise and promote the GWRideConnect program.

Looking forward, GWRideConnect is working to launch a new ride matching app with local rewards and plans to kick off a new strategic planning effort in the coming months.

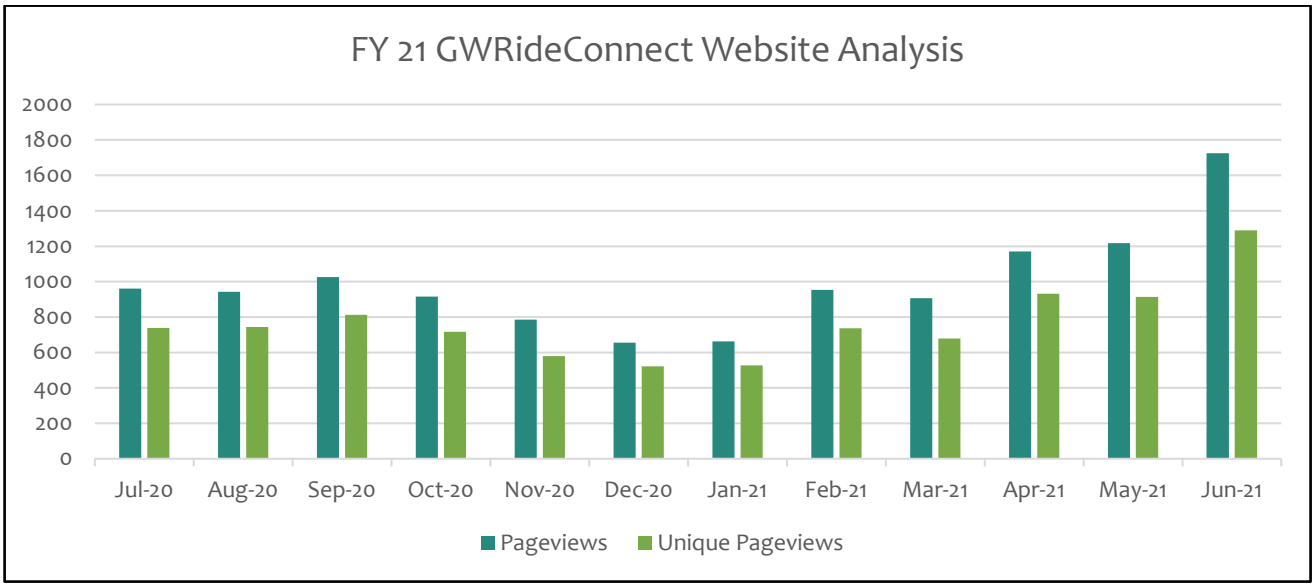
Please refer to the Tables 5.7 and 5.8, below, for GWRideConnect application processing statistics and website usage analytics. In website analysis, pageviews represent the total number of times a web page is viewed including multiple views by the same user within a single viewing session. Unique pageviews only count each user viewing a page once thereby eliminating multiple view counts within a single session.

Table 5.7: GWRideConnect FY2021 Processed Applications



Source: Commuter Connection FY2021 Annual Progress Report

Table 5.8: GWRideConnect FY2021 Website Analysis



Source: GWRideConnect 2021

5.4 ACTIVE TRANSPORTATION NETWORK

The FAMPO Region is continuing to grow and develop its bicycle and pedestrian network. When new road projects are constructed, accommodations are included where feasible. The City of Fredericksburg has a comprehensive network of sidewalks and has been developing an off-road urban trail system. This system has expanded to four paved shared-use paths within city limits used by cyclists and pedestrians alike.

Outside of Fredericksburg, Stafford and Spotsylvania Counties are more sparsely developed. In the past, not much emphasis was placed on accommodating bicyclists and pedestrians in transportation planning, but recently focus has shifted and interest in bike and pedestrian planning has greatly increased. Spotsylvania's Trailways Master Plan calls for a comprehensive bike and pedestrian network, and two notable projects, parts of the VCR Trail in Spotsylvania County, and the Spotsylvania Parkway Trail, have been completed in the last few years, beginning the county's future network. Stafford County has also completed several paved shared-use paths, including the first segment of the future Belmont to Ferry Farm Trail, which will connect these two historical sites; and the Celebrate Virginia Trail, part of the Celebrate Virginia North development.

Some recent roadway projects have also incorporated bike/pedestrian facilities into their design, and planned residential and commercial developments are incorporating shared-use trails as well as sidewalks into their site plans. Unfortunately, while these latter facilities are beneficial to the residents of the subdivision or consumers at the commercial development, the trails often end at the physical boundaries of the subdivisions/commercial areas and offer no connectivity to other subdivisions, commercial or public areas. This causes innumerable gaps in the network, making it difficult for pedestrians or cyclists to travel anywhere safely. A comprehensive strategy for filling in these gaps begins with this plan and will continue to be developed and refined for years to come.

The **FAMPO 2050 Active Transportation Plan** can be found in Appendix C and details the existing network and regional needs in full.

5.5 FREIGHT MOVEMENT

The passage of the FAST Act in December 2015 continues the innovations of its predecessor legislation MAP-21 by requiring the development of performance-based plans, currently (as of September 2021) Congress is progressing the newest legislation related to transportation called the Infrastructure Improvement and Jobs Act. The FAST Act as well as MAP-21 included provisions to improve the condition and performance of the national freight network and support investment in freight-related surface transportation projects.

In more recent months, the Federal Highway Administration (FHWA) has released numerous initiatives geared toward planning for freight interests as part of our overall transportation program. A few of these include:

- Identifying a national freight policy – FHWA released a draft National Freight Strategic Plan in October 2015 and adopted in December 2017.
- Establishing a National Multimodal Freight Network (NMFN) – The identification of such a network (both at the national and regional level) will help transportation planning agencies in strategically directing resources toward the improved movement of freight. This priority network is discussed in more detail within this element of the LRTP.
- Freight-related performance measures – In assisting with plans that are more outcomes- and performance-based, the act seeks to improve access to data and tools that MPOs and DOTs can use in informing their planning processes. FAMPO will set performance targets in relation to freight measures, and integrate these targets within its planning process, and report periodically on progress made in relation to these targets.
- Completing an Oversize Truck and Weight Study – FHWA completed and released a comprehensive Truck Size and Weight Limits Study in 2015, shortly before the passage of the FAST Act. The MPO will

continue to monitor for possible federal regulatory changes in truck size and weight and be prepared to implement any changes to the Federal-aid highway system.

In accordance with Code of Virginia § 58.1-2217, the DMV Commissioner is required to levy an excise tax on motor fuels for the periods July 1, 2020 to June 30, 2021 and July 1, 2021 to July 2022. In addition to the tax, § 58.1-2217 requires a storage tank fee to be imposed on motor fuels sold and delivered or used in the Commonwealth. The current per gallon rate for gasoline is 26.2 cents and diesel is 27.0 cents.

As part of the update to the LRTP, FAMPO is seeking to place a greater emphasis on freight planning as part of its regular work program as guided by these new state and federal directions.

Socioeconomics

Based on economic output, retail trade is the strongest industry by employment within the region. This is followed by health care, wholesale trade, public administration, and finance/insurance (VMTP Freight Plan). The top three major industries in the region are all dependent on freight to conduct business. As wholesale trade is also an important industry in the region, the area is home to several major warehousing and distribution facilities. Planning District 16 is also host to three military bases: Marine Corps Base Quantico (in the FAMPO Region), Naval Surface Warfare Center Dahlgren, and Fort A.P. Hill. These facilities support research and development, strategic combat planning, and training for the armed forces and several Federal law enforcement agencies. They are also major generators of freight traffic.

Roadway Overview

A 2,555-mile network of interstate, primary, secondary, and local roadways serve the Fredericksburg Area. Interstate 95 (I-95) is the largest roadway serving the region, connecting the Washington Metropolitan Area to the regions north and Richmond, the state capital, to the regions south. The corridor is important not only to the regional economy, but also the national economy, as it connects to several major highway, rail, seaport, and airport facilities. The Virginia Freight Element (VFE), a component of VTrans2045 – the state's long-range plan, highlights the corridor as a priority one mid-term need throughout Stafford County and portions of Spotsylvania County and remaining portions of the interstate are listed as priority two mid-term needs. The VFE is currently undergoing an update from 2040 to 2045 and only portions of the plan have been completed, but the plan's mid-term needs were approved in March 2021.

The I-95 corridor features a large amount of pass-through traffic, freight and passenger, with the addition of a large number of trips that only begin or end inside of the FAMPO region due in part to the number of passenger trips made to the Northern Virginia and Washington D.C. area. The 2040 VFE notes that the I-95 corridor between I-495 and the City of Fredericksburg facilitates the movement of freight at a value between $145 and $180 billion annually. By truck, the corridor is projected to carry 137 million tons of freight valued at $252 billion by 2025. Truck traffic on I-95 accounts for eight to 17 percent of all traffic volume on I-95 and are subject to the same delays and unreliability as auto users.

There are 179 miles of primary roadway in the FAMPO region. Other critical routes include U.S. U.S. 1 and 17 as well as Virginia State Routes 3, 2, and 208. Of these roadways, U.S. U.S. 17 (U.S. 17) is the most critical freight corridor, with over $2 billion dollars' worth of goods moving on the corridor in 2012. Additionally, U.S. 17 is an alternative route to the terminal facilities in the Hampton Roads region. Also, freight movement from Interstate 66 to the northwest region of the state, to I-95. U.S. 1 and Route 3, serves freight generators such as schools, distribution centers, and retail centers. Table 5.9 highlights the region's roadway mileage, by system.

Table 5.9: Regional Roadway Mileage, by Network

System	Miles
Interstate	31
Primary	179
Secondary	380

Source: FAMPO and VDOT Pathways for Planning

The secondary roadway system in the region is comprised of 380 miles of roadway. The secondary roadway system consists of lower-order roadways and provides access to the interstate and primary system. VDOT maintains all public roadways within the FAMPO; none of the jurisdictions maintains their own roadway system. There are privately-owned local roads within the region, but these roads are not eligible for Federal funding through FAMPO. It should be noted that in some instances local roads facilitate the movement of first- and last-mile freight traffic and as such are vitally important to goods movement.

National Highway Freight Network

The FAST Act repealed the Primary Freight Network (PFN) and instructs FHWA to establish a National Highway Freight Network (NHFN) to direct Federal funding and policies toward improved performance of highway portions of the national freight system.

The NHFN includes the following elements:

- **Primary Highway Freight System (PHFS):** This is a network of highways identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective national data. The network consists of 41,518 centerline miles, including 37,436 centerline miles of Interstate and 4,082 centerline miles of non-Interstate roads. Within FAMPO, the PHFS consists only of I-95.
- **Other Interstate portions not on the PHFS:** These highways consist of the remaining portion of Interstates not included in the PHFS. These routes provide important continuity and access to freight transportation facilities. These portions amount to an estimated 9,843 centerline miles of Interstate, nationwide, and will fluctuate with additions and deletions to the Interstate Highway System. There are no segments within the region that are a part of this network.
- **Critical Rural Freight Corridors (CRFCs):** These designations are public roads not in an urbanized area which provide access and connection to the PHFS and the interstates with other important ports, public transportation facilities, or other intermodal freight facilities. Nationwide, there are 4,412 centerline middles designated as CRFCs. The Commonwealth is eligible to designate roughly 167 miles of roadway that will increases the state's network and provide programming flexibility in allocations of NHFP formula funds and FASTLANE Grant Program funds for eligible projects under the FAST Act.
- **Critical Urban Freight Corridors (CUFCs):** These are public roads in urbanized areas which provide access and connection to the PHFS and the Interstate with other ports, public transportation facilities, or other intermodal transportation facilities. Nationwide, there are 2,213 centerline miles designated as CUFCs. CUFC designation requires coordination between the State and local MPO. Virginia's statewide mileage cap for these priority segments roughly 84 miles.

FHWA has given VDOT primary responsibility for designating both CUFCs and CRFCs for the state. Since the initiation of CRFC and CUFC designations, region has not been selected for any additional segments. Prior to 2021 VDOT had not designated the maximum milage possible for both CUFC and CRFC, so as part of the 2045 VFE, the state added the majority of CRFC to Interstate 64 (I-64), with portions of corridor near Richmond receiving CUFC status. During this time no CUFC or CRFCs were considered or designated in the Region.

Other Priority Networks

For highways in Virginia, most trucks are limited to the designated highway system. This includes the aforementioned national network as well as the Virginia Qualifying system and the Virginia Access System. The Virginia Qualifying system includes qualifying state primary highways that are not already included in the NHFN. The Virginia Access System is comprised of roadways that lead directly to major freight generators and are not served by the Virginia Qualifying system. Trucks may travel up to one mile off the NHFN and the Virginia Qualifying system. As shown in Map 5.8, there are designated freight routes in every jurisdiction in the region. These include I-95, U.S. 17, and Route 3, among others. These roadways serve most major freight-generating land uses within the jurisdictions.

Other priority highway networks within the region include the Corridors of Statewide Significance (CoSS). Across the state, there are 12 such corridors which are recognized as primary conduits of regional and interstate travel for both passengers and freight. The corridors are broadly drawn and include multimodal facilities, including highways, transit services, port facilities, and airports.

Commonwealth law requires that Virginia's long-range transportation plan (VTrans) set forth an assessment of needs for all CoSS and that all modes of travel be considered. The FAMPO region is traversed by two such strategic corridors, including the Washington to North Carolina Corridor (centered on Interstate 95), and the Coastal Corridor (centered on U.S. 17).

As part of CoSS needs assessments, the Office of Intermodal Planning and Investment (OIPI) conducts Corridor Master Planning studies. These studies start by unifying the Commonwealth Transportation Board's (CTB's) vision for each corridor, the VTrans goals, and local goals. These master plans aim to provide a set of recommendations for the Corridor or Corridor segment. They seek to document existing plans related to the corridor, project future multimodal travel conditions, identify corridor needs based on technical analysis, and present recommendations for how the corridor or corridor segment should be improved in the future.

The designated corridors differ with respect to their geography, their physical and operational conditions, and their level of past and recent planning. Table 5.10 provides an overview of each of these strategic corridors, and how the region fits within the context of the larger corridor.

Map 5.8: Designated Freight Routes

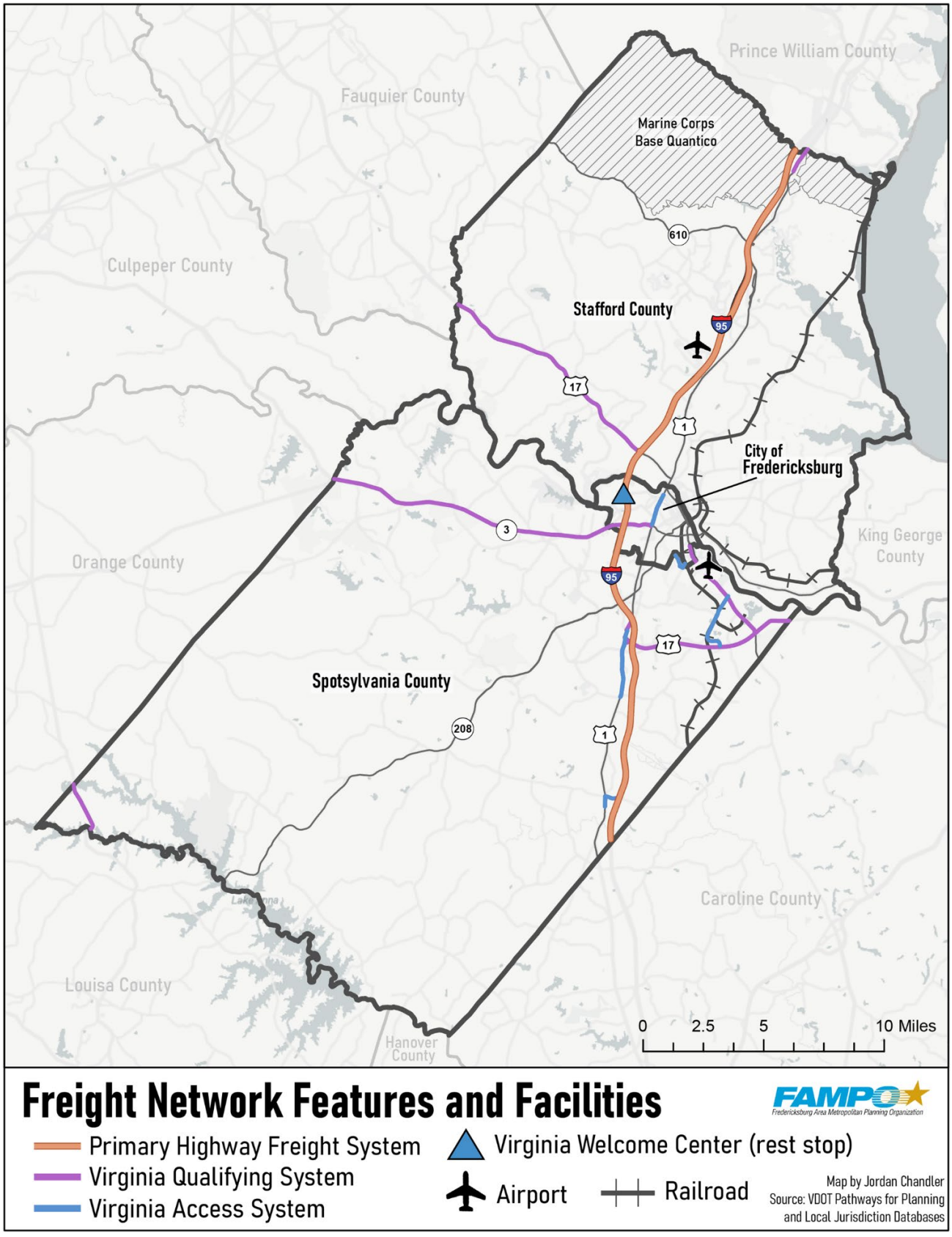


Table 5.10: Summary of Corridors of Statewide Significance (CoSS)

	Coastal Corridor	Washington to NC Corridor
Primary Highway Corridor	• U.S. 17 • Local Transit Services • Port of Virginia • Port of Richmond • Rappahannock River • Norfolk Southern's Heartland Corridor, and Coal Corridor • CSX's National Gateway Corridor, and Coal Corridor • Amtrak • Norfolk International Airport, Newport News Airport, Williamsburg Airport	• I-95, I-395, I-495, I-85, I-195, I-295, U.S. 1 and U.S. 301 • WMATA Blue and Yellow Lines • Local Transit Services • VRE • Ports of Alexandria and Richmond • James River • CSX National Gateway Corridor • Amtrak • Ronald Reagan Washington National Airport • Richmond International Airport
Key Functions	• Major I-95 alternative to shore destinations and through traffic (Alternative route from Hampton Roads to Northern Virginia) • Connection for trucks between Hampton Roads and I-95 • Tourism (access to Northern Neck and Middle Peninsula)	• Commuter corridor in Northern Virginia and Richmond areas • Through traffic ("Main Street" of East Coast) • Freight Corridor (trucks, CSX Rail lines) • Military access (Pentagon, Quantico, Fort Belvoir, Fort A.P. Hill, Fort Lee, etc.) • Multimodal corridor (Metrorail, VRE, Amtrak, Express Bus, HOV/HOT Lanes) • Link to Maryland, Washington, D.C., and Capital Beltway from points south
Potential Strategies	• Improve capacity by widening, intersection improvements, and/or construction of interchanges at strategic locations • Increase freight rail capacity from Port of Virginia and ensure multimodal freight movement coordination with the proposed Craney Island expansion • Support expanded freight capacity by expanding intermodal facilities • Improve transit in rural areas by expanding existing fixed-route services and offering increased demand response services for the elderly and disabled • Improve capacity through high-density areas through traffic management, access management, development of parallel routes and grid streets to separate local and through traffic, and possible use of ITS technologies • Improve ground access to airport facilities	• Explore value pricing to increase capacity and/or reduce single-occupancy vehicles along the corridor • Increase interstate capacity around the Washington D.C. Metropolitan area and increase capacity for through traffic • Increase transit options and transit capacity in Northern Virginia • Encourage increased Transportation Demand Management (TDM) • Increase highway capacity through interchange improvements and modifications, interchange construction, and widening in strategic locations • Improve ITS, including along parallel roadways • Improve freight rail capacity and allow for greater passenger rail capacity, including the East Coast high speed rail corridor • Improve ground access to airport facilities

Source: VTrans2040

Truck Congestion and Delay

The state freight plan notes that freight delays along the I-95 corridor are by far the highest among the state's CoSS's. Significant freight delays within the corridor include:

- U.S. 1 near the interchange with I-95 at Exit 126 in Spotsylvania County;

- Most of U.S. 1 between Centerport Parkway and American Legion Rd in Stafford County; and
- I-95 between Route 3 in the City of Fredericksburg line.

Congestion is a freight concern along the I-95 corridor. Safety is also a concern, with crash clusters south of the U.S. 17 interchange in Stafford County. The Atlantic Gateway project will expand express lanes north to the Pentagon and south to U.S. 17 in Stafford County. It will also include the construction of the Southbound Rappahannock River Crossing project and rail improvements that will benefit Virginia Railway Express (VRE) commuters and improve safety. These improvements will help freight movement by providing multimodal options for commuter traffic.

Truck Crashes

The region has averaged approximately 444 crashes with a truck involved each year with roughly 5 fatalities and 169 people injured between 2016 and 2020. Crash trends have not exhibited any predictable pattern. Within the region, truck crashes are the most prevalent in Stafford County; however, the severity of the crash is most fatal in Spotsylvania County. Tables 5.11 through 5.13 provide more details on crashes with a truck involved among the region's jurisdictions for the most recent four-year period.

Table 5.11: Truck Crash Fatalities in FAMPO Region

Jurisdiction	Fatalities				
	2016	2017	2018	2019	2020
City of Fredericksburg	1	2	0	0	1
Spotsylvania County	3	1	4	1	3
Stafford County	2	1	1	3	1
FAMPO Region Total	**5**	**4**	**5**	**4**	**5**

Table 5.12: Truck Crash Persons Injured in FAMPO Region

Jurisdiction	Persons Injured				
	2016	2017	2018	2019	2020
City of Fredericksburg	35	42	38	47	21
Spotsylvania County	66	33	54	62	53
Stafford County	45	68	117	99	66
FAMPO Region Total	**146**	**143**	**209**	**208**	**140**

Table 5.13: Truck Crashes in FAMPO Region

Jurisdiction	Crashes				
	2016	2017	2018	2019	2020
City of Fredericksburg	54	6	64	74	55
Spotsylvania County	253	136	150	160	149
Stafford County	186	223	280	260	211
FAMPO Region Total	**393**	**425**	**494**	**494**	**415**

Bridge Inventory

There are 335 bridges within the FAMPO region as of 2018. Of these bridges, 22 have either height or weight restrictions. While most bridges with height and weight restriction are located on secondary roadways, there are multiple bridges on U.S. 1 and Route 3 with either height or weight restrictions. Table 5.14 provides more information on posted bridges within the region, including sufficiency rating (SR), and bridges that are functionally obsolete (FO), and/or structurally deficient (SD). Average Daily Traffic (ADT) is also noted. Bridges with sufficiency ratings between 50 and 80 are eligible for Federal bridge rehabilitation funds, while those with ratings lower than 50 are eligible for replacement.

Table 5.14: Posted Bridges

Jurisdiction	Route	Name	Crossing	Year Built	SR	FO	SD	ADT
Spotsylvania County	622	Fairview Rd	NE Creek	1964	25.5	no	yes	1,371
Spotsylvania County	647	Blayde's Corner	stream	1968	23.7	no	yes	363
Spotsylvania County	649	Seays Rd	Glady Run	1970	22.8	no	yes	764
Stafford County	1	Richmond Hwy	Claiborne Run	1935	35.4	yes	no	22,982
Stafford County	607	Naomi Rd	Claiborne Rn & CSX	1931	56.5	yes	no	645
Stafford County	644	Rockhill Church Rd	Aquia Creek	1950	34.5	no	yes	1,938

Source: VDOT

Rail Freight

Class I

Rail freight service within the region is led by Class I carrier, CSX Transportation. Class I status is determined by a carrier earning revenues greater than $250 million, Class II earning between $20 and $250 million, and Class III earning less than $20 million. The rail giant's National Gateway Corridor parallels I-95 through the region. The National Gateway connects the region to the east coast ports of Baltimore, Maryland, Wilmington, North Carolina and other midwestern market areas. Projects proposed through the National Gateway program will likely raise bridges and remove other overhead clearance constraints that limit the use of double-stack intermodal trains and upgrade tracks, equipment, and facilities.

Dahlgren Spur

The Dahlgren Spur branches off from the CSX main line in Stafford County and parallels Kings Highway, Route 3. While the main rail line serves both freight and passenger trains, the Dahlgren Spur provides only freight service.

Rail Congestion

Transforming Rail in Virginia is a $3.7 billion program to expand and improve passenger, commuter, and freight rail in Virginia. It will connect the Northeast and Southeast corridors in America's national rail network. In partnership with CSX, Amtrak, and VRE, Virginia is constructing a new Long Bridge over the Potomac dedicated

to passenger and commuter rail. 386 miles of rail right-of-way and 223 miles of track were acquired, and more than $1 billion was invested for additional rail infrastructure.

Over the next ten years, these investments will result in nearly hourly Amtrak service between Richmond and Washington. Amtrak service will also be enhanced for Newport News and Norfolk. VRE services will increase by 75 percent along the I-95 Corridor and weekend service will be added. In the FAMPO Region during Phase 1, expecting competition before 2026, of improvements includes a four mile segment of third track, Potomac Creek, between the Brooke and Leeland Road VRE Stations. In Phase II, expecting completion by 2030, the Region will see an Aquia Creek and Crossroads third track.

The Washington to North Carolina Corridor is the most heavily used corridor in Virginia, with increasing freight, regional and long-distance passenger rail, and commuter rail services. The corridor also provides another rail link between the Port of Virginia and the Midwest, which previous Commonwealth investments have helped to clear for double-stack container service. The corridor has the most severe bottlenecks on the freight rail network.,

At-Grade Rail Crossings

There are 28 active at-grade rail crossings in the region, all of which are roadway crossings. Of these crossings, almost 35 percent are on public roadways. All of the region's private at-grade crossings are in Stafford or Spotsylvania counties, as shown in Table 5.15. Map 5.9 shows the locations of these crossings throughout the region.

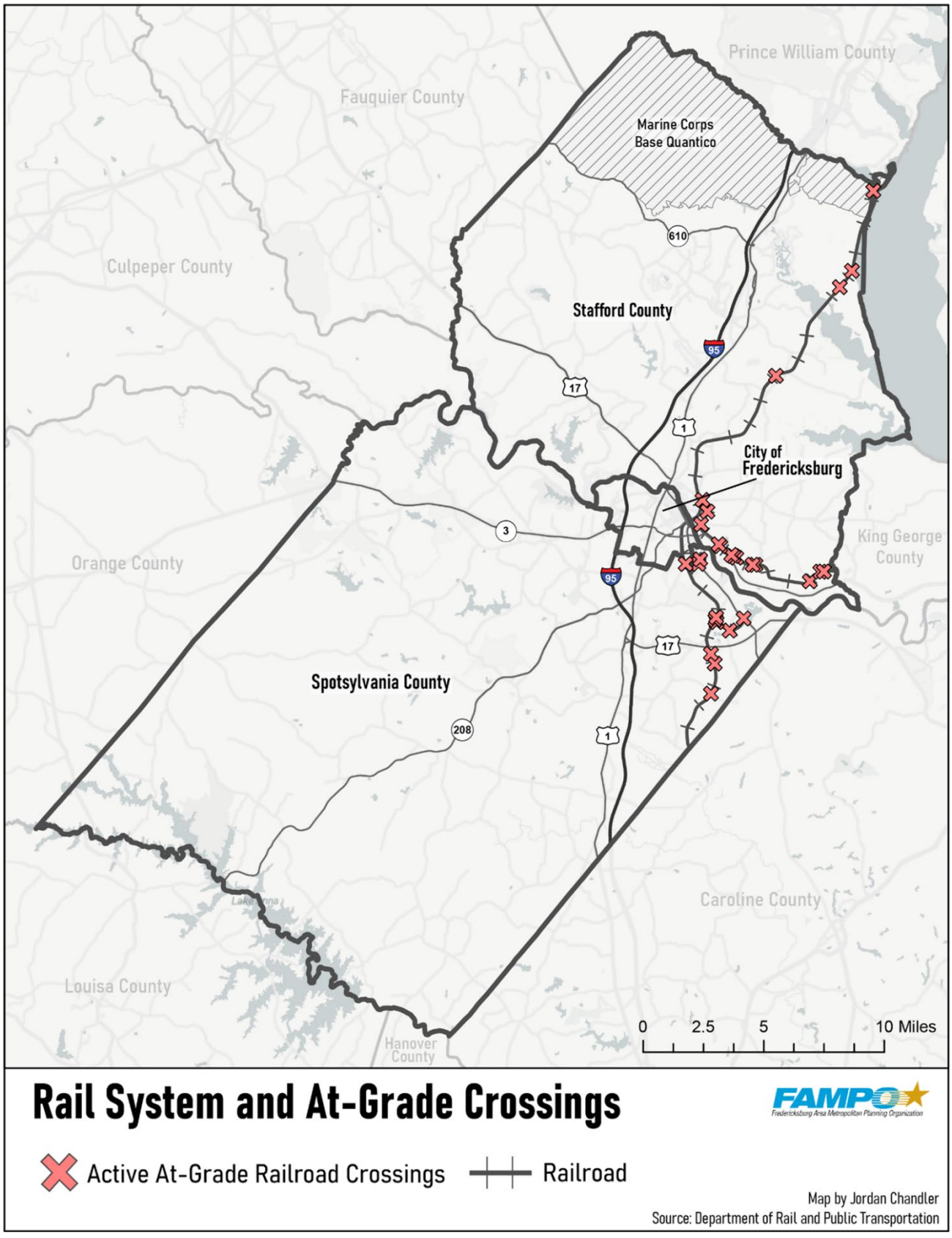
Table 5.15: At-Grade Rail Crossings

Jurisdiction	At-Grade Crossings
Stafford County	10
Spotsylvania County	17
City of Fredericksburg	1

Source: Department of Rail and Public Transportation (DRPT)

Since 2002 the U.S. Department of Transportation has reported that five rail crashes have occurred within the FAMPO region. Three of the crashes occurred in Stafford County while the other two crashes occurred in Spotsylvania County. Most of these crashes occurred either when a motorist did not stop at the crossing or the vehicle was stalled on the track. Each at-grade crossing where a crash occurred had either advanced warnings, cross bucks, or gates.

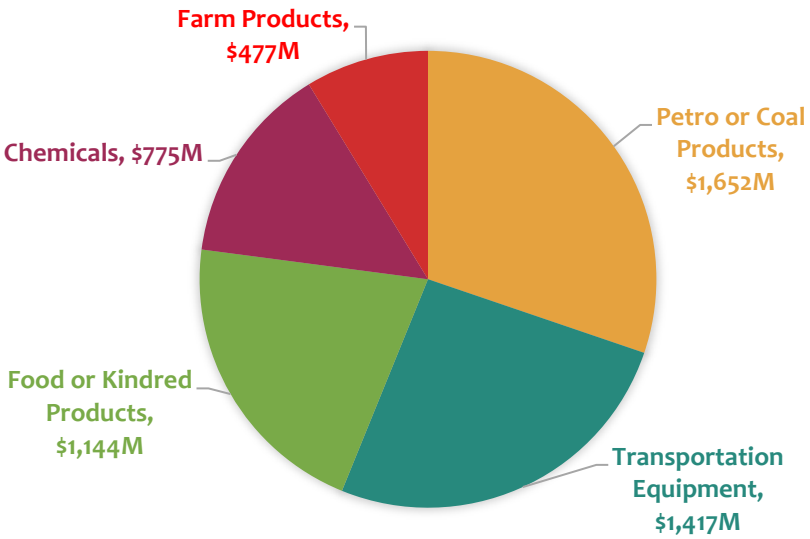
Map 5.9: Regional Rail System and Active At-Grade Public Rail Crossings



Commodity Flow

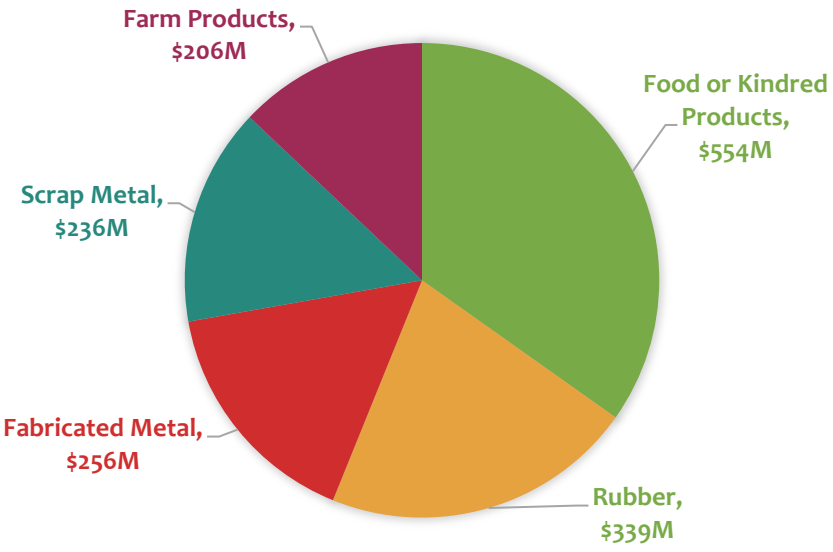
A wide variety of commodities are transported into and out of the region. The top five commodities as of 2017[1] by value (both inbound and outbound) are shown in Figure 5.2 and Figure 5.3, respectively.

Figure 5.2: Top 5 FAMPO Inbound Truck Commodities, by Value ($M)



Source: VTrans Freight Element

Figure 5.3: Top 5 FAMPO Outbound Truck Commodities, by Value ($M)

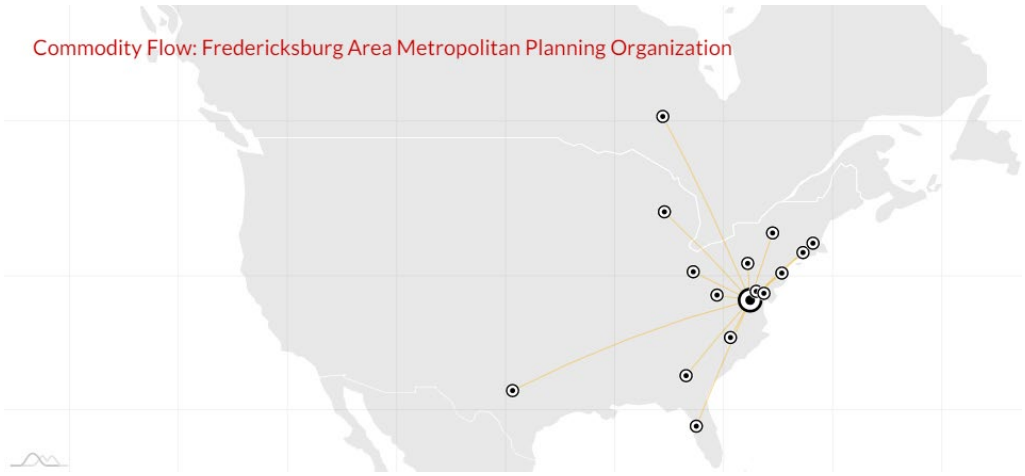


Source: VTrans Freight Element

[1] https://www.vtrans.org/mid-term-planning/freight-plan Commodities as of February 2022

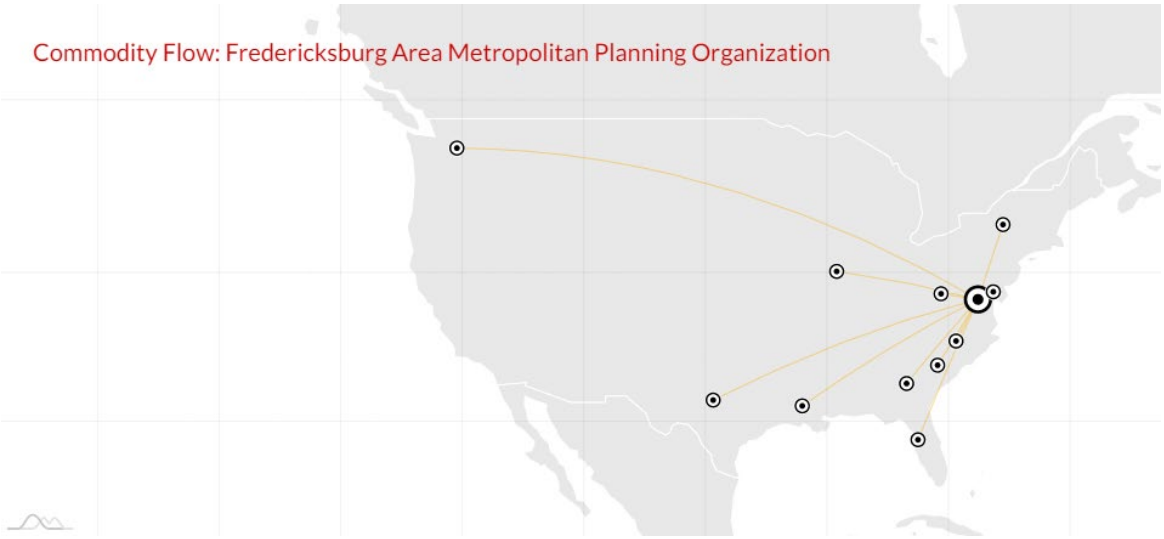
The FAMPO Region moves a majority of its outbound truck freight to destinations in the Northeastern United States while the majority of its outbound rail freight is bound for destinations in the Southeastern United States. Overall, the Region moves a value of over $1.6 billion worth of outbound truck commodities throughout the Commonwealth and to other areas of the Country. Figures 5.4 and 5.5 graphically shows destinations throughout North America for the region's outbound truck and rail freight in 2017.

Figure 5.4: Top Outbound Truck Freight Destinations, by Value, from the FAMPO Region



Source: VTrans Freight Element

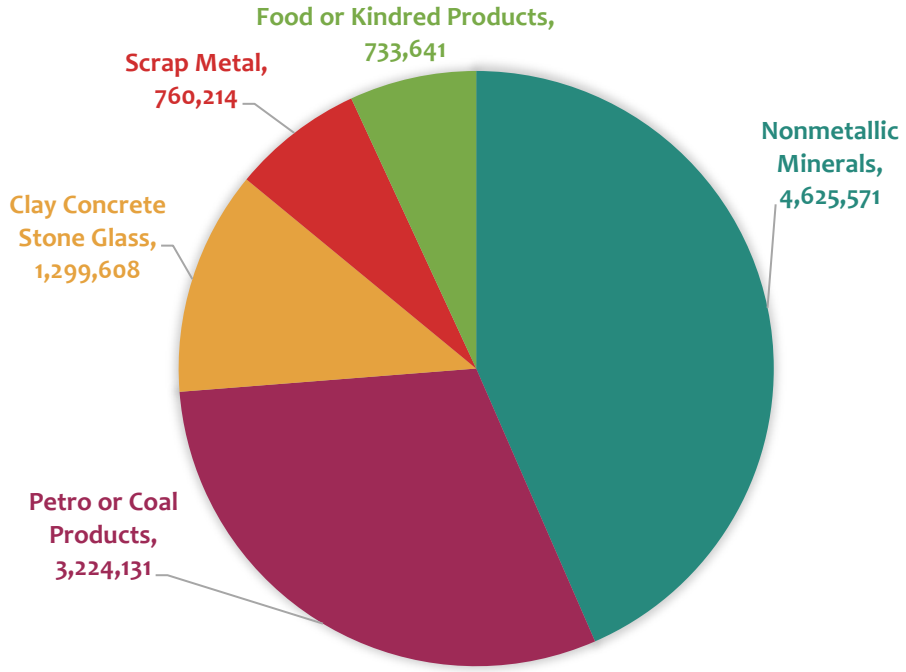
Figure 5.5: Top Outbound Rail Freight Destinations, by Value, from the FAMPO Region



Source: VTrans Freight Element

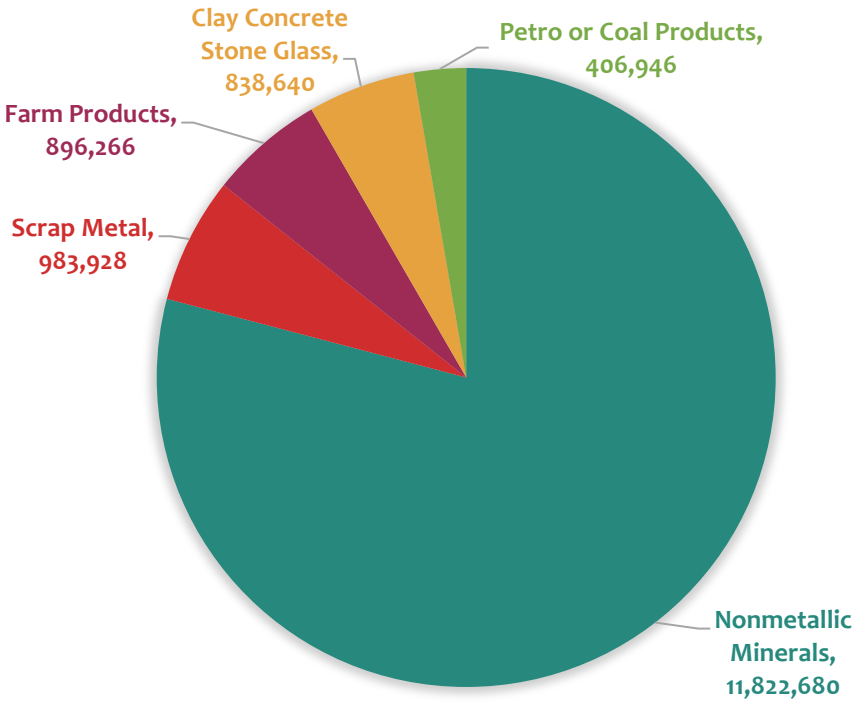
Accounting for weight, nonmetallic minerals comprise the largest tonnage of freight being imported and exported from the FAMPO Region. Other high tonnage commodities include Clay, Concrete, Stone, Glass and Petro and Coal Products, as shown in Figure 5.6 and Figure 5.7.

Figure 5.6: Top 5 FAMPO Inbound Truck Commodities, by Weight (tons)



Source: VTrans Freight Element

Figure 5.7: Top 5 FAMPO Outbound Truck Commodities, by Weight (tons)



Source: VTrans Freight Element

Policy, Regulation, and Investment Plan

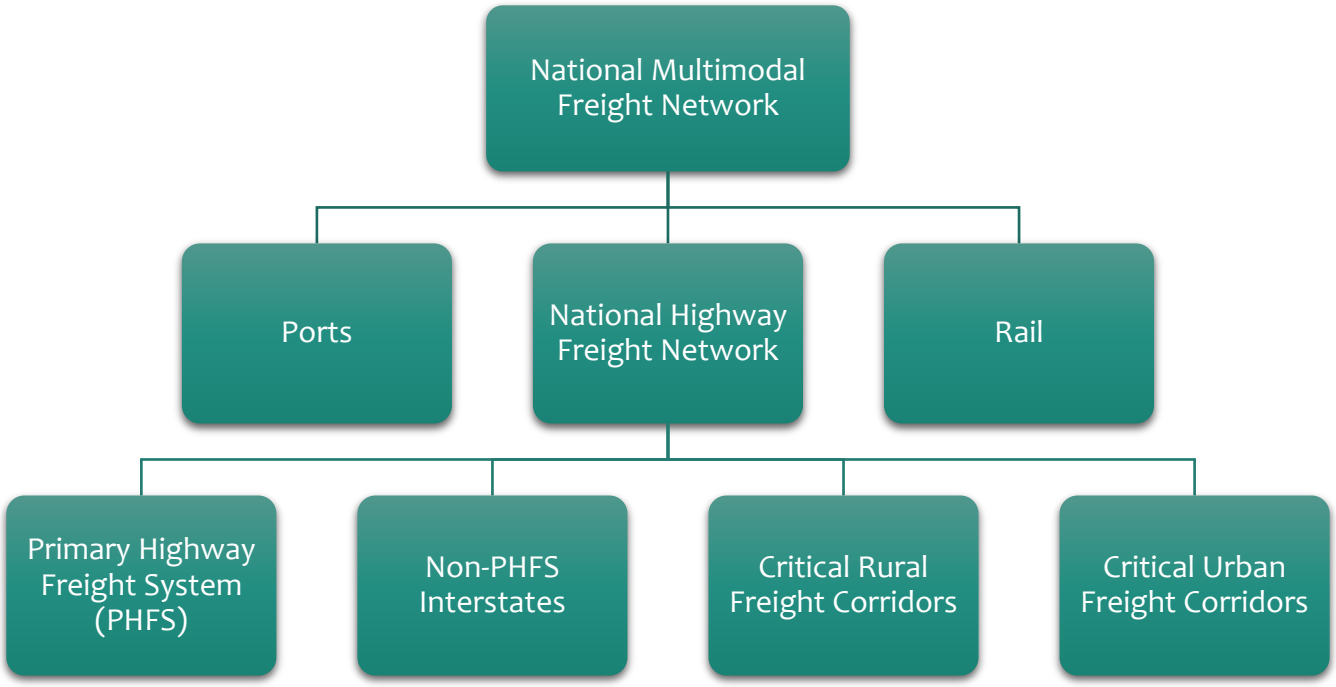
Freight planning within the region is guided by several plans at the regional, state, and national levels. The tenets of these documents, and their implications for freight planning within the region, are described below.

The FAST Act

The passage of the FAST Act in December 2015 authorized $305 billion from both the Highway Trust Fund (HTF) and the General Fund of the United States Treasury. It provided $225 billion in Highway Trust Fund contract authority over five years for the Federal-aid Highway Program, increasing funding from $41 billion in 2015 to $47 billion in 2020.

The FAST Act placed a major emphasis on freight investment to be supported by the HTF by creating the National Highway Freight Program (NHFP) funded at an average of $1.26 billion annually and distributed to the states by formula. The law also created a new discretionary program entitled the Nationally Significant Freight and Highway Projects, funded at an average of $900 million a year. The Act further required USDOT to create a National Multimodal Freight Policy, along with a corresponding National Multimodal Freight Network (NMFN). A National Freight Strategic Plan was also required to be created, that would improve the condition and the performance of the NMFN. As its name implies, the NMFN entails all modes of transportation and includes the elements as shown in Figure 5.8.

Figure 5.8: National Multimodal Freight Network and Related Elements



Source: USDOT

National Freight Strategic Plan

The passage of the FAST Act in December 2015 continued the development of a national freight strategic plan. The vision of this effort is to strengthen the nation's economic competitiveness with safe and reliable supply

chains that efficiently and seamlessly connect producers, shippers, and consumers in domestic and foreign markets.

The introduction of freight policy at the federal level is intended to better integrate the country's multimodal freight transportation needs and facilities. At its highest level, the national freight plan addresses:

- Expected growth in freight traffic;
- Historic underinvestment in the nation's freight transportation system;
- Difficulty in planning and implementing freight projects;
- Safety and security concerns associated with freight movement and facilities;
- International trade; and
- New technologies affecting goods movement.

The FAST Act recognizes that freight policy at a national level alone is not enough to advance a meaningful freight strategy. It acknowledges that more planning needs to be carried at out state and regional levels, with freight data that is more granular and industry-specific. The national freight plan can then be supported by state and regional freight plans that can now take advantage of competitive investment, federal formula freight funding, and reforms.

Virginia State Freight Plan

The FAST Act requires all states to have an adopted freight plan within two years of its enactment (or by December 2017). Moreover, each state is encouraged (but not required) to establish a freight advisory committee, consisting of a cross-section of representatives from public and private sector freight stakeholders.

The Virginia Multimodal Freight Plan is the Commonwealth's strategy to improve goods movement on its highway, rail, waterborne, and aviation systems. The efficient movement of freight is critically important to the Commonwealth's economy—to support industries located in Virginia and to sustain national commerce that moves over its transportation system. The purpose of the freight plan is to establish the vision, goals, and priority actions to facilitate goods movement statewide. The Plan accomplishes the following:

1. Develops policy standpoints and recommendations for freight which reflect freight stakeholder input from the Virginia Freight Transportation Advisory Committee (VFTAC) and Virginia Freight Transportation Advisory Committee (VFTAC) and the VTrans performance-based planning process;
2. Organizes and supplements information from the Multimodal Freight Study to meet Federal standards for state freight plans introduced in the latest surface transportation bill — Moving Ahead for Progress in the 21st Century Act (MAP-21);
3. Provides recommendations for strategies and project types to achieve the goals of MAP-21; and
4. Identifies policy initiatives that can be translated into project recommendations at the agency level.

The Freight Plan is part of the Commonwealth's long-range transportation planning process known as VTrans. This document not only serves as a key input to VTrans but also fulfills Federal law which requires states to identify major freight needs within statewide freight plans to qualify for enhanced funding for freight projects.

Regional Freight Policy

Freight policy within the region is guided by the strategic directions noted within the MPO's long-range transportation plan. The plan is organized around seven broad goal statements that guide the agency in its planning and programming functions. Goals two and five specifically call out objectives that can improve regional freight planning and infrastructure. Since freight transportation is conducted in line with the overall long-range plan, the freight planning ideas identified within this section correspond with the overall LRTP goal statements. With the passage of the FAST Act in December 2015, there are now 10 federal planning factors to ensure that the MPO administers a continuing, coordinated, and comprehensive transportation planning process throughout the FAMPO Region. As of 2021 the FA MPO does not have a standalone regional freight planning document. Staff is working to create a freight plan and host a Freight Summit that will consist of private and public stakeholders.

The Federal Planning Factors:

1. Economic
2. Safety
3. Security
4. Accessibility & Mobility
5. Environment
6. Integration & Connectivity
7. System Management and Operation
8. System Preservation
9. System Resiliency & Reliability
10. Travel & Tourism

Federal Performance Measures

The Federal Highway Administration has finalized six interrelated performance guidelines to implement the transportation performance management framework established by MAP-21 and the FAST Act. Collectively, these rules address the challenges facing the national transportation system, including:

- Improving safety;
- Maintaining infrastructure conditions;
- Reducing traffic congestion;
- Improving the efficiency of the system and freight movement;
- Protecting the environment; and
- Reducing delays in project delivery.

The rules establish national performance measures. State DOTs and state MPOs will be required to establish targets for applicable measures. New and existing plans will document strategies and investments used to achieve the targets, and progress toward the targets will be reported through new and existing mechanisms.

VDOT established 2- and 4-year targets for each set performance period. These targets are related to safety, bridge and pavement condition, system performance, and freight. The first set of targets must be established within one year of the final ruling, or May 20, 2018. State targets then must be reported to FHWA by October 1 of that same year in the form of a Baseline Performance Report. A subsequent Mid-Performance Period Progress Report is due October 1, 2020, with a Full Performance Period Progress Report due on that date two years afterward, in 2022.

The assessment for freight reliability is based on the truck travel time reliability (TTTR) index. The truck travel time reliability performance measure and performance targets for the 2018-2021, 2- and 4-year, performance period are indicated in Table 5.16.

Table 5.16: Freight Reliability Performance Measures and Targets

Truck Travel Time Reliability Performance	CY 2018-2019 Two Year Target	CY 2018-2021 Four Year Target
Truck Travel Time Reliability Index	1.53	1.56

The Commonwealth Transportation Board (CTB) approves the performance measures and targets developed for Virginia's surface transportation network. Such targets, including those for Highways Safety Performance, are linked to the goals and objectives in the Virginia long-range transportation plan, VTrans.

The TTTR Index considers factors that are unique to this industry, such as the use of the system during all hours of the day and the need to consider more extreme impacts to the system in planning for on-time arrivals. The freight measure will be used by VDOT and the MPOs in assessing the performance of the Interstates in moving freight. The Index is defined as the ratio of the 95th percentile truck travel time to the 50th percentile truck travel time. See Table 5.17 for the specific hours of each TTR period.

Table 5.17: Travel Time Reliability Weekday and Weekend Periods

Weekdays (Mon-Fri)	**Weekend (Sat-Sun)**
6am – 10am	6am – 8 pm
10am – 4pm	**Overnight (All Days)**
4pm – 8 pm	8pm – 6am

Source: USDOT

The highest TTTR ratio of the five time periods shown for a particular roadway segment is used to aggregate reporting segments for the entire Interstate System, which is weighted by segment length. FHWA recognizes there may be time periods (15-minute bins) where there were no freight vehicle probes, resulting in blank data. For this metric, the Final Rule requires the all-traffic travel time be substituted for the freight vehicle travel time. Time periods when an NHS roadway is closed may be excluded from the calculations. VDOT and FAMPO will be able to draw from the National Performance Management Research Data Set (NPMRDS) as this data set includes truck travel times for the full Interstate system.

Local Comprehensive Plans

The three jurisdictions within the region each maintain a comprehensive plan. While none of the comprehensive plans calls out any specific freight-related goals, the plans address freight modes and freight-related land uses that are of concern to planning for freight interests. Table 5.18 further outlines these freight-related subjects by jurisdiction.

Table 5.18: Freight-related Considerations within Local Comprehensive Plans

Jurisdiction	Date Adopted	Freight-related Considerations
City of Fredericksburg	2015	The plan encourages consideration of the following factors in future planning: curbside management (loading zones); freight access (connections from I-95 to commercial areas); and infrastructure (planning for freight is as important as planning for passengers).
Spotsylvania County	2020	The county identifies more than 50 parcels of land that are within a ½ mile of the rail corridor or rail spurs that are not already built out or protected via a conservation easement or preservation ownership that could be developed. The county identifies eleven road based regional freight needs. The majority of these improvements focus on Route 2, U.S. 17 Bus., Lansdowne Road with two projects relating to U.S. 1 and I-95. The plan also calls out the two Corridors of Statewide Significance (CoSS) that crisscross the county as freight priorities. Lastly, the plan identifies several strategies that support capacity enhancements and efficiency improvements for freight and passenger rail.
Stafford County	2016	While there are no specific policies or strategies that address freight movement, the plan finds that the increasing population negatively affects the existing roadway network (specifically I-95 and U.S. 17).

Source: Local comprehensive plans

While each jurisdiction is unique, there are common themes within each of the comprehensive plans. These commonalities are:

- Concentrated development areas, especially along I-95/U.S.1/U.S. 17 and the CSX rail corridors;
- Limited development outside the service areas;
- Enhancement of rail corridor to reduce rail and highway congestion;
- Compatible land uses near military land bases.

In Spotsylvania County, commercial, institutional, and industrial land uses are concentrated along the I-95/U.S. 1 corridor, VA 3 and U.S. 17. These patterns are similar in Stafford County, with a concentration of commercial and industrial land uses on I-95/U.S. 1, U.S. 17, and VA 610. Industrial land uses are limited in Fredericksburg City, but many institutional and retail land uses are concentrated in the I-95/U.S. 1 corridor.

All jurisdictions within the region concentrate freight-generating land uses on major corridors, such as I-95, U.S. 1, U.S 17, and VA 3. These freight-generating land uses include suburban office parks, suburban commercial centers, and heavy industrial and regional airports. While many of these corridors are already designated freight routes, portions of U.S. 1 are not.

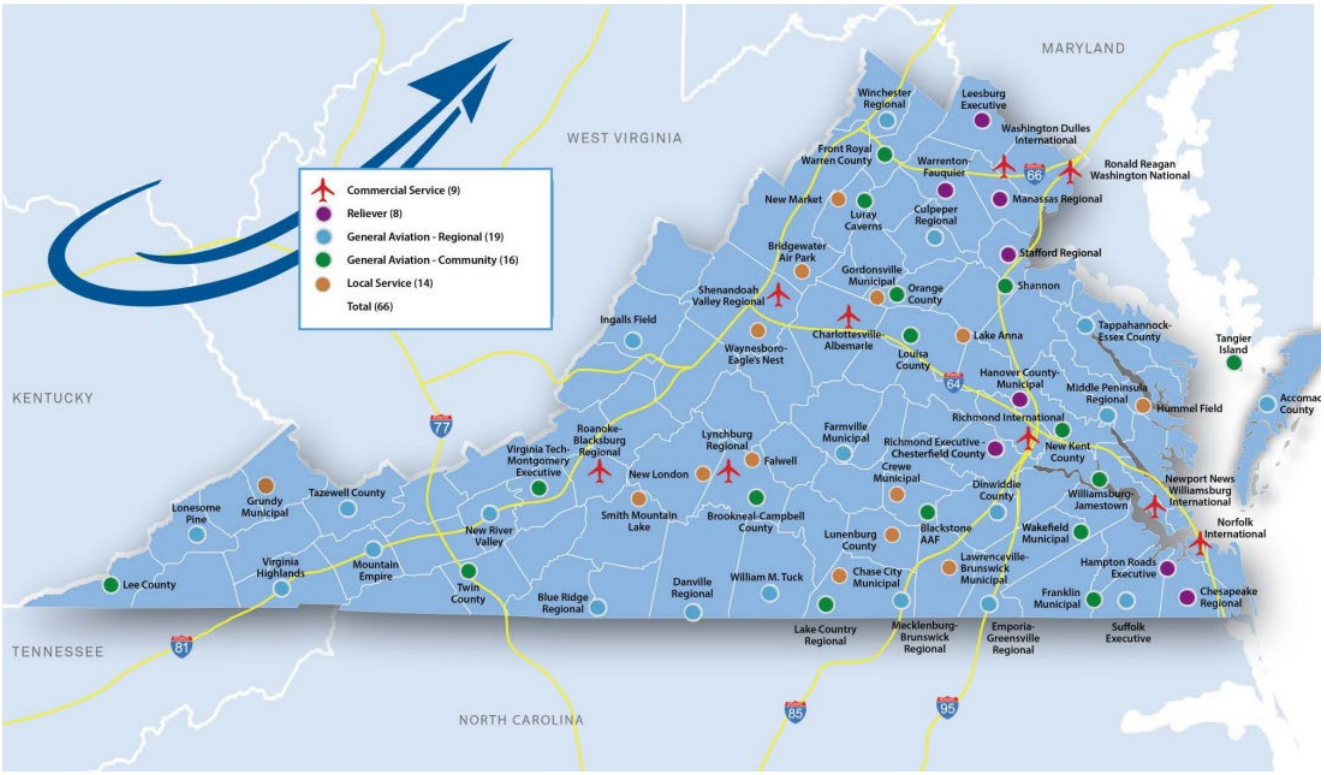
5.6 AVIATION

There are two public-use airports located in the FAMPO Region that provide general aviation service. The Stafford Regional Airport located in Stafford County, west of I-95, 46 miles south of Washington, D.C. and 65 miles north of Richmond, VA, and Shannon Airport, located in Spotsylvania County on Tidewater Trail (Rt. 2), 65 miles South of Washington, D.C. and 58 miles North of Richmond, VA. No commercial airline service is provided within the

Region. This section of the plan will focus on these aviation facilities and will describe the current condition and type of facilities at each of these airports. Finally, this section will also describe each airport's role within the national, state and local transportation systems.

There are 66 public-use airports in the Commonwealth of Virginia, as shown in Figure 5.9. Nine are commercial service airports, eight are designated reliever airports, 19 are regional general aviation airports, 16 are community general aviation airports and 14 are local service airports (as defined by the Virginia Department of Aviation).

Figure 5.9: Virginia Public Use Airports (source: 2016 Virginia Air Transportation System Plan Update)



Stafford Regional Airport (KRMN)

The Stafford Regional Airport is a public-use reliever airport owned and operated by the Stafford Regional Airport Authority. The Stafford Regional Airport Authority is composed of representatives from Stafford and Prince William counties and the City of Fredericksburg. The Stafford Regional Airport does not currently have commercial aviation. As a result, its operations consist primarily of general aviation and military activities. According to information collected from the Stafford Regional Airport Manager, the Airport had 23,659 annual operations in the twelve months ending May 31, 2013. According to the Federal Aviation Administration's Terminal Area Forecasts (TAF) issued January 2016, future projections of aircraft activity at Stafford Regional Airport reflect a constant level of aircraft activity with approximately 23,659 annual operations per year through 2040. It should be noted that the primary type of aircraft using the Airport are itinerant aircraft, those originating from another airport and utilizing the facilities at Stafford.

The Stafford Regional Airport is not equipped with a control tower but has a Common Traffic Advisory Frequency (CTAF) (122.725) for pilots to communicate during approach, landing, takeoff or taxiing operations. The Flight

Service Station (FSS) for this airport is the Leesburg Flight Service Station and the associated Air Route Traffic Control Center (ARTCC) is Washington Center. Table 5.19 provides an overview of the Stafford Regional Airport.

Table 5.19: Overview of the Stafford Regional Airport

Type of Airport	Reliever
No. of Runways	1 (RW 15-33)
Runway Dimensions	5,000′ x 100′ (Asphalt)
Instrument Approach	ILS or LOC RW 33, RNAV/GPS RW 33, VOR RW 33
Annual Operations	23,659
General Aviation Local Annual Operations	6,172
General Aviation Itinerant Annual Operations	15,945
Military Annual Operations	1,542
Based Aircraft	69
Single Engine Based Aircraft	51
Multi Engine Based Aircraft	4
Jet Engine Based Aircraft	0
Helicopter Based Aircraft	12
Ultralight Based Aircraft	1
Turboprop Based Aircraft	1

Source: FAA's APO Terminal Area Forecast Detail Report, 2017

Several businesses are located at the Stafford Regional Airport. These include Stafford Regional Airport Fixed Based Operator (FBO), flight training, and local rental car. The Stafford Regional Airport Authority is the FBO that offers a variety of services to recreational pilots landing or departing from Stafford Regional Airport. The FBO offers Jet A and 100LL (Avgas) fuel for sale, weather and flight planning, conference room, pilot's lounge, coordination for catering, limousine service, coffee, and ice. A local rental car company provides rental car service to pilots and passengers. Several hotels and restaurants are also a short driving distance from the airport. In addition, the airport offers activities such as law enforcement, public charter, flight training, and recreational flying activities. The airport also serves as a staging area for community events.

Table 5.20: Stafford Regional Airport Capital Improvement Program (as of April 1, 2016)

Fiscal Year	Project Description	Total Estimate
2017	Runway Extension - Phase 1 - Construction	$5,777,778
2018	T-Hangar #6 Site - Construction	$1,200,000
2018	Runway Extension - Phase 2 - Construction	$5,777,778
2019	Apron Expansion - Design	$150,000
2019	Obstruction Removal - Runway 15, 34:1 Approach - Easement Acquisition Services	$150,000

Proposed improvements at Stafford Regional Airport will increase capacity, provide additional hangar space for more based aircraft, and allow airplanes with longer takeoff and landing length requirements to access the airport. The six-year Airport Capital Improvement Program (ACIP) (see Table 5.20 above) identifies the proposed

improvements needed at the airport over the short-term. Significant projects in the airport's ACIP include new corporate hangars and a 1,000' runway extension to Runway 15-33. In addition to these improvements, the ACIP includes the extension of the primary apron to provide additional aircraft tie-down positions as well as the acquisition of land to control the runway protection zones for each runway. An additional 25 acres of rough-graded finished lots are available for lease, development of individual, corporate and T-hangar aircraft storage buildings and other aviation-related business facilities.

Overall, the Stafford Regional Airport's existing facilities are in good condition. The existing terminal building is new and was opened in January 2014. The condition of the runway, taxiway and apron pavements is good. Lighting, signage, and other navigation aids are also in good condition.

Shannon Airport (KEZF)

Shannon Airport is a privately owned, public-use airport owned and operated by Shannon Airport, LLC. The airport's operations consist of local general aviation and military activities. According to the FAA's Terminal Area Forecasts, Shannon Airport had approximately 31,593 operations in 2013. In addition, the airport is home to 91 based aircraft. These include 81 single-engine piston, five multi-engine piston, four helicopters and one ultra-light aircraft. Shannon Airport has two operating runways, Runway 6-24 and Runway 15-33. Runway 6-24 is an asphalt paved runway which measures 2,999' in length by 100' in width. Runway 6-24 is equipped with a non-precision RNAV/GPS approach and a NDB approach. Runway 15- 33 is a turf runway which measures 1,500' in length by 150' in width. Runway 15-33 is used primarily during high crosswind conditions and for flight training. Runways 6-24 and 15-33 have basic (visual) approaches. Shannon Airport is also equipped with a concrete helipad, which measures 30' by 30'. Navigational aids at the Airport include a Visual Approach Path Indicator (VASI) for Runway 6-24. Both runways are equipped with an illuminated wind indicator (wind sock).

The Shannon Airport is a community, non-towered airport with a Common Traffic Advisory Frequency (122.8) for pilots to communicate during approach, landing, takeoff and taxiing operations. The FSS associated with the Airport is Leesburg. The ARTCC is the Washington Center. Table 5.21 summarizes the facilities located at Shannon Airport.

Table 5.21: Overview of Shannon Airport

Type of Airport	General Aviation Community
No. of Runways	2 (Runway 6-24, Runway 15-33)
Runway Dimensions	RW 6-24: 2,999' x 100' (Asphalt)
	RW15-33: 1,300' x 75' (Turf)
Instrument Approach	RNAV/GPS RW 24, NDB RW 24
Annual Operations	31,593
General Aviation Local Annual Operations	26,919
General Aviation Itinerant Annual Operations	4,487
Military Annual Operations	187
Based Aircraft	95
Single Engine Based Aircraft	85
Multi Engine Based Aircraft	5
Jet Engine Based Aircraft	0
Helicopter Based Aircraft	2
Ultralight Based Aircraft	2

Source: airnav.com/airport/kezf

Several businesses including a flight school, two maintenance facilities, a restaurant, and an air ambulance service (Medivac) are located at Shannon. The flight school offers private pilot and instrument training certifications. The maintenance facilities at Shannon offer air frame repair, general maintenance, and power plant repair. The airport sells 100LL (avgas) fuel. Hangars and tie downs are also available for rent. Shannon Airport's ability to expand in the future is limited by the geography surrounding the airport. A highway is located directly to the north and a railroad directly to the south.

Table 5.22: Shannon Airport Capital Improvement Program (as of April 1, 2016)

Fiscal Year	Project Description	Total Estimate
2017	Land Acquisition (M&D)	$750,000
2017	Obstruction Removal – Environmental	$20,000
2017	Runway Lighting Upgrade to LED – Construction	$150,000
2018	Land Acquisition (Shannon Trust)	$50,000
2018	Obstruction Removal – Design	$30,000
2019	Land Acquisition (Wilson)	$100,000
2019	Obstruction Removal – Construction	$120,000
2019	Taxiway to Runway 6 – Environmental	$50,000
2020	Taxiway to Runway 6 – Design	$50,000
2021	Access Road Expansion – Design	$50,000
2021	Taxiway to Runway 6 – Construction	$250,000

Proposed improvements planned for Shannon Airport in the future include a parallel taxiway for RW 6-24, an asphalt overlay for the primary aircraft apron and existing taxiway. See Table 5.22, above, for more information on the ACIP for Shannon Airport.

Shannon Airport's facilities are in good condition. The Airport recently renovated the terminal building, remarked the paved runway, added additional airplane apron parking, and added paved landside parking for airport users. Both the paved and turf runways are well maintained and require no significant repair. Navigational aids such as lighting and signage are in good condition.