Virginia's Long-Range Multimodal Transportation Plan

Corridors of Statewide Significance: Northern Virginia Connector

Prepared for:
Commonwealth Transportation Board

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Office of Intermodal Planning and Investment
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Corridor Overview

1.1 Transportation Facilities

The Northern Virginia Connector is primarily defined by Interstate 66, which is a four-to-eight-lane interstate located in the northern part of Virginia. This corridor traverses urban, suburban, and rural areas over the course of its approximate 75-mile length. The western limit of I-66 is located at I-81 near Strasburg, Virginia, and the eastern limit is at the border of the District of Columbia in Arlington, Virginia.

I- 66 is primarily a commuting corridor used to connect residential areas in the west to employment centers in the east, especially through Prince William, Fairfax and Arlington Counties. It is more of a rural highway west of Gainesville and east of its western terminus at I-81, west of Front Royal. I-66 is an important multimodal corridor, as there are a range of transit options for long and short distance commuters, access to Dulles International Airport and to the Virginia Inland Port and rail lines.

There are multiple transit options along the Northern Virginia Connector including the Washington D.C. Metrorail's Orange Line, which runs parallel to I-66 from Arlington to Vienna, and the Virginia Railway Express (VRE), which runs near I-66 to Manassas from Washington D.C. The future Metrorail Silver Line will access Tysons Corner, Reston, Dulles Airport, and beyond into Loudoun County. Multiple express bus services also run along the corridor, assisting commuters from the western part of the state. Figure 1 illustrates the entire corridor in Virginia and shows all modal facilities. Figure 2 shows a closer view of the corridor in the Northern Virginia region.

Both Dulles International Airport and Reagan National Airport are within 10 miles of the Northern Virginia Connector, and I-66 provides access to numerous other airports. The Virginia Inland Port is located one mile north of I-66 and five miles west of I-81, providing freight connections to Northern Virginia and the Washington D.C. metropolitan area. Norfolk Southern rail lines access the port, Washington D.C. and points north.

Northern Virginia Connector Jurisdictions

- Arlington County
- Fairfax County
- City of Fairfax
- Prince William County
- Loudoun County
- Fauquier County
- Warren County
- Clarke County

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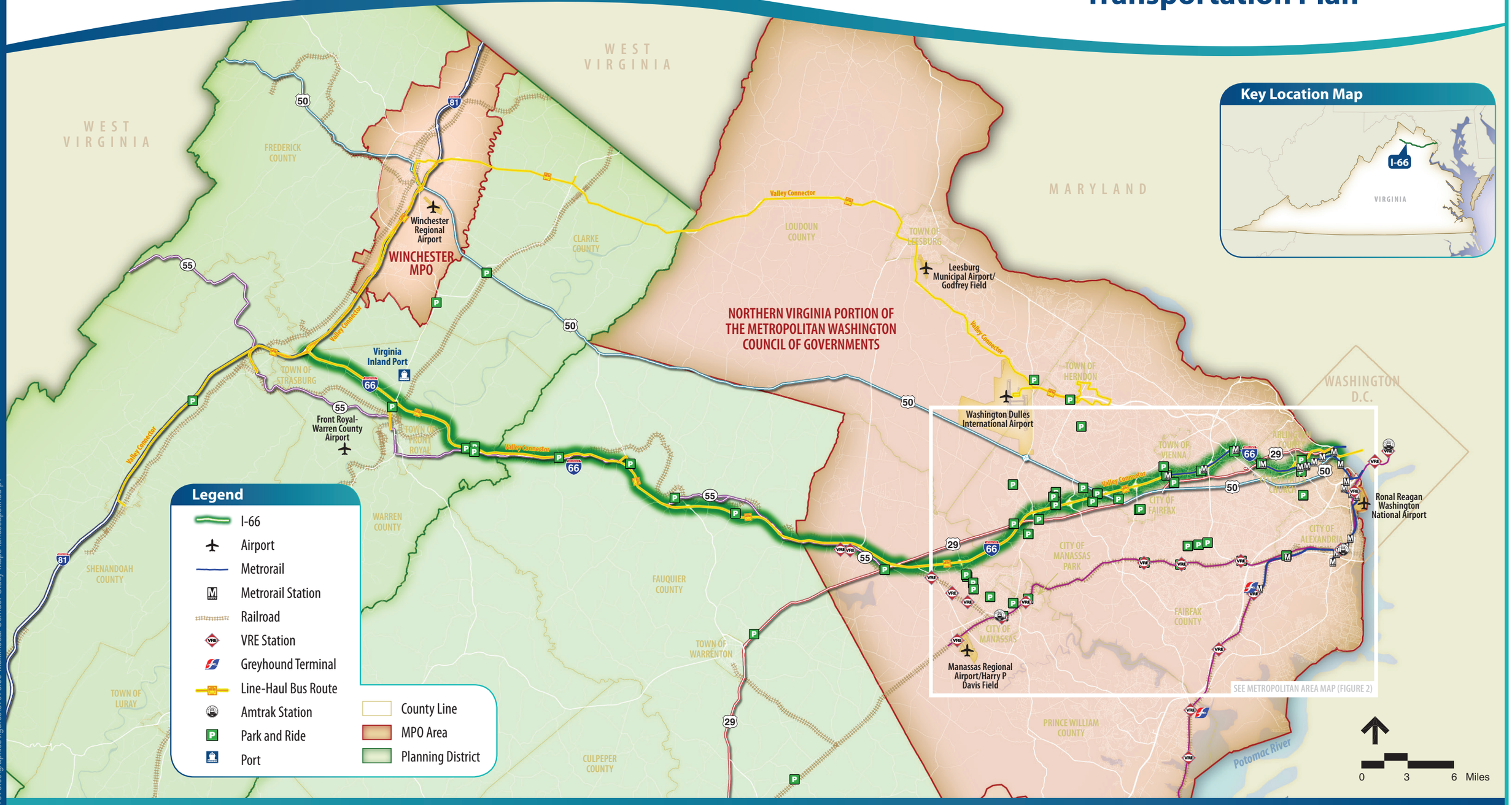

Key Location Map

FIGURE 1
Northern Virginia Connector Map

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Virginia Statewide Multimodal Transportation Plan

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Washington Dulles International Airport
John S. Mosby Highway
Sully Road
Fairfax County Parkway
Maple Avenue
TOWN OF VIENNA
Dunn Loring-Merrifield
Vienna/Fairfax-GMU
West Falls Church-VT/UVA
CITY OF FALLS CHURCH
East Falls Church
North Glebe Road
Court House
Rosslyn
Clarendon
Virginia Square-GMU
Ballston-MU
Arlington Cemetery
Union
L'Enfant
MARYLAND
Pentagon
Pentagon City
Crystal City
Crystal City
National Airport
Ronal Reagan Washington National Airport
ARLINGTON COUNTY
Leesburg Pike
Lee Highway
Arlington Boulevard
Lee-Jackson Highway
Valley Connector
Sully Road
CITY OF FAIRFAX
Chain Bridge Road
Capital Railway
Braddock Road
Alexandria
King Street
CITY OF ALEXANDRIA
Potomac River
Eisenhower Avenue
Huntington
Van Dorn Street
Backlick Road
Burke Center
Rolling Road
Centreville Road
Norfolk Southern
Prince William Parkway
Nokesville Road
Manassas Park
CITY OF MANASSAS PARK
CITY OF MANASSAS
Manassas
Broad Run / Airport
Manassas Regional Airport/ Harry P Davis Field
FAIRFAX COUNTY
Ox Road
Fairfax County Parkway
Franconia / Springfield
Franconia-Springfield
CSX Transportation
Lorton
Davison Airfield
Richmond Highway
PRINCE WILLIAM COUNTY
Dumfries Road
I-66
29
50
66
495
395
95
1

0 1 2 Miles

Legend
- I-66
- Metrorail
- Metrorail Station
- Railroad
- VRE Rail Line
- VRE Station
- Greyhound Terminal
- Line-Haul Bus Route
- Amtrak Station
- Park and Ride
- County Line

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FIGURE 2
Northern Virginia Connector Metropolitan Area Map

Through Arlington County, I-66 is primarily an urban highway with seven access points; and through Fairfax County and Prince William County, I-66 travels through a primarily suburban environment, with a total of nine access points in Fairfax County and four access points in Prince William County. The environment is mostly rural through both Fauquier County and Warren County, and fewer access points exist through these two counties, with five in Fauquier County and two in Warren County prior to connecting with I-81.

East of I-495, I-66 is a four-lane facility with peak direction High Occupancy Vehicle (HOV) restrictions during weekday peak periods. Trucks are prohibited at all times in both directions. During the AM peak period, all eastbound lanes are HOV-2 only, while during the PM peak period, all westbound lanes are HOV-2 only. West of I-495, in Fairfax County, the highway expands to a six-lane facility, with each left-most lane dedicated to HOV-2 during peak periods. In addition, the shoulder is available during peak periods as a fourth lane in each direction. West of U.S. 50, the roadway expands to eight lanes, with HOV restrictions continuing in the left lane in each direction. The eight-lane section continues through Fairfax County and into Prince William County, where it becomes a four-lane facility again near Gainesville. The remainder of I-66 to the west is a four-lane facility.

U.S. 29 runs within the Northern Virginia Connector from Arlington to Gainesville, and Route 55 is part of the corridor from Gainesville to the western limits of I-66. There are three direct access points from I-66 to U.S. 29: one in Arlington, one in Centreville in western Fairfax County, and one in Gainesville in Prince William County. U.S. 29 is primarily a four- to six-lane roadway while it parallels I-66, though it is a two-lane facility for a short distance between Fairfax County and Prince William County. At Gainesville, U.S. 29 continues to the south, and Route 55 begins and acts as a parallel corridor to I-66 throughout the remainder of Prince William County to the western terminus of I-66 at I-81. Route 55 is primarily a two-lane facility while it parallels I-66.

I-66 Parallel and Concurrent Roadway Facilities

Parallel:
- U.S. 29
- U.S. 50
- Route 55

Concurrent:
- U.S. 17

U.S. 50 also runs parallel to I-66 from Arlington County to Winchester. At the interchange in Fairfax with I-66, U.S. 50 veers to the northwest to provide local access to points north, including southern Loudoun County. It is primarily a six-lane facility through Arlington and Fairfax Counties. U.S. 50 continues to run parallel to I-66 to the north through Loudoun County, Fauquier County, and into Frederick County. At Paris in northern Fauquier County, U.S. 50 links up with U.S. 17 to travel northwest toward Winchester. This stretch of road is a four-lane divided facility, and trucks are prohibited along this highway. U.S. 50 connects with I-81 approximately 13 miles to the north of I-66.

I-66 is a major corridor for line-haul transit options and other modal options for passengers because of its position as the major corridor connecting Northern Virginia from east to west. It also is the major corridor connecting the Shenandoah Valley with the Washington Metro region. The Northern Virginia Connector has two options for rail transit, as well as HOV facilities and numerous park and ride lots along its length.

Between the Capital Beltway and Route 234 in Manassas, the far left eastbound lane is restricted to HOV-2 only from 5:30am to 9:30am, and the far left westbound lane is restricted to HOV-2 only from 3:00pm to 7:00pm. The far right eastbound lane between the Capital Beltway and Route 50 is open to traffic from 6:30am to 10am, and the far right westbound lane over this stretch of I-66 is open to traffic from 4pm to 8pm. During other times, this lane is used as the shoulder and emergency pull-off. Multiple emergency pull-offs have been constructed to allow vehicles to pull over during the times the fourth lane is being used.

I-66 Transit Facilities

- High-Occupancy Vehicle (HOV-2) Lanes
- WMATA Metrorail Orange Line
- Virginia Railway Express (VRE)
- Metrobus
- Fairfax Connector
- PRTC Express Bus
- Loudoun County Connector
- Valley Connector
- Park-and-ride lots

In addition, there are direct HOV ramps at two locations: Monument Drive in Fairfax and Stringfellow Road in Chantilly. The ramps operate in the peak direction of flow, with the on-ramps to I-66 eastbound open from 5:30am to 9:30am and the westbound off-ramps, accessing Monument Drive and Stringfellow Road open from 3:00pm to 7:00pm.

The Washington Metropolitan Area Transit Authority's (WMATA) Metrorail Orange Line runs parallel to I-66 from Arlington to Vienna, with multiple stops in Arlington (Rosslyn, Court House, Clarendon, Virginia Square, and Ballston), near Falls Church (East Falls Church and West Falls Church), and in Fairfax County (Dunn Loring and Vienna). The Orange line provides connections to many different local transit providers such as Metro, City of Fairfax City-University-Energysaver (CUE), George, Fairfax Connector, and Arlington Transit. In addition, Metrobus and Fairfax Connector provide express bus service from multiple locations to the Vienna Metrorail Station. Stations along the Orange line have almost 9,000 parking spaces available for all-day parking. Short-term and long-term parking are available at the four western-most stops, and bus service from western Fairfax County is available to and from the West Falls Church Station. There is a very large park and ride facility at the Vienna Metrorail Station, with multiple garages and multiple surface lots for commuters to use.

The first stage of the proposed Silver Line of the Metrorail system will run from West Falls Church into Tysons Corner, where there will be an additional four stops, then into Reston. The second stage of the Silver Line will connect from Reston through Herndon to Dulles Airport and beyond to stops in Loudoun County.

The Virginia Railway Express (VRE) operates commuter rail service within the Northern Virginia Connector. VRE provides commuter rail service between suburbs

of Northern Virginia and Washington, D.C. The service operates Monday through Friday, traveling inbound (towards Washington) in the mornings and outbound (away from Washington) in the afternoon and evenings. The Manassas Line service travels between the Manassas Airport and Washington, D.C. using the Norfolk Southern Piedmont freight rail line. VRE Stations are located at the following locations along the route: Broad Run/Manassas Airport, Manassas, Manassas Park, Burke Center, Rolling Road, Backlick Road, Alexandria, Crystal City, L'Enfant, and Union Station.

The Potomac and Rappahannock Transportation Commission (PRTC) provides commuter bus service along the Northern Virginia Connector. These routes are used to connect residents of Prince William County and the Cities of Manassas and Manassas Park with Metrorail or destinations in Washington, D.C. The routes operate Monday through Friday with trips occurring during the peak morning and evening travel times. They also offer service during the mid-day period to accommodate individuals needing more flexible scheduling.

The Loudoun County Connector is a commuter bus service, operated by Loudoun County Transit, providing transportation from park and ride lots during rush hours, Monday through Friday. Destinations include West Falls Church Metro, Rosslyn, the Pentagon, and Washington, DC. The Loudoun County Connector also provides transportation from the West Falls Church Metrorail station to Eastern Loudoun County. The Loudoun County Connector provides service as far west as Purcellville into the Washington D.C. metropolitan area, with destinations in Arlington and McLean.

There are at least ten park and ride lots in Prince William County along the Northern Virginia Connector, several in Arlington County, and approximately 30 park and ride lots in Fairfax County, many associated with Metrorail stops and VRE stations.

Line-haul transit opportunities exist in the western counties for commuters to the Northern Virginia region and Washington D.C. metropolitan area. The Valley Connector, which provides the majority of the line-haul service in the I-81 corridor, also provides line-haul service along I-66 and the Northern Virginia Connector. The routes connect Northern Shenandoah Valley commuters with the Washington metro area. There are four routes that provide service along the Northern Virginia Connector Monday through Friday, offering morning and evening travel times. The majority of these routes travel the corridor from near the I-81/I-66 junction into Washington, D.C. These routes make stops at a number of park and ride lots within the corridor in addition to making connections to the Metrorail system and other local transit providers in Northern Virginia and Washington, DC.

The Virginia Inland Port is located one mile off I-66, five miles from the western terminus of the corridor. Cargo from Virginia's three other ports, located in Newport News, Portsmouth, and Norfolk, travel to the Virginia Inland Port five days a week to be further distributed to the U.S. market and international markets, in effect bringing the Port of Virginia 220 miles inland. The Inland Port is located near the junction with I-81, the major freight corridor in Virginia. Norfolk Southern provides rail lines in and out of the Inland Port.

Norfolk Southern operates rail lines along the Northern Virginia Connector, and these lines provide rail access north of Washington, D.C. to Baltimore and points north along the east coast. In addition, these lines provide access to Norfolk Southern's Crescent Line along the I-81 corridor to the north and south and along the U.S. 29 corridor to the south. The Winchester and Western Railroad Company operates a short-line railroad between Gore and Winchester and then north to Maryland. It is exclusively a freight line with connections to CSX and Norfolk Southern lines. Also, Amtrak has a station in Manassas that provides passenger rail service along its Crescent Route, which runs from Washington D.C. to the south along the U.S. 29 corridor.

I-66 Rail and Port Facilities

Port:

- Virginia Inland Port

Freight Rail:

- Norfolk Southern Crescent Corridor (both eastern and western lines)

Short Line:

- Shenandoah Valley Railroad

Passenger Rail:

- Amtrak Crescent Route
- Virginia Railway Express

Dulles International Airport is accessible from I-66 via the Dulles Toll and Access Road (Route 267), which connects to I-66 north of Falls Church and via Route 28, which can be accessed from I-66 at exit 53 in Fairfax County. Ronald Reagan National Airport can be accessed from I-66 via Route 110 and the George Washington Memorial Parkway. These two airports are the most important air facilities in Virginia and two of the most important airports in the Washington, D.C. and Baltimore metropolitan areas. In addition, there are multiple other reliever or general aviation facilities along the Northern Virginia Connector. Table 1 lists all of the airport facilities, along with location and the designation of the facility by the Virginia Air Transportation System Plan.

Table 1 Northern Virginia Connector Airport Facilities

Airport	Type	Location
Dulles International	Commercial Service	Fairfax/Loudoun Counties
Reagan Washington National	Commercial Service	Arlington County
Manassas Regional	Reliever	Prince William County
Warrenton-Fauquier	Reliever	Fauquier County
Leesburg Executive	Reliever	Loudoun County
Front Royal-Warren County	General Aviation – Community	Warren County
Winchester Regional	General Aviation – Regional	Frederick County

2

Corridor Functions

2.1 Corridor Functions in Virginia

The Northern Virginia Connector is a major commuting corridor in the Commonwealth of Virginia, providing access from points west to Washington D.C. and Northern Virginia. As such, it also operates as an important multimodal corridor, with passenger rail, express bus, Metrorail, and HOV lanes in the Northern Virginia region.

Functions of I-66

- Freight movement (Inland Port)
- Technology corridor
- Commuter corridor and link between western Virginia and D.C. metro area
- Airport access and multimodal corridor

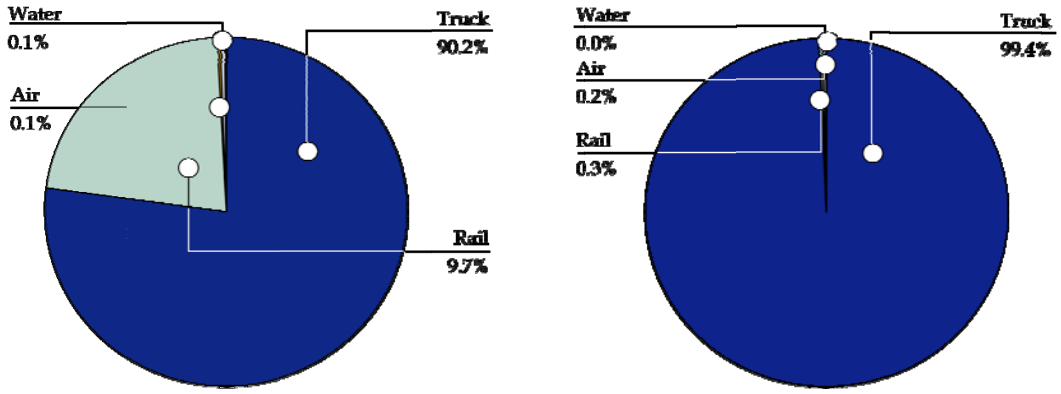
The corridor provides a link from the important I-81 freight corridor to the nation's capital and links service providers to markets in Northern Virginia and the entire Washington D.C. metropolitan area. The corridor provides access to the Dulles International and Ronald Reagan National Airports, and provides an important evacuation route from Washington D.C. The Northern Virginia Connector is also an important technology corridor, especially in western Fairfax County and through Loudoun and Prince William Counties.

2.2 Freight Movement and Technology Corridor

2.2.1 Freight Movement

The Northern Virginia Connector is an important freight corridor, with most freight movement accomplished via trucking along the highway, though other options exist, including rail and air. Trucking accounts for approximately 90 percent of the freight movement, and freight rail accounts for most of the remainder of the total freight movement, which is concentrated along a portion of Norfolk Southern's Crescent Corridor. This portion connects not only both north-south lines of the Crescent Corridor with Washington, D.C., it connects with the Virginia Inland Port, which is located near the junction of I-66 and I-81. Figure 3 shows the tonnage by mode along the Northern Virginia Connector, as well as the freight value by mode.

Figure 3 Total Freight Tonnage and Value by Mode



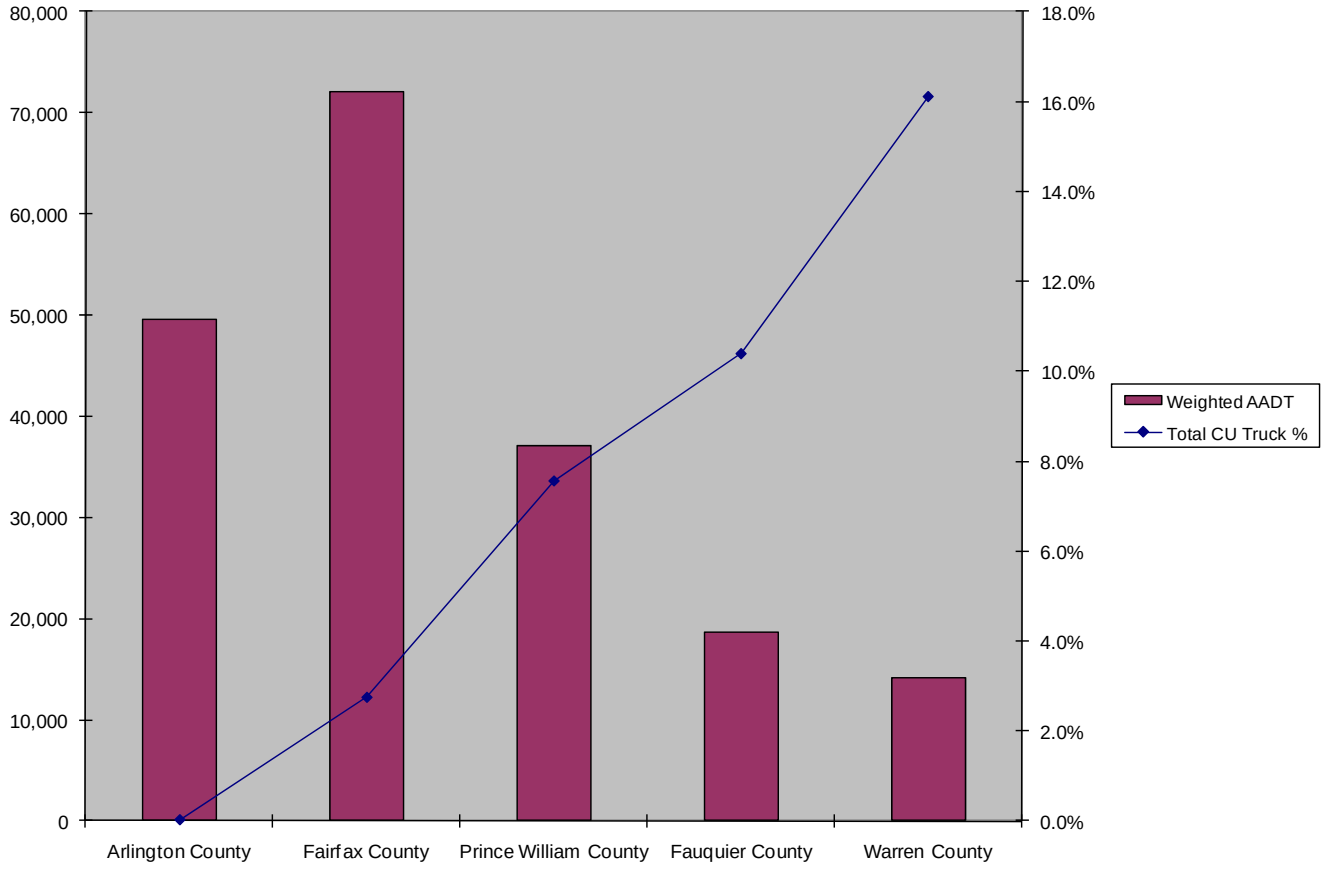
Tonnage Value

(Source: Statewide Freight Study)

As seen in Figure 3, most freight along the Northern Virginia Connector is handled by truck despite the presence of Norfolk Southern rail lines and the Virginia Inland Port. Over 90 percent of total freight volume is moved by truck and over 99 percent of total freight value moved over the highway facilities of the corridor by truck.

Figure 4 below illustrates that trucks account for up to 16 percent of the total traffic along I-66. This again illustrates the importance of I-66 as a freight corridor and illustrates the fact that a large amount of freight is moved by truck using the highway facilities, especially near the Inland Port.

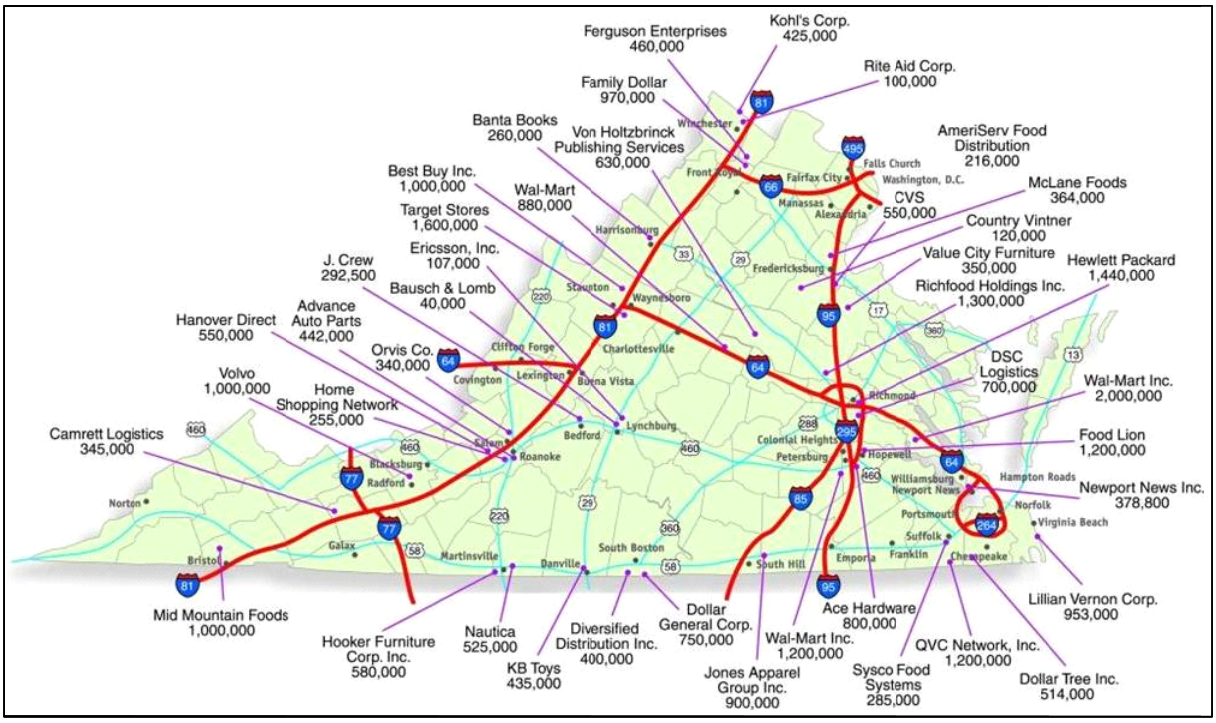
Figure 4 I-66 Average Annual Daily Traffic (ADT) and Commercial Unit (CU) Truck Percentages



(Source: Statewide Freight Study)

Figure 5 shows the major distribution centers in Virginia. As seen in the figure, there are no distribution centers in the Northern Virginia area. However, there is one distribution center near the junction with I-81 and another near the Virginia Inland Port.

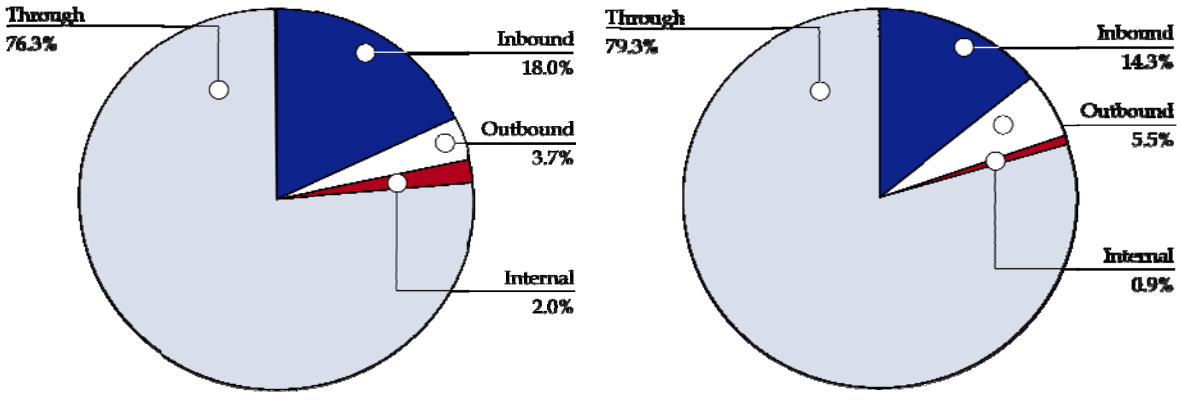
Figure 5 Major Virginia Distribution Centers



(Source: Statewide Freight Study)

Figure 6 shows the freight tonnage and value by direction. As seen in this figure, approximately three-quarters of the freight moved along the corridor is through freight, likely between the Port of Virginia and markets to the west of Virginia, such as the Midwest. There is significantly more freight traveling inbound to Virginia markets than outbound along the Northern Virginia Connector, and a small amount of internal freight movement.

Figure 6 Freight Tonnage and Value by Direction



Tonnage Value

(Source: Statewide Freight Study)

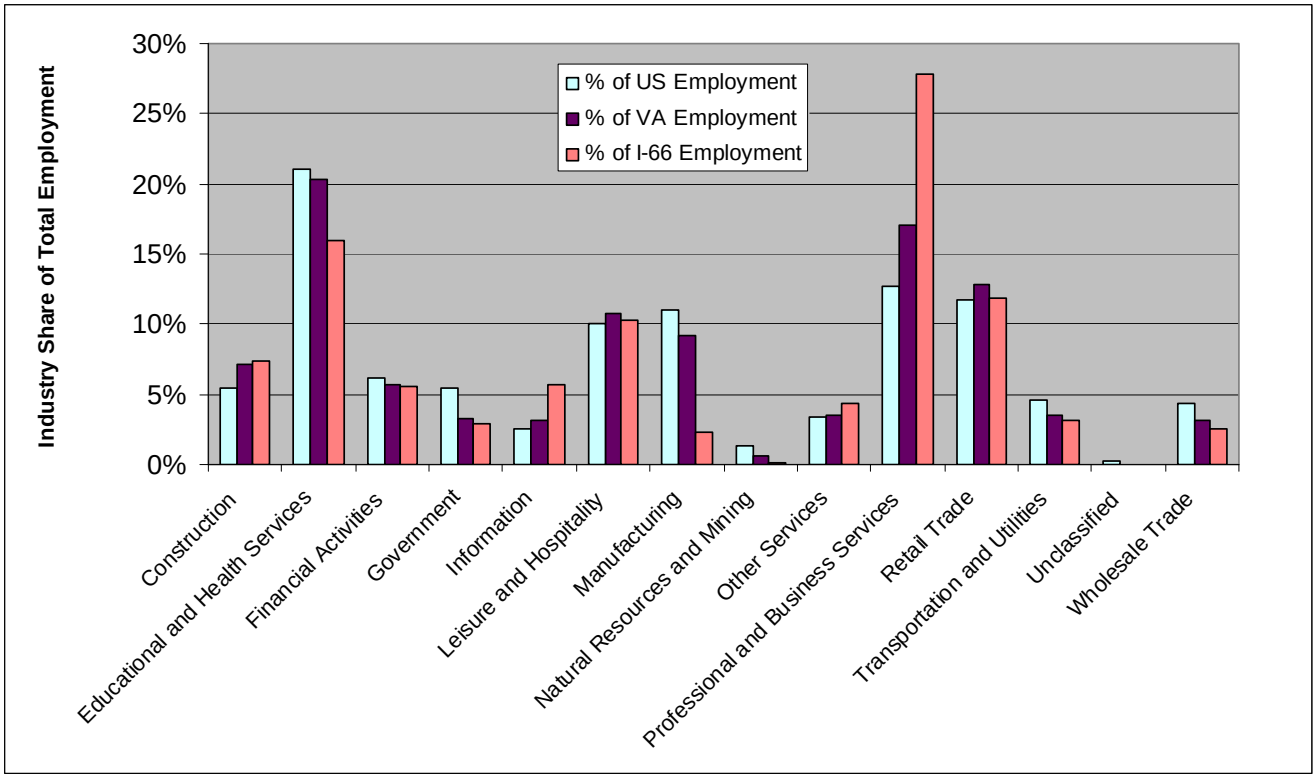
Freight volumes along the Northern Virginia Connector will continue to grow and will be influenced by a number of factors leading to increased transportation demand. Population growth along the corridor, which is at a higher rate the overall population growth rate in Virginia, will play a major role. In addition, changes in national and global logistics patterns and the corridor's evolving industry structure will lead to increased demand for freight along this already heavy freight corridor.

With increases in freight demand, it is important that capacity to carry the expected volumes of freight will exist in the future, not only along the highway facilities but along the rail facilities as well. Norfolk Southern has many planned projects for their Crescent Corridor, part of which connects the Virginia Inland Port with the remainder of the Corridor. These projects include expansion of single-line tracks to double tracks, adding and improving existing passing sidings, realigning curves, improving connections, raising tunnels to provide for double-stack capacity, and adding track signals and systems. These will all increase capacity of the rail system as it connects to the Virginia Inland Port. It is important that with these projects, more freight is moved to rail to connect with national markets as well as to the Virginia Inland Port and the distribution centers.

2.2.2 Technology Corridor

One function of the Northern Virginia Connector is its role as a technology corridor. A large portion of the industry located along the corridor, including near Dulles Airport, is technologically-based. Figure 7 illustrates the economic structure of the Northern Virginia Connector. Technological services fall under the category of Professional and Business Services. As seen in the figure, these services represent over a quarter of the total employment within the corridor. The total percentage is also substantially higher than the state average and over twice as high as the national average.

Figure 7 Economic Structure of Northern Virginia Connector



(Source: Statewide Freight Study)

2.3 Commuter Corridor and Link Between Western Virginia and D.C. Metro Area

The Northern Virginia Connector acts as a commuting corridor, bringing residents from as far out as the Shenandoah Valley into Northern Virginia and the Washington D.C. metropolitan area. It passes through Warren, Fauquier, Prince William, Fairfax, and Arlington Counties, collecting commuters along the way. In addition, as shown in the previous section, there is a large amount of employment throughout the corridor, especially professional and technological employment, allowing many of these commuters to exit the highway before Washington, D.C. and Arlington. During the AM peak period, the peak direction of flow is from the west to the east, while it is from the east to the west during the PM peak period. I-66 also provides a connection to the Capital Beltway (I-495) as well as to the Dulles Access and Toll Road (VA Route 267), which is considered part of the overall corridor.

2.3.1 Population Projections

The Virginia Transportation Research Council (VTRC) completed a report as part of VTrans2035, detailing population and employment trends and projections to 2035 for these socioeconomic factors. Increases in population will impact the amount of person and freight movement along the corridor.

Table 2 details the population projections for 2010 and 2035 based on two different sources, one a private vendor (NPA Data Associates) and one a public source (Virginia Employment Commission - VEC). Projections by both these sources only extended to 2030, so linear regression was used by VTRC to project to 2035. The data was organized by Planning District. Figure 8 illustrates the population density projections for the year 2010 at the Planning District level along the Northern Virginia Connector, and Figure 9 illustrates the density projections for the year 2035 and the increase in population density from 2010 to 2035.

Table 2 Population Projections to 2035

	2010 Value		Midpoint 2035 Forecast		Percentage Increase		Annual Effective Growth Rate	
PDC	VEC	NPA	VEC	NPA[2]	VEC	NPA	VEC	NPA
Northern Virginia	2,192,533	2,250,780	3,022,996	3,484,698	37.9%	54.8%	1.3%	1.8%
Rappahannock	176,584	175,960	279,603	253,073	58.3%	43.8%	1.9%	1.5%
Northern Shenandoah Valley	225,501	224,660	324,804	308,542	44.0%	37.3%	1.5%	1.3%
Statewide Totals	8,010,340	8,057,350	10,278,943	10,926,181	28.3%	35.6%	1.0%	1.2%

Source: Virginia Transportation Research Council

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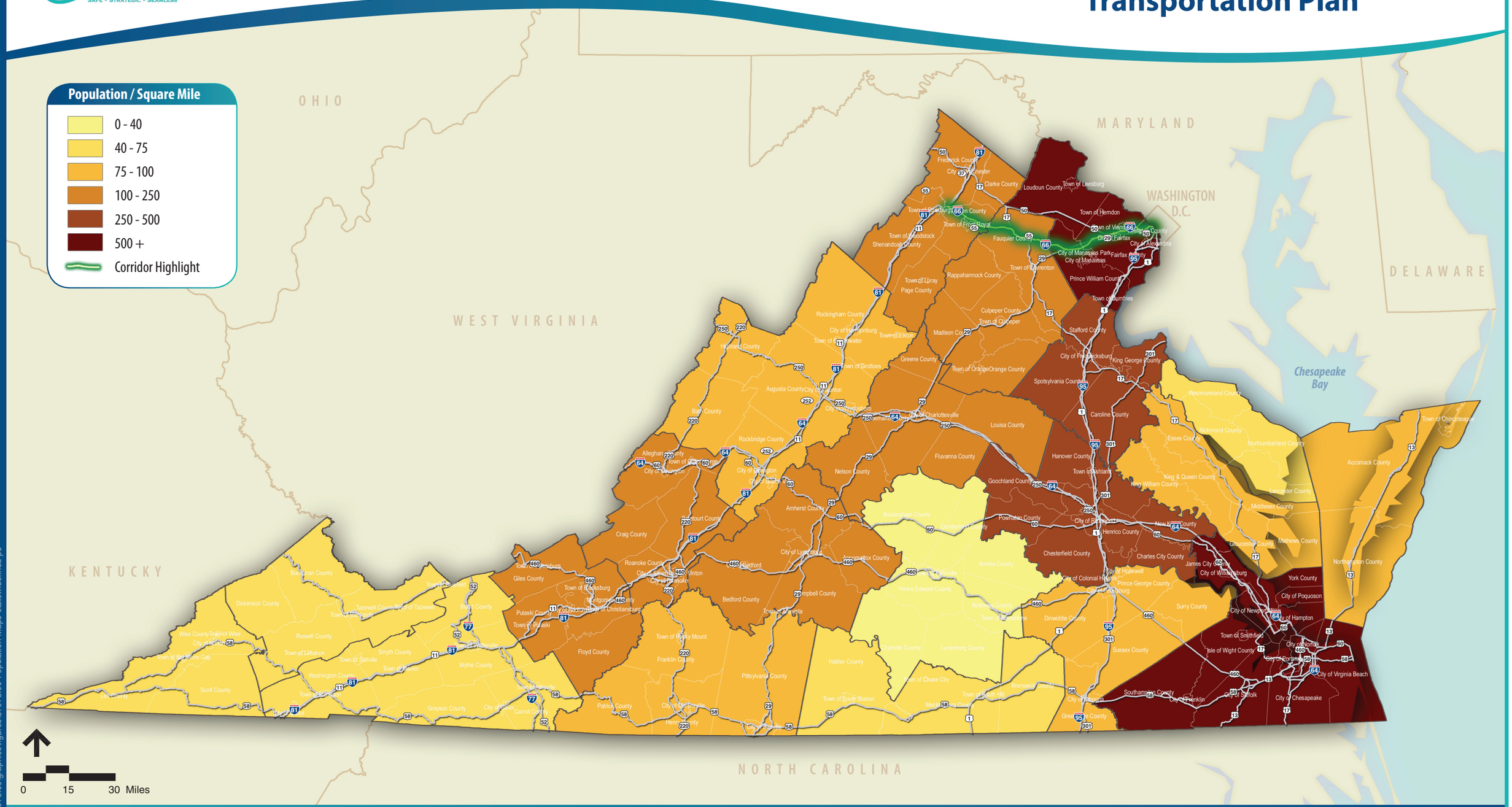

FIGURE 8

Population Density 2010 Projections - Northern Virginia Connector

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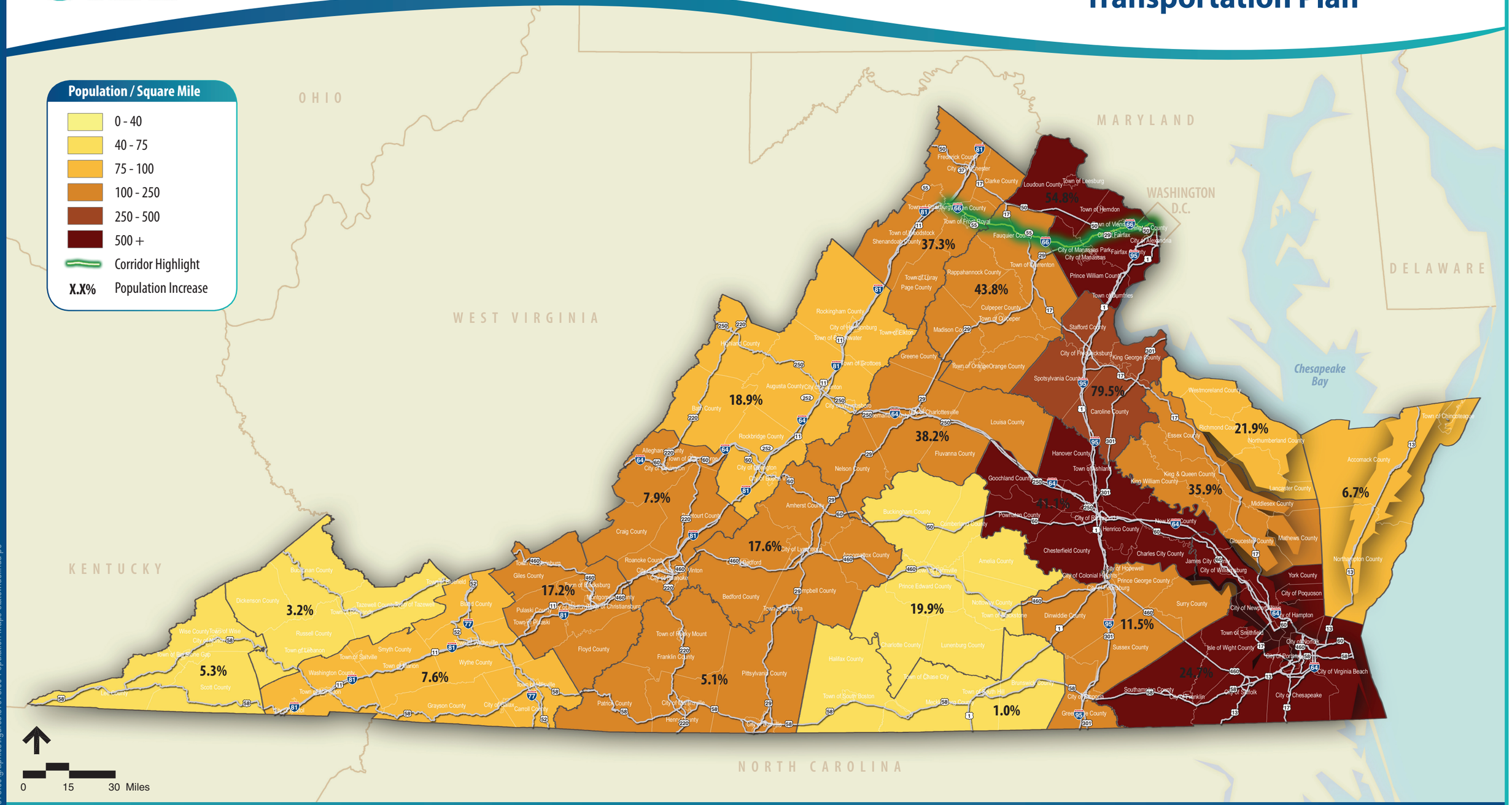

FIGURE 9
Population Density 2035 Projections - Northern Virginia Connector

As seen in this table and in the graphics, the projected increases in population between 2010 and 2035 along the Northern Virginia Connector are substantial. All increases are above the state average. Population in the Rappahannock PDC, which includes Fauquier County along the Northern Virginia Connector, is expected to grow by approximately 50 percent. Many of these new residents are likely to be commuters to the Washington, D.C. metropolitan area and are likely to travel along the Northern Virginia Connector to access their places of employment.

According to the VTRC Trends Report, between 76 and 81 percent of the total population increase in Virginia will take place in four Planning Districts (Northern Virginia, Richmond Regional, Hampton Roads, and George Washington). The Northern Virginia Connector includes Northern Virginia, which is by far the PDC with the largest and densest population. While the Rappahannock PDC and Northern Shenandoah PDC are expected to grow substantially as well, the total population of these regions combined is expected to be less than 15 percent of the population of Northern Virginia.

2.3.2 Levels of Service

Figures 10 (entire corridor) and 11 (Northern Virginia region only) show the existing levels of service (LOS) along the Northern Virginia Connector, with red areas indicating undesirable levels of service (i.e., LOS 'E' or LOS 'F'). All areas not marked in red are where acceptable levels of service (i.e., LOS 'A' through LOS 'D') currently exist. Levels of service are not only shown for I-66; they are also shown for U.S. 29, U.S. 50, and Route 55, as these parallel routes are all considered part of the Northern Virginia Connector. As seen in Figure 11, there are currently areas of deficiency along I-66, U.S. 50, and U.S. 29 through Arlington County and through Fairfax County. There is also an area with undesirable LOS along U.S. 29 in the Gainesville area, near the junction with both I-66 and Route 55 and a short area of deficiency along U.S. 50 in the City of Winchester.

Figures 12 (entire corridor) and 13 (Northern Virginia region only) show the future LOS along the Northern Virginia Connector, with the same color coding. As seen in these figures, LOS will significantly degrade along the Northern Virginia Connector in the future. In the Northern Virginia region, I-66 will experience undesirable levels of service between Route 267 and Washington D.C. as well as between I-495 and U.S. 50 and west of Route 7100 through into Prince William County. In addition, both U.S. 29 and U.S. 50 will have areas of deficiency, especially through Arlington and Fairfax Counties.

In the western part of the corridor, I-66 will operate at undesirable levels of service throughout much of Prince William County into Fauquier County, and there will be shorter areas of deficiency along Route 55 around Front Royal and along U.S. 50 in the Winchester area.

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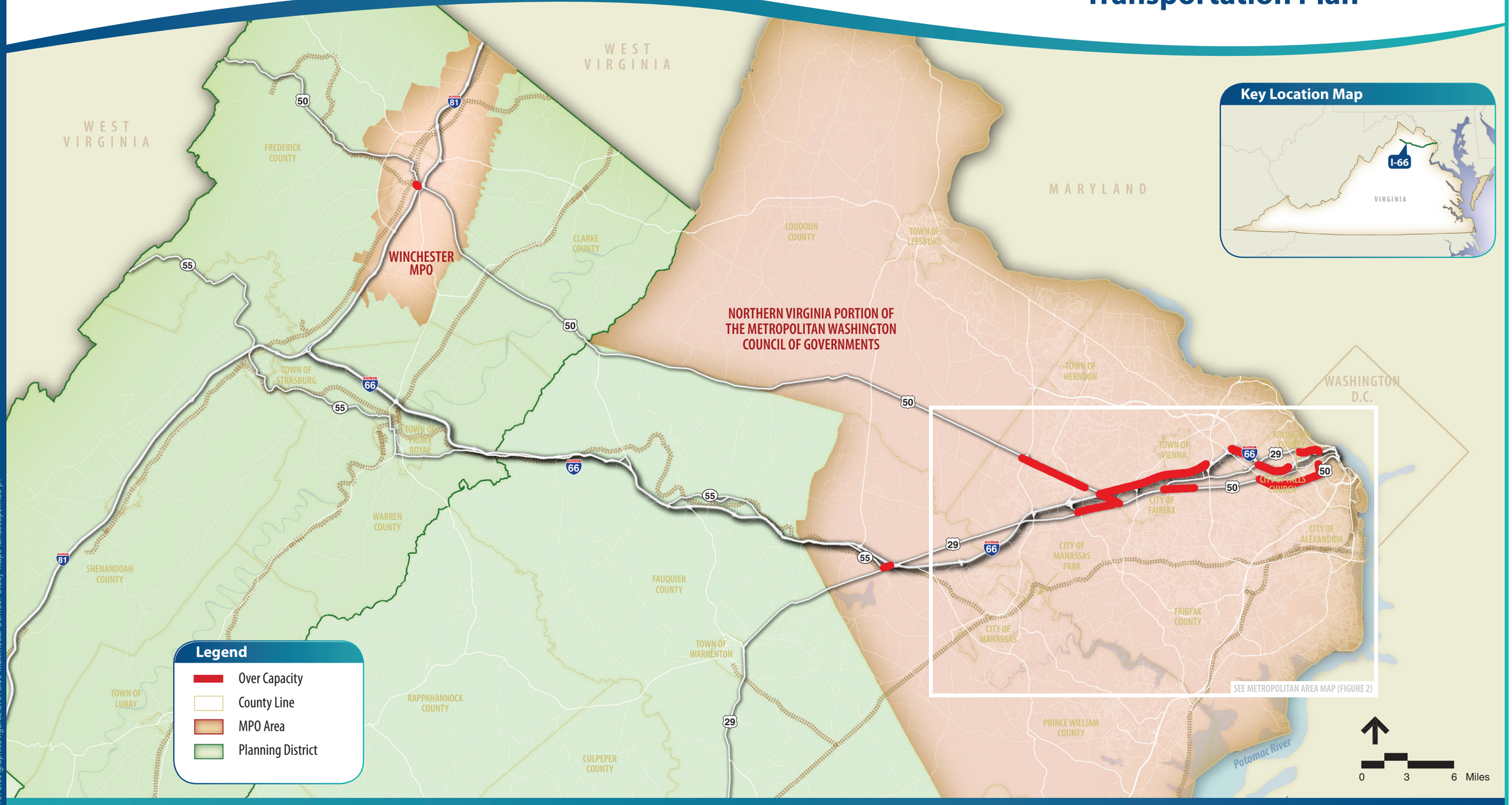

FIGURE 10
Northern Virginia Connector Existing Conditions

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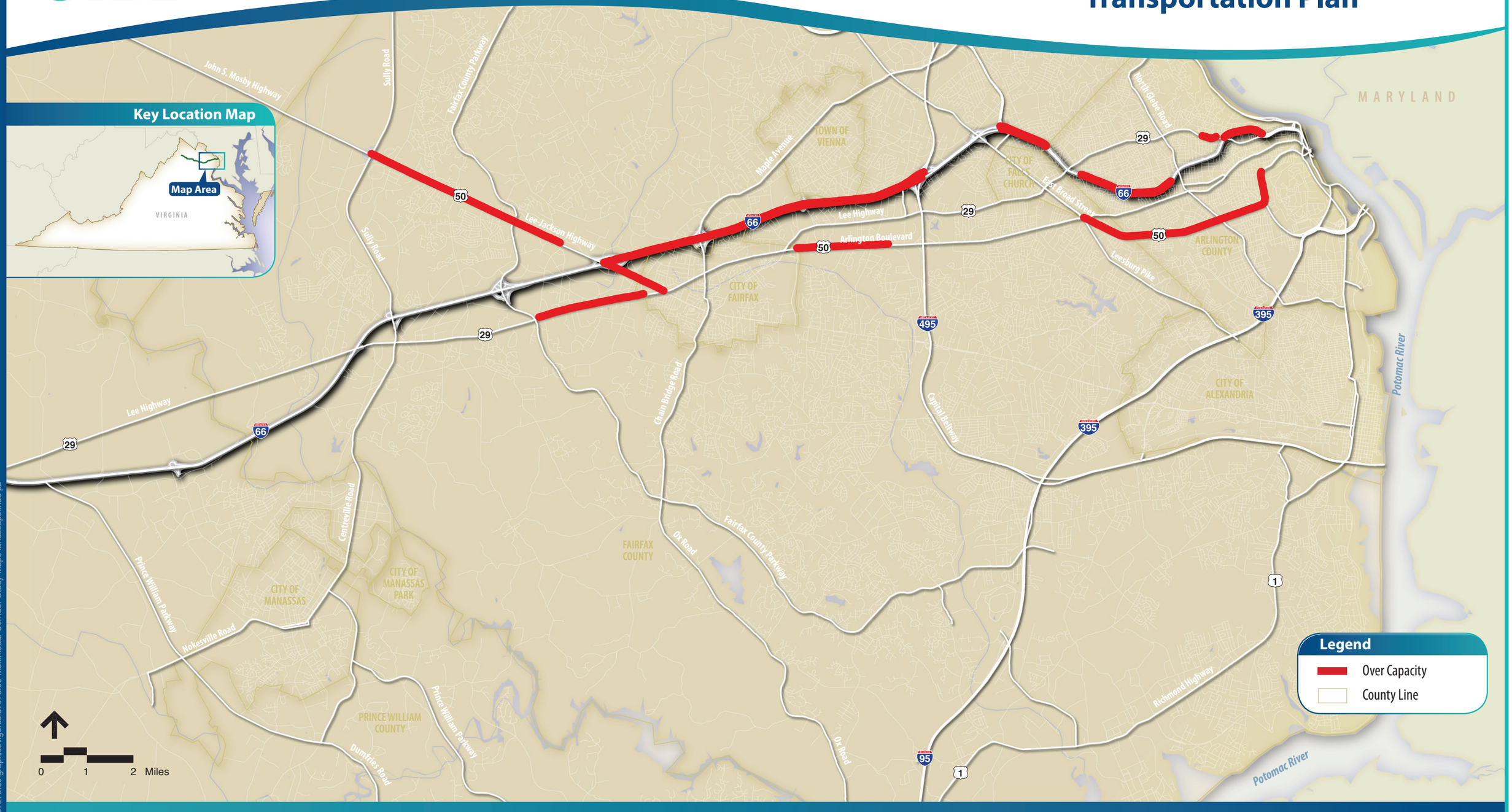

FIGURE 11
Northern Virginia Connector Metropolitan Area Existing Conditions

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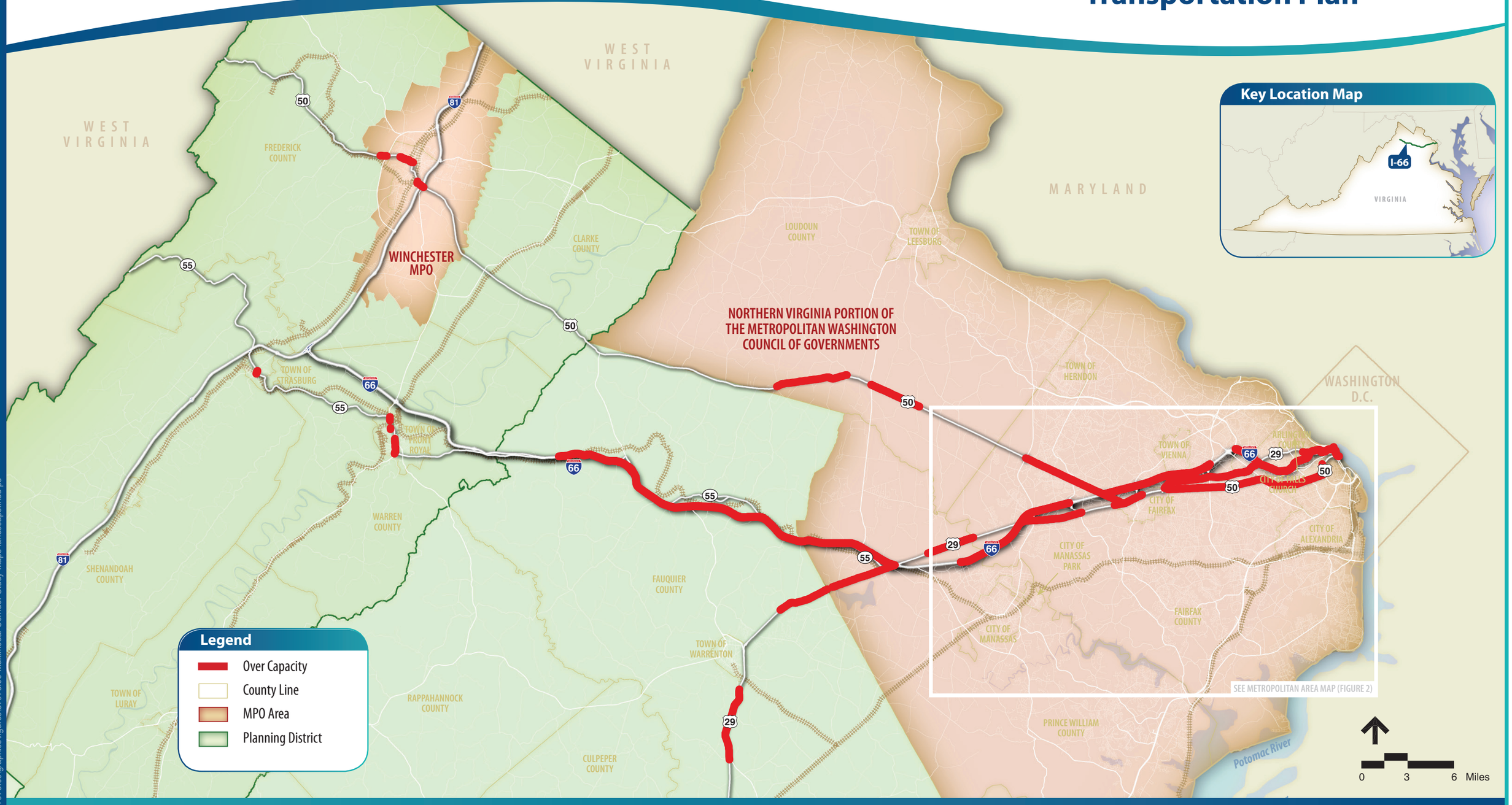

Key Location Map

Legend

- Over Capacity
- County Line
- MPO Area
- Planning District

0 3 6 Miles

FIGURE 12
Northern Virginia Connector Future Conditions

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Virginia Statewide Multimodal Transportation Plan

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FIGURE 13
Northern Virginia Connector Metropolitan Area Future Conditions

The future levels of service take into account projects along the roadway that are planned by the Virginia Department of Transportation. Even with planned expansions of roadways and other programmed improvements, the highway facilities of the corridor are expected to significantly degrade by 2035. To combat this, localities, PDCs, and MPOs should identify the worst areas and plan for improvements to these areas. In addition, multimodal coordination should take place to encourage shifts from single-occupancy. This could include increased line-haul transit along the corridor and an increase in the number of park and ride facilities, which could increase carpooling. While this is a multimodal corridor, increased transit, HOV facilities, express bus, and expansions to Metrorail should be considered to alleviate congestion along this heavily-traveled corridor. This would assist with both commuters and travelers between western Virginia and the Washington D.C. metro area.

2.3.3 High-Crash Rate Areas

Figure 14 illustrates areas along I-66 that have been identified as high-crash rate areas, according to the Virginia Department of Transportation. As seen in the figures, there are multiple high-crash rate areas, both along I- 66 and along its parallel facilities, such as U.S. 29 and U.S. 50. The highest concentration of these high-crash rate areas is in the Northern Virginia region, especially through Fairfax County. There is also a concentration of high-crash rate areas around the junction of I-66 with both U.S. 29 and Route 55 in the Gainesville area. West of this however, there are fewer areas with high-crash rates along both I-66 and along its other parallel roadway facilities. The high-crash rate areas are mostly confined to the more densely populated regions, likely signaling that the high-crash rates may be due to large volumes of traffic and capacity issues rather than unsafe road conditions. As population increases and traffic increases, the number of crashes will likely increase in these urban areas unless measures are taken to improve high-risk locations within the corridor.

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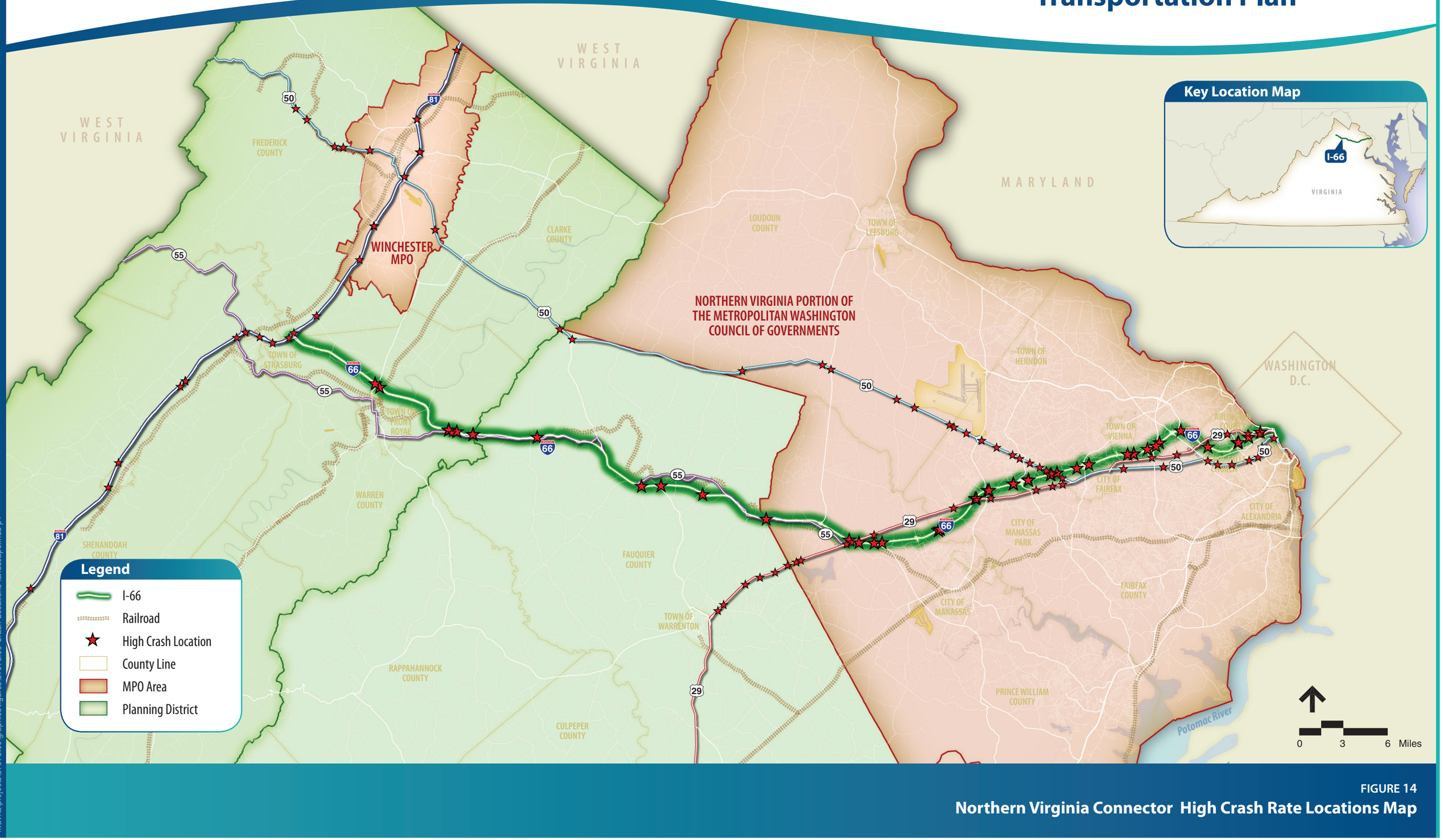


Key Location Map

FIGURE 14
Northern Virginia Connector High Crash Rate Locations Map

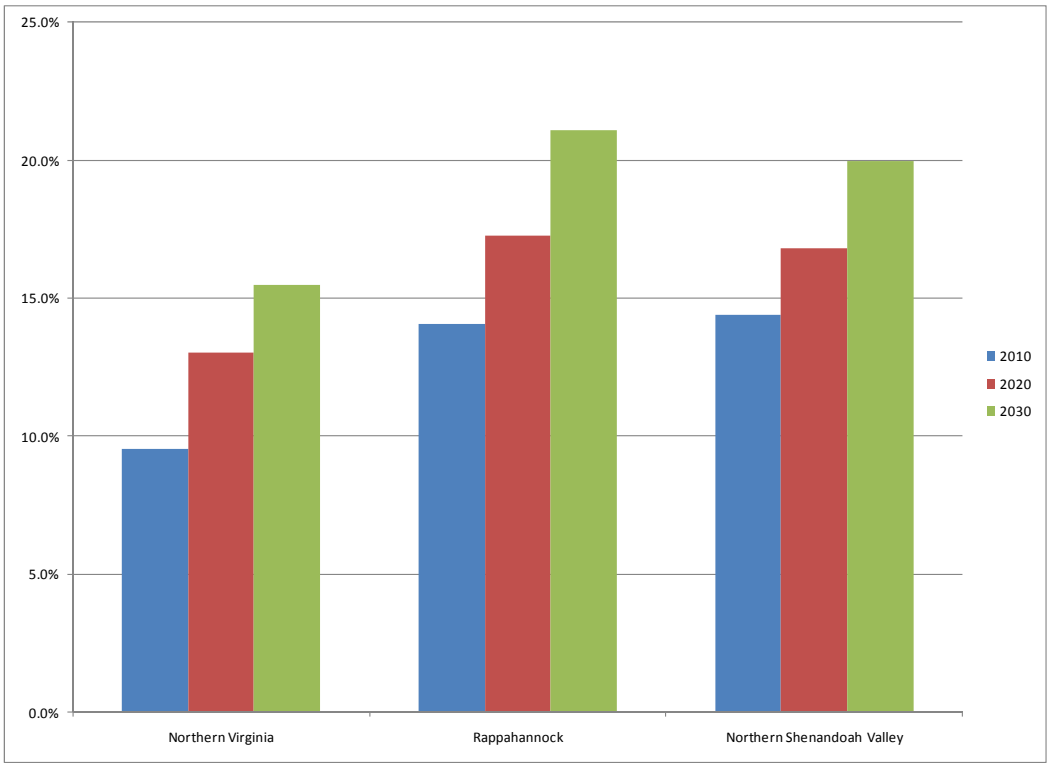
2.3.4 Corridor Mobility for Aging Population

In addition to general population projection, VTRC projected the ages of the population, broken down into five-year increments for a total of 18 categories. The percentage of population that is over age 65 was calculated based on these projections, and this information is available in Figure 15 for the years 2010, 2020, and 2030. The percentages were calculated for each Planning District along the Northern Virginia Connector.

As seen in this figure, the percentage of the population over age 65 is expected to increase in all Planning Districts, with substantially more elderly population in the more rural areas on the Northern Virginia Connector. In the Rappahannock and Northern Shenandoah Valley Planning Districts, 20 percent of the population will be over age 65 in the year 2030.

As the older population increases, it is likely that the population without access to a vehicle will increase as well, leading to a need for other modes of transportation, especially transit. There are a number of line-haul transit options along the Northern Virginia Connector, and these services will likely have to be expanded in order to meet the needs of the aging population.

Figure 15 Percentage of Population over Age 65 (Projections)



2.4 Airport Access and Multimodal Corridor

2.4.1 Airports

Both Dulles International Airport and Reagan National Airport are within 10 miles of the Northern Virginia Connector. The Northern Virginia Connector offers the main connection to Washington Dulles International Airport, which is located in western Fairfax County and eastern Loudoun County. Dulles Airport is not only the largest airport in Virginia with the largest number of enplanements, it is the largest and one of the most important airports in the Washington D.C. and Baltimore regions. It serves both passengers and freight to domestic and international destinations.

Dulles Airport can be accessed along I-66 via Route 28, U.S. 50, or the Dulles Toll and Access Road (Route 267), which connects directly to I-66 in Arlington County. Dulles Airport can easily be accessed from Washington D.C. and Arlington County via the Dulles Toll and Access Road, running parallel to I-66. Those wishing to access the airport from the west can use I-66 from Prince William, Fauquier, and Warren Counties, U.S. 50 from Loudoun County, Clarke County, Frederick County, and the City of Winchester, or the Dulles Greenway, an extension of the Dulles Toll and Access Road from Loudoun County.

Ronald Reagan National Airport can be accessed from I-66 via Route 110 and the George Washington Memorial Parkway.

2.4.2 Multimodal Corridor

The Northern Virginia Connector is an important multimodal corridor in Virginia. Along with the I-95 corridor, the most modal options other than single-occupancy vehicle trips are offered by the Northern Virginia Connector. Section 1 described many of the modal options, including Metrorail along the Orange Line; multiple express bus services between the Shenandoah Valley and the Washington D.C. metropolitan area as well as Dulles Airport; HOV lanes (HOV-2) on I-66 in Arlington, Fairfax, and Prince William Counties; VRE commuter passenger rail; local transit systems; and multiple park and ride lots along the corridor. These modal facilities are shown in both Figure 1 and Figure 2 in the previous section.

In the future, enhanced modal options are expected, as Metrorail will be extended to Dulles Airport and likely into Centreville along the Northern Virginia Connector. VRE is likely to be expanded further to the west into Fauquier County along the Northern Virginia Connector, and expansions of local transit systems and express bus options are also expected.

3

Corridor Strategies

This section discusses the general corridor strategies for the Northern Virginia Connector, which have been formulated to improve safety, mobility, and capacity along the corridor. The functions of the Northern Virginia Connector are listed below, and Figure 16 presents a matrix showing how the strategies relate to each function.

Functions of the Northern Virginia Connector

- *Freight movement (Inland Port)*
- *Technology corridor*
- *Commuter corridor and link between western Virginia and D.C. metro area*
- *Airport access and multimodal corridor*

Strategies were formulated based on trends, system performance, issues/challenges, elements of the VDOT Six-Year Program, the Constrained Long-Range Plans for each Metropolitan Planning Organization, visions and plans for the various Planning Districts, and any available Comprehensive Plan visions and strategies for each county and jurisdiction within each corridor. A Regional Planning Forum was held in the spring of 2009 with transportation representatives from across Virginia, including VDOT, Planning Districts and MPOs, transit agencies, the Virginia Airport Authority, the Port of Virginia, and other stakeholders in the Virginia transportation system. Public meetings were held in four locations in June and July of 2009 (Northern Virginia, Richmond, Hampton Roads, and Roanoke). Corridor deficiencies and what could be done to alleviate these deficiencies were discussed, with this information playing a major role in the formulation of these strategies. These strategies are part of a continuing planning process and are designed to be used as a guide for future transportation plans along the corridor within Virginia. They are not the explicit policy of the Commonwealth Transportation Board (CTB), though they are designed to assist the CTB, state and local transportation agencies, and local planning organizations in their planning efforts along the corridor. Specific corridor strategies and improvement recommendations will ultimately be developed as part of subsequent planning analyses at the State and local level.

Figure 16 - Northern Virginia Connector Strategies vs. Functions Matrix

	Functions					
Strategies	**Commuter Corridor**	**Freight**	**Link between I-81/West and D.C. Metro Area**	**Multi-modal Corridor**	**Airport Access**	**Technology Corridor**
Expand highway and HOV Capacity.	●	●	●	●	●	●
Extend Metrorail service.	●		○	●	●	●
Increase transit options and transit capacity.	●	⊙	●	●	●	●
Encourage increased Transportation Demand Management (TDM) throughout the Northern Virginia Connector.	●	○	○	●	●	●
Improve express bus service to Washington, D.C. and Dulles Airport, and extend Virginia Railway Express (VRE) lines.	●	⊙	●	●	●	●
Improve ground access to Dulles International Airport from the west and from the Virginia Inland Port and improve ground access to other airport facilities.	○	●	○	⊙	●	
Improve capacity of parallel roadway facilities to relieve pressure on I-66.	●	○	●	○	●	●
Improve Intelligent Transportation Systems (ITS), as appropriate, including along parallel roadways.	●	●	●	●	●	●
Improve freight movement via increased rail capacity and intermodal facilitation.	⊙	●	⊙	●		⊙

● Strong Correlation ○ Medium Correlation ⊙ Some Correlation

3.1 Strategies for Northern Virginia Connector

Strategy: Expand highway and HOV capacity.

There are currently plans to expand the capacity of the Northern Virginia Connector's highway facilities along I-66 within Northern Virginia, including expansion to a total of 10 lanes through Fairfax County. In addition, construction is currently underway for the third and final phase of the expansion of I-66 between Manassas and Gainesville, which includes highway expansion along U.S. 29 in Gainesville and interchange improvements at I-66 and U.S. 29 in Gainesville. This expansion from 2 to 4 lanes will add capacity for all traffic as well as allow the HOV lane in each direction to be expanded. Other expansion projects should be considered at locations where it is determined that there are capacity issues, and expansion of HOV facilities along the corridor should also be considered where deemed relevant.

Strategy: Extend Metrorail service.

Metrorail is currently being extended through Tysons Corner into Reston with construction of the Silver Line. The second stage will extend the Silver Line past Dulles Airport and into Loudoun County. In addition, there are proposals to extend the Orange Line into Centreville through Fairfax. These projects will significantly add transit capacity to the Northern Virginia Connector and allow better transit access to Dulles Airport, which should be one of the highest priorities for this corridor. I-66 is one of the prime multimodal corridors in Virginia and one of the most heavily utilized commuting corridors. With additional Metrorail capacity, capacity along the corridor will be increased, and better access to Dulles Airport and technology centers to the west will be realized.

Strategy: Increase transit options and transit capacity.

There have been a number of planning studies related to I-66. A transit study is ongoing and a multimodal study is just underway. In addition to the proposed Metrorail expansion, other transit options should be considered and/or expanded along the Northern Virginia Connector, especially throughout Northern Virginia. Increased capacity along current bus routes throughout the area and increased planned capacity along the planned Metrorail lines should be considered, such as through Rosslyn in Arlington. Bus rapid transit (BRT) is under study along the corridor, which would add another transit option to this multimodal corridor. The Regional Planning Forum identified BRT as a viable interim improvement for the corridor while rail extensions (Metrorail and VRE) are in the design and construction phase, and a study for BRT is currently underway. Also, the numerous park and ride lots along I-66 should be expanded with any expansion in transit service to accommodate the increase in transit ridership. In addition, new lots should be constructed in strategic areas, especially to the west of the Northern Virginia Connector, to encourage increased transit use for commuting and carpooling. There is also planned roadway expansion along I-66 in Fairfax County that will assist in

increasing transit capacity. Value pricing should be investigated for sections of the corridor to determine if it is a viable option, as it is expected to be along the I-95 corridor.

Refurbishments and upgrades to the existing transit infrastructure, including buses, Metrorail lines, and Metrorail trains should be included in any expansion to ensure maximum capacity and maximum safety for riders. An increase in transit use assists with every function of the corridor, not just with commuting and access to technological centers, as freight movement along the highway facilities can move faster, linkage to I-81 and western Virginia can be accomplished multimodally, and Dulles Airport can be more easily accessed.

Strategy: Encourage increased Transportation Demand Management throughout the Northern Virginia Connector.

Transportation Demand Management (TDM) measures should be used to further decrease the number of single-occupancy vehicles on the highway facilities of the Northern Virginia Connector, especially in Northern Virginia. These should include encouraging carpooling, vanpooling, and transit use by employers and residential centers. It could also include the opening of more telework centers and encouraging telecommuting. Parking management is another TDM strategy that could be employed, as could ITS technologies, such as counting the number of available parking spaces and notifying drivers on the highways of vacancies, or having parking information available via smart-phones or internet. As population increases and the number of commuters along the Northern Virginia Connector increases, the need for TDM will become more vital.

Transit-oriented development is encouraged by many localities. With this type of mixed-use development centered around transit stations, transit use is increased by making transit more accessible and convenient. This eliminates one leg of the journey for potential riders. These developments typically encourage not only transit ridership but carpooling and vanpooling as well. As Metrorail and VRE are expanded west along the Northern Virginia Connector, transit-oriented development should be encouraged, and TDM measures should be required by the various localities in an attempt to coordinate transportation with land use decisions. This is currently being done by Fairfax and Arlington Counties, and should continue in these counties. Such measures should also be implemented in the localities to the west.

Strategy: Improve express bus service to Washington, D.C. and Dulles Airport and extend Virginia Railway Express (VRE) lines.

Express bus service currently exists along the Northern Virginia Connector, including the Loudoun County Connector and the Valley Connector, providing transit access to Northern Virginia and Washington, D.C. to commuters in the western counties of the corridor. County Comprehensive Plans and the Regional Planning Forum both call for increased express bus service to add capacity to the Northern Virginia Connector for commuters whether roadway expansion takes place or not. In addition, VRE lines should be extended as planned through Prince

William County to Haymarket, and the viability of extending VRE into Fauquier County and Culpeper County should be examined as well.

Strategy: Improve ground access to Dulles International Airport from the west and from the Virginia Inland Port and improve ground access to other airport facilities .

Access to Dulles Airport from points west of the airport has been identified through the Regional Planning Forum as being a deficiency of the Northern Virginia Connector. However, this should be somewhat alleviated as Route 28, which connects I-66 with the airport becomes a limited-access freeway between I-66 and Dulles Airport. The Transaction 2030 plan included a new Light Rail Transit (LRT) line from Manassas to Dulles Airport. Other forms of alternative access should be considered from points west, including better transit and shuttle bus connections.

The 18-mile Dulles Loop, encompassing Route 28, U.S. 50, and Route 606 around the airport is proposed to be a limited access network of roadways that would offer improved access to Dulles Airport and the surrounding areas. The Dulles Loop Implementation Group, which is comprised of local stakeholders, suggests that U.S. 50 in this area be a limited-access roadway with all crossovers as grade-separated interchanges. This includes a planned interchange at Route 606 and the aforementioned interchange construction projects along Route 28 that will convert it to a limited access freeway near Dulles Airport. This would improve local traffic flow as well as airport access.

In addition, ground access to the various airport facilities, including Manassas Regional Airport, a reliever facility, should be improved to ensure maximum usage of these airports. Ground access to airports has been identified as an overall weakness across the Commonwealth of Virginia.

Strategy: Improve capacity of parallel roadway facilities to relieve pressure on I-66.

Capacity improvements to U.S. 29, U.S. 50, and Route 55 are planned or desired, according to Comprehensive Plans for the relevant counties and jurisdictions. More capacity on these corridors would divert local traffic and some commuter traffic to these routes and would relieve congestion along I-66 for through traffic and freight traffic. Warren County has a need for an additional connection and interchange between I-66 and Route 55, which would divert some of the local traffic within this county. The Regional Planning Forum also identified Route 55 as an important parallel roadway to I-66 that needs to add capacity. This would assist commuters from western Virginia counties and West Virginia commuting to Northern Virginia and the Washington, D.C. metropolitan area.

In addition, improvements are currently underway at the U.S. 29/I-66 interchange in Gainesville, and further improvements to U.S. 29 through Gainesville are planned for the future. Traffic along U.S. 29, which provides local access through Arlington and Fairfax Counties, should be managed to ensure the smoothest flow possible through signal re-timings and coordination, intersection improvements and construction of interchanges. Widening U.S. 29 should also be considered to improve capacity.

U.S. 50 offers a parallel facility to the north not only through Arlington and Fairfax Counties but to connect with I-81 to the north of I-66. There are currently plans to expand capacity along Route 50 near Dulles Airport as well as construct interchanges along the roadway in Loudoun County, including at Route 606. These improvements should go forward, and other improvements to U.S. 50 should be investigated as with U.S. 29 and Route 55.

Apart from adding vehicular capacity on parallel routes, studies should be undertaken to evaluate implementation of transit priority treatments to increase the person-carrying capacity of the parallel routes.

Strategy: Improve Intelligent Transportation Systems, as appropriate, including along parallel roadways.

Intelligent Transportation Systems (ITS) currently exist along segments of I-66, assisting with traveler information, incident management, and traffic management along the highway facilities. However, these systems, such as vehicle detection, CCTV, dynamic message signs, and integrated corridor management, can be improved for incident management, traffic flow, and for evacuation purposes. In addition, ITS should be utilized along parallel routes in the corridor, especially along U.S. 29 between Arlington and Gainesville to help reduce congestion and provide better information to commuters about traffic flow and travel times. These strategies could include signal optimization and transit signal priority along U.S. 29 and U.S. 50.

ITS strategies are planned to convert the shoulder lanes through Fairfax County that currently are open at fixed times to become more flexible to help alleviate congestion during non-peak times. In addition, variable speed limits may be another option along the Northern Virginia Connector, especially through Fairfax County.

Strategy: Improve freight movement via increased rail capacity and intermodal facilitation.

The Regional Planning Forum identified freight movement along the Northern Virginia Connector into Washington, D.C. as being deficient. Trucks cannot travel on I-66 inside I-495, the Capital Beltway, which requires them to divert either to the north or south on the Beltway, or to parallel roadways to enter the core area. Freight rail capacity should be increased on the Norfolk Southern rail lines. The Virginia Statewide Rail Plan has identified these rail lines as being in need of improvement, and they are part of the Crescent Corridor Initiative, which will increase rail capacity, including inside the Beltway. Rail along the Northern Virginia Connector connects to the Crescent Corridor through two main north-south lines, which run along the U.S. 29 and I-81 corridors and connects to the Virginia Inland Port and to Washington, D.C. Improvements to these rail lines to increase capacity will greatly improve freight movement between these important north-south freight corridors, as well as between the Inland Port and Washington, D.C. and points north.

In addition, freight movement from Washington, D.C. and points west to the midwest has been identified as a deficiency by the Virginia Port Authority. While both CSX and Norfolk Southern rail lines provide freight rail access to the midwest

from the Port of Virginia, access from Washington, D.C. and the Virginia Inland Port in Front Royal is limited, as the east-west-running rail lines are much further south from the Northern Virginia Connector.

3.2 Strategies vs. VTrans2035 Goals

The above strategies relate to the seven goals of VTrans2035, and Figure 17 illustrates this relationship. A discussion of each of the goals is below.

- **Goal 1: Safety and Security—Provide a safe and secure transportation system.** Most of the strategies for I-66 relate to the safety and security of the roadway. In addition, many of the strategies promote transit use, transportation demand management, and carpooling, which all increase the capacity of the corridor. Increasing rail capacity will lessen the truck load along the Northern Virginia Connector, which will improve safety, as will improved Intelligent Transportation Systems.
- **Goal 2: System Maintenance and Preservation—Preserve and maintain the condition of the existing transportation system.** All of the strategies help to achieve this goal, as the existing transportation system is maintained and preserved, and in many cases, improved. As capacity is increased along the rail lines or along the highway facilities or transit systems, the existing facilities are maintained and preserved. Better access to Dulles Airport and from the Inland Port to the west will improve the current transportation infrastructure.
- **Goal 3: Mobility, Connectivity, and Accessibility—Facilitate the easy movement of people and goods, improve interconnectivity of regions and activity centers, and provide access to different modes of transportation.** All of the strategies promote increased mobility, connectivity, and accessibility. Any increase in capacity along the roadway, whether it is along the highway facilities, the rail facilities, or an increase in transit capacity assists in achieving this goal. The main issues along I-66 deal with capacity and a lack of mobility, so most of the strategies have been developed to assist in alleviating these capacity issues, whether by increases in capacity for the various transit options, an extension of the various transit options, transportation demand management, or construction and expansion of highway facilities. All of these lead to better mobility, connectivity, and accessibility along the Northern Virginia Connector.
- **Goal 4: Environmental Stewardship—Protect the environment and improve the quality of life for Virginians.** Many of the strategies promote greater transit use and less reliance on single-occupancy vehicles. All of these strategies promote better environmental stewardship, as they remove vehicles from the roadway. In addition, any increase in capacity should help to minimize the amount of time vehicles are on the roadway, which leads to fewer emissions. Movement of freight and passengers to rail facilities along the Northern Virginia Connector helps to achieve this goal.

- **Goal 5: Economic Vitality—Provide a transportation system that supports economic prosperity.** Dulles Airport is one of the two major economic drivers in Virginia, so better access to and from the airport would be beneficial to the economy in Virginia. The Port of Virginia, which includes the Virginia Inland Port, is the other economic driver. Better access to and from the Inland Port is Important to the local economy. Also, the Northern Virginia area is the most highly developed area and an economic engine for the state. Improvements to one of the major corridors through this region should assist in increased economic vitality in this important region. In addition, an increase in freight rail capacity as well as passenger capacity would promote economic vitality.
- **Goal 6: Coordination of Transportation and Land Use—Facilitate the effective coordination of transportation and land use to promote livable communities.** Any construction along the Northern Virginia Connector should be accomplished in coordination with land use decisions. New development along the Northern Virginia Connector should be centered around major transit facilities, such as Metrorail stations and VRE stations (both new and existing), and TDM measures should be expected for new development within the corridor. Increases in capacity along the parallel roadways to I-66 should be accomplished only with direct coordination regarding land use decisions in those areas. In addition, local planning efforts should protect airspace and ensure that airports are not compromised by encroachment of incompatible land uses.

Figure 17 - Northern Virginia Connector Strategies vs. Goals Matrix

	Goals					
Strategies	**Safety and Security**	**System Maintenance and Preservation**	**Mobility, Connectivity, and Accessibility**	**Environmental Stewardship**	**Economic Vitality**	**Coordination of Transportation and Land Use**
Expand highway and HOV Capacity.	○	●	●	○	○	○
Extend Metrorail service.	○	●	●	●	○	○
Increase transit options and transit capacity.	○	●	●	●	○	●
Encourage increased Transportation Demand Management (TDM) throughout the Northern Virginia Connector.	○	●	●	●	⊙	●
Improve express bus service to Washington, D.C. and Dulles Airport, and extend Virginia Railway Express (VRE) lines.	○	●	●	●	○	○
Improve ground access to Dulles International Airport from the west and from the Virginia Inland Port and improve ground access to other airport facilities.	⊙	●	●	⊙	●	
Improve capacity of parallel roadway facilities to relieve pressure on I-66.	○	●	●	○	○	○
Improve Intelligent Transportation Systems (ITS), as appropriate, including along parallel roadways.	●	●	●	○		
Improve freight movement via increased rail capacity and intermodal facilitation.	○	●	●	●	●	

● Strong Correlation ○ Medium Correlation ⊙ Some Correlation