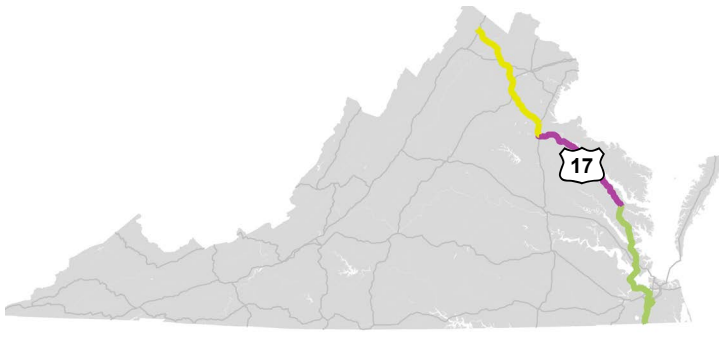
VTrans2040 Multimodal Transportation Plan

Corridors of Statewide Significance Needs Assessment

Coastal Corridor (A)



Office of INTERMODAL Planning and Investment

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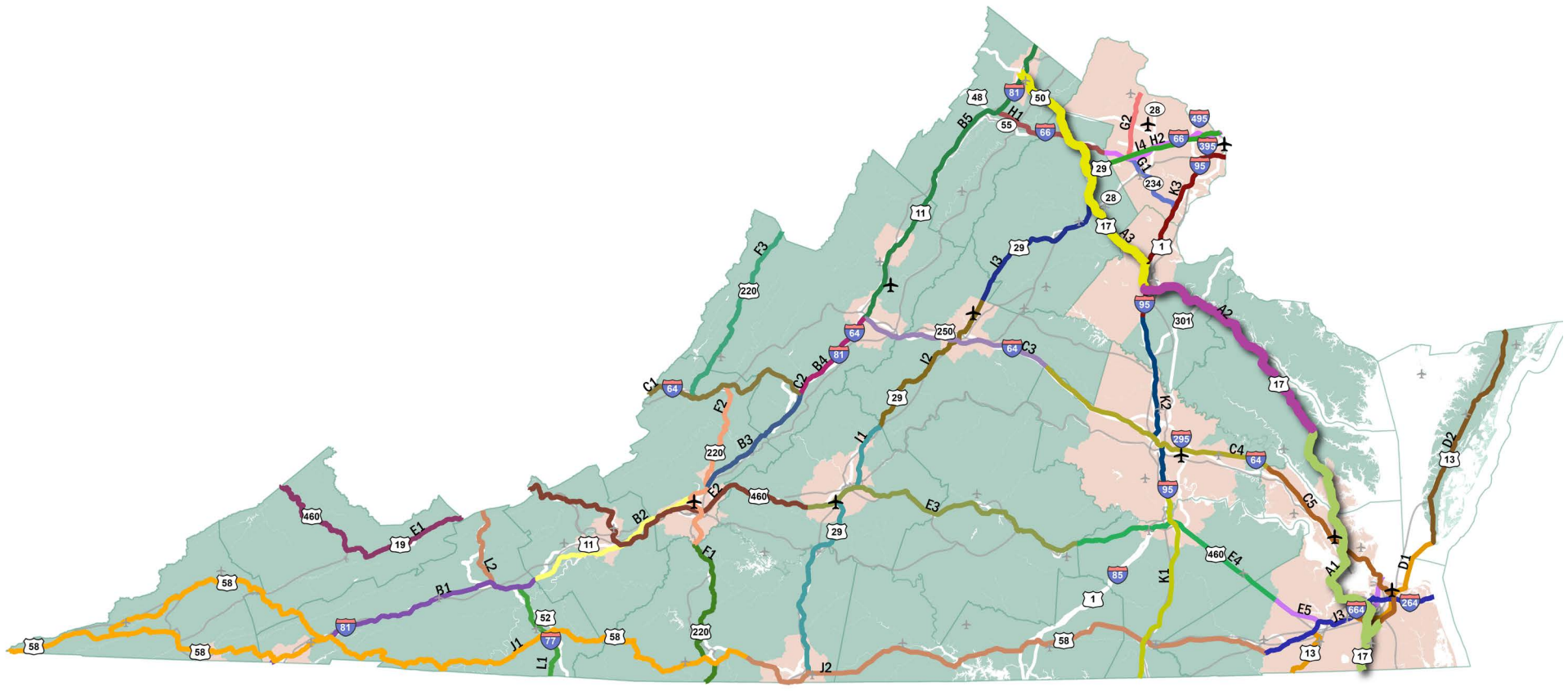
See *Corridors of Statewide Significance, Needs Assessment: Executive Summary and Methodology Report* for details on the overall assessment approach, data sources, and performance measures used throughout this report.

I. Corridor Overview



Corridor of Statewide Significance
(color varies by segment)

Railroad

Airport Facility
(grey denotes not a commercial service airport)

Metropolitan Planning Organization Area

The Coastal Corridor (Corridor A) is primarily defined by US 17, which runs from north to south in the eastern United States for nearly 1,200 miles. US 17 is known as the "Coastal Highway" because it is located near the Atlantic coast for much of its length. In the Commonwealth of Virginia, US 17 does not parallel the coast the way it does in other states, although it runs close to the coast in its southern sections, especially in the Hampton Roads area. In addition to serving local communities, the Coastal Corridor serves an alternative to using I-95 and I-64 between Fredericksburg and the Hampton Roads area.

Passengers in the Coastal Corridor have several travel options in addition to driving, including the following:

- Multiple Park-and-Ride lots, available along the Coastal Corridor between Winchester and the Hampton Roads Area, providing commuting options to Washington, DC, Fredericksburg, and the Hampton Roads region;
- Four Greyhound bus stations in the Hampton Roads area, as well as a station in Fredericksburg, near the Coastal Corridor;
- The Fredericksburg Virginia Railway Express line, available in Fredericksburg;
- Amtrak stations in Fredericksburg, Norfolk, Newport News, and Williamsburg, providing access to various Amtrak routes throughout the state and the eastern United States; and
- Twelve airports, including two providing commercial service, within the Coastal Corridor. Although it is not located directly along US 17, the Newport News-Williamsburg Airport can be easily accessed via I-64, and US 17 provides indirect access to Norfolk International Airport. Two reliever facilities are also accessible in the Hampton Roads Area, including Chesapeake Regional Airport, which is located directly along US 17 just north of the state line. US 17 also provides access to two other reliever facilities and multiple general aviation facilities.

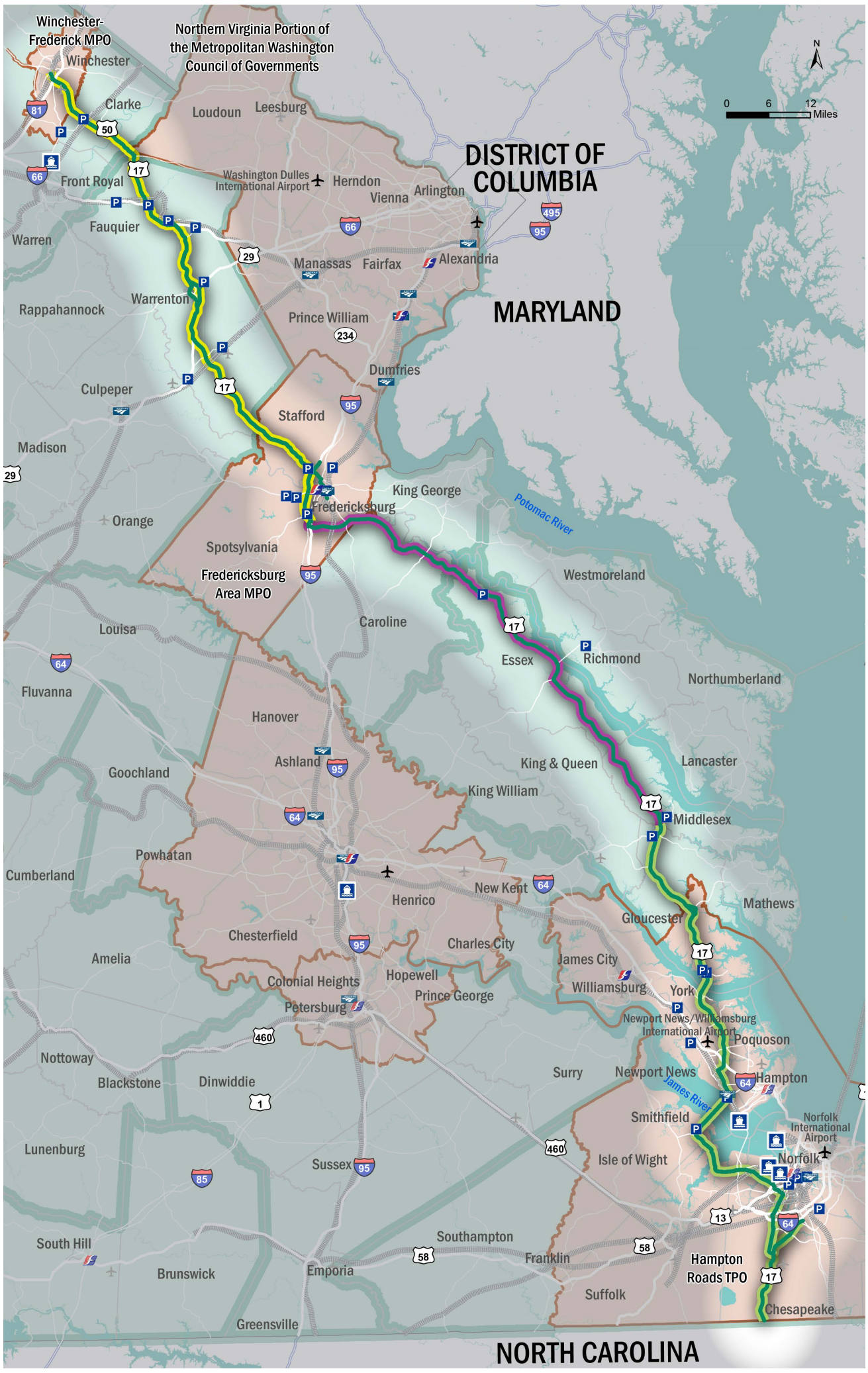
US 17 does not directly access the Port of Virginia's facilities located in the Hampton Roads Area, but it provides indirect access to those ports from southern Virginia through the Hampton Roads Area. In addition, US 17 provides access to the Rappahannock River navigational channels, located between the Northern Neck and Middle Peninsula. No rail line runs directly along the Coastal Corridor, although access to numerous Norfolk Southern and CSX lines is available at certain locations.

Corridors of Statewide Significance

A	Coastal Corridor (US 17)
B	Crescent Corridor (I-81)
C	East-West Corridor (I-64)
D	Eastern Shore Corridor (US 13)
E	Heartland Corridor (US 460)
F	North Carolina to West Virginia Corridor (US 220)
G	North-South Corridor (Route 234)
H	Northern Virginia Corridor (I-66)
I	Seminole Corridor (US 29)
J	Southside Corridor (US 58)
K	Washington to North Carolina Corridor (I-95)
L	Western Mountain Corridor (I-77)

Corridor Components

Highway Facilities	
Primary Facility	• US 17
Other Highway Facilities	• US 17 Business
Transit Services	
	• Amtrak • Intercity bus service
Rail Facilities	
	• CSX National Gateway Corridor • CSX Coal Corridor • Norfolk Southern Heartland Corridor • Norfolk Southern Coal Corridor
Port Facilities	
	• Newport News Marine Terminal • Norfolk International Terminal • Portsmouth Marine Terminal • Virginia International Gateway
Airport Facilities	
	• Norfolk International Airport • Newport News/ Williamsburg International Airport

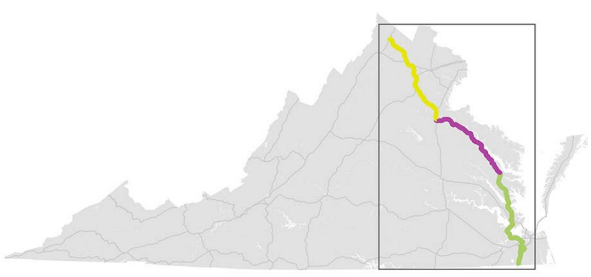


Corridor Segments:

- A1
- A2
- A3

- Corridor Component Road
- Railroad
- Airport Facility
- Amtrak Facility
- Greyhound Facility
- VRE Facility
- Metrorail Facility
- Port Facility
- Park & Ride Facility

- MPO Area
- Planning District Area



Demographics and Economic Trends

Along Corridor A, the primary population centers with greater than 500 persons per square mile are currently found in Norfolk, Hampton, Newport News, Fredericksburg, and Winchester. Essex County has the lowest population density along the corridor, with less than 50 persons per square mile. The most densely populated segment along the corridor is Segment A1 in the Hampton Roads Area.

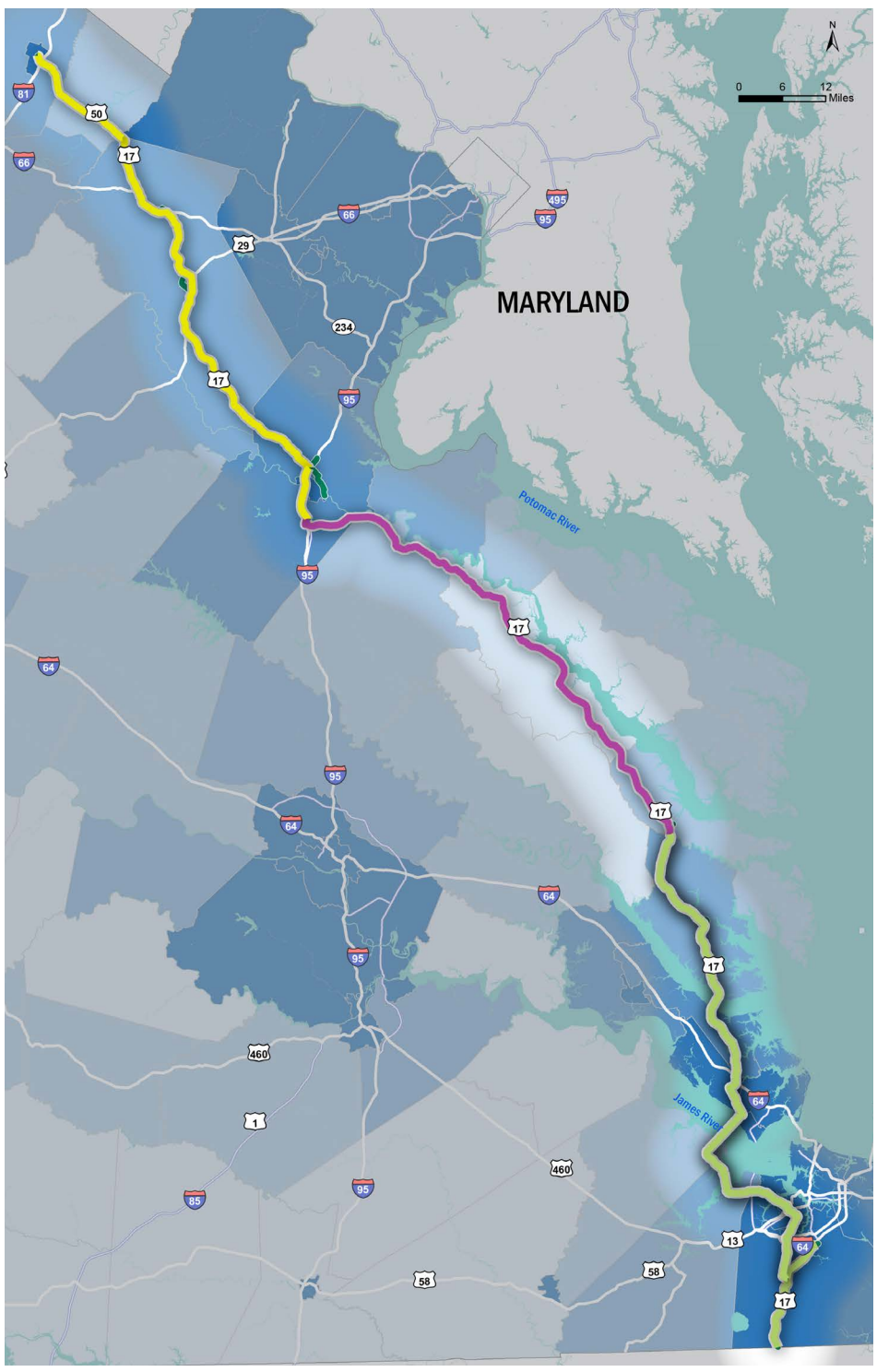
Between 2012 and 2025, the City of Suffolk, Spotsylvania County, and Frederick County are anticipated to see the largest population growth - greater than 25 percent - among the jurisdictions along the corridor. The Cities of Chesapeake and Poquoson and Gloucester, Middlesex, Caroline, King George, and Fauquier Counties are also anticipated to have significant population increases, with growth between 11 and 25 percent. The already densely-populated Cities of Norfolk and Newport News are expected to see the lowest growth, while the population of Hampton is expected to decline. However, overall population along the corridor is expected to grow significantly.

Current employment centers follow a similar pattern to those exhibited by the population centers. Employment growth also tracks a similar pattern along the corridor; however, Newport News is the only city within Corridor A where the employment levels are anticipated to decline.

Corridor A passes through three MPO areas and is also adjacent to the Northern Virginia region. Some of the largest industry sectors in the MPO Areas along this corridor include professional/ scientific/ technical Services, public administration, and retail trade.

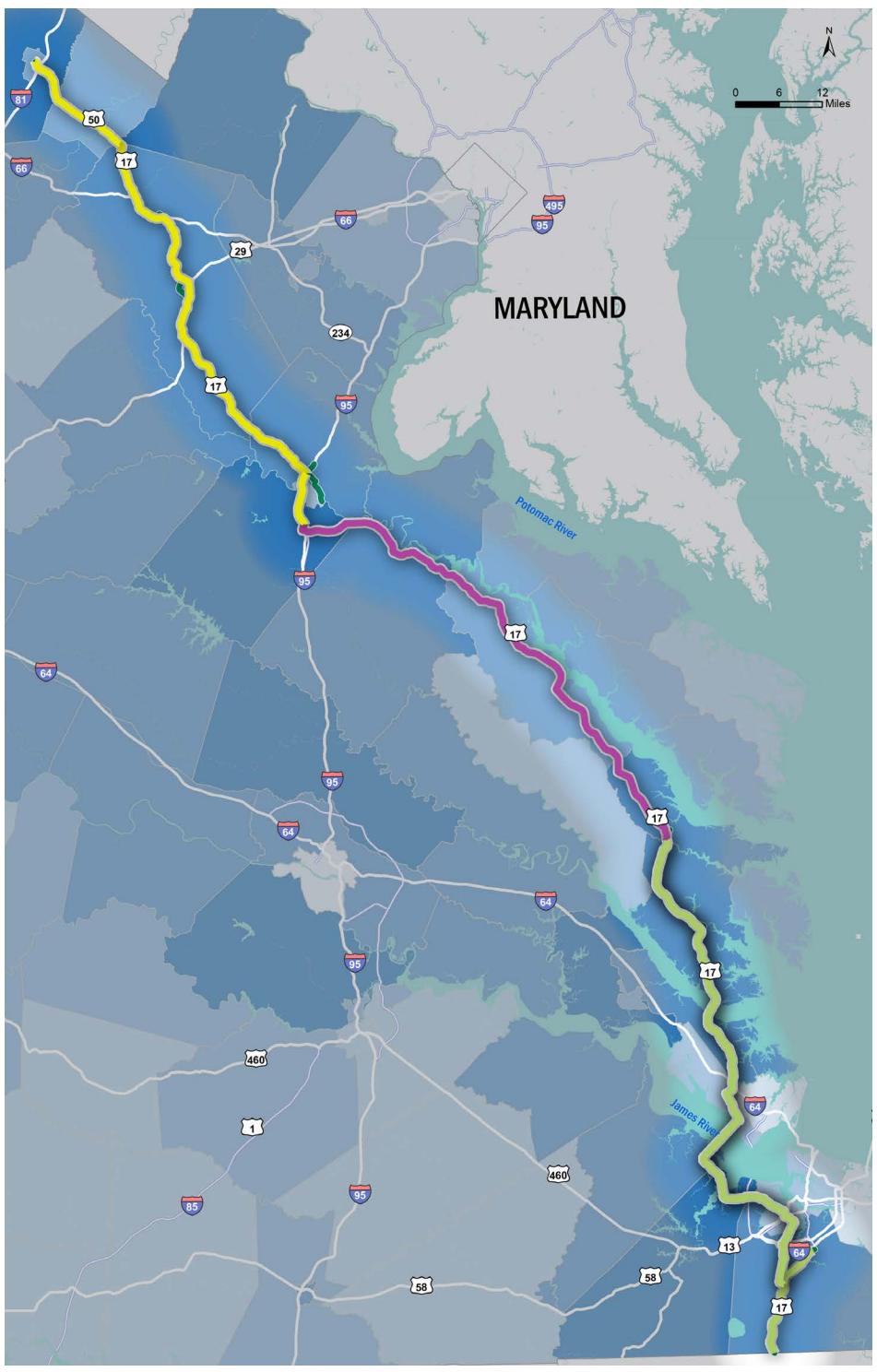
2012 Population Density Persons / Square Mile

- 0 - 50
- 50 - 100
- 100 - 250
- 250 - 500
- 500 +



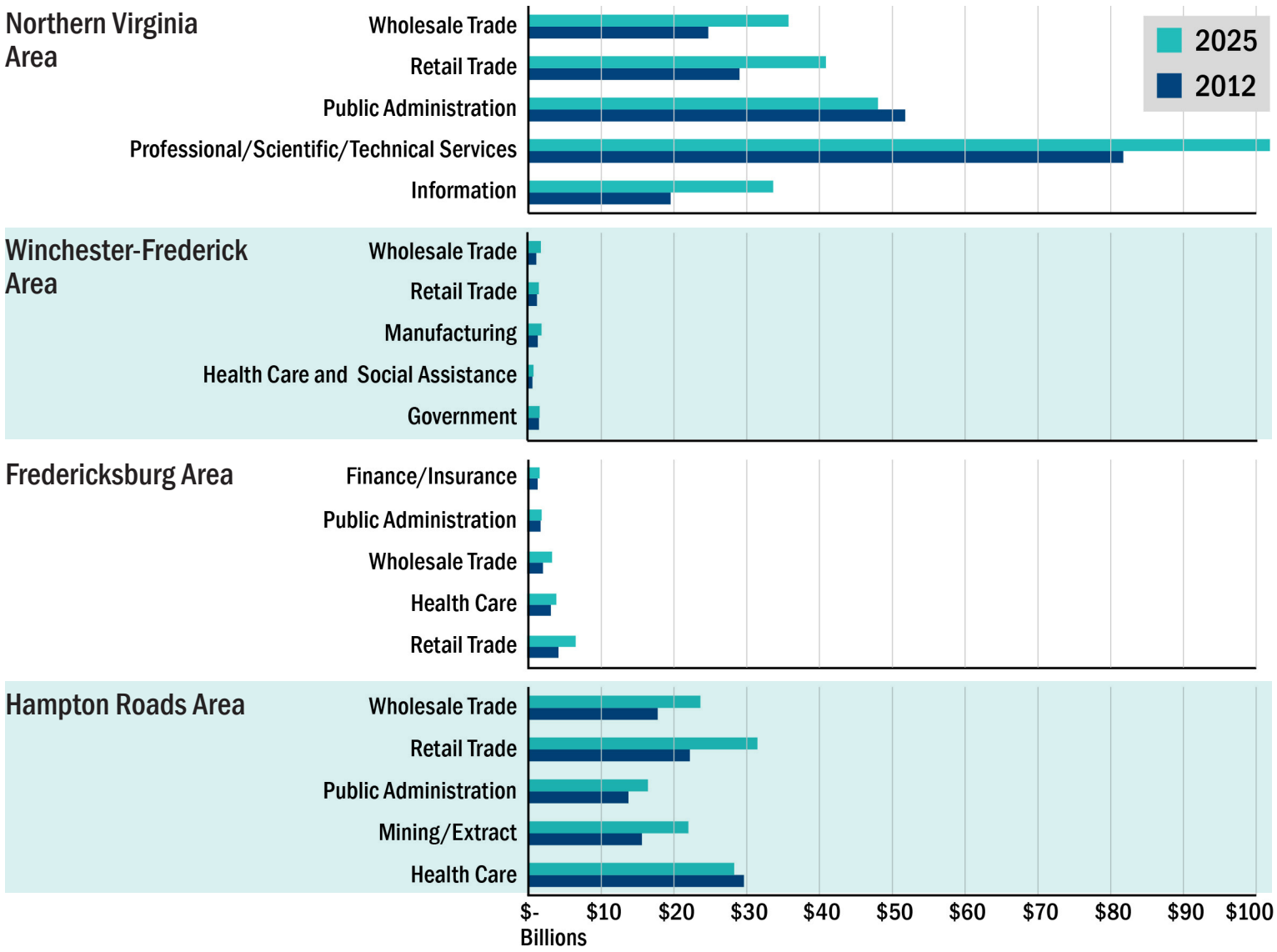
Population Growth (2012-2025 Percent Change)

- -8% - 0%
- 1% - 5%
- 6% - 10%
- 11% - 25%
- 26% - 57%



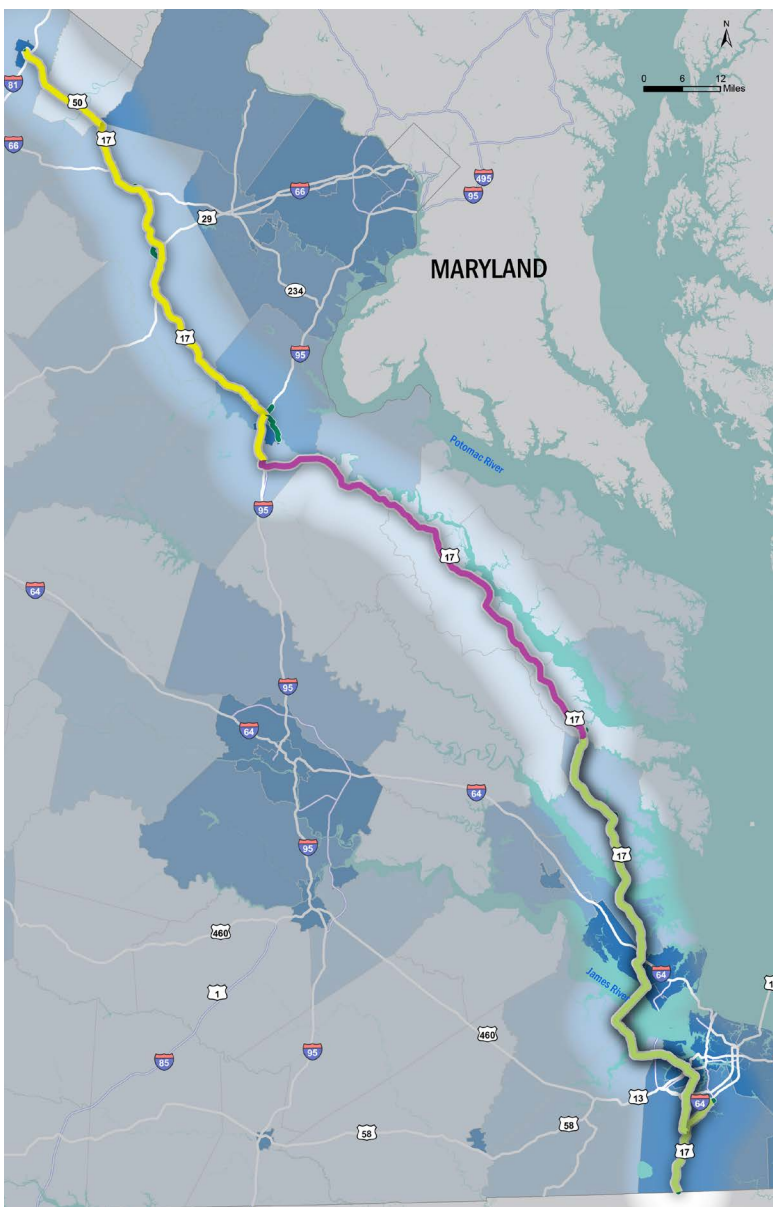
CORRIDOR A OVERVIEW

Top Industries (GDP)



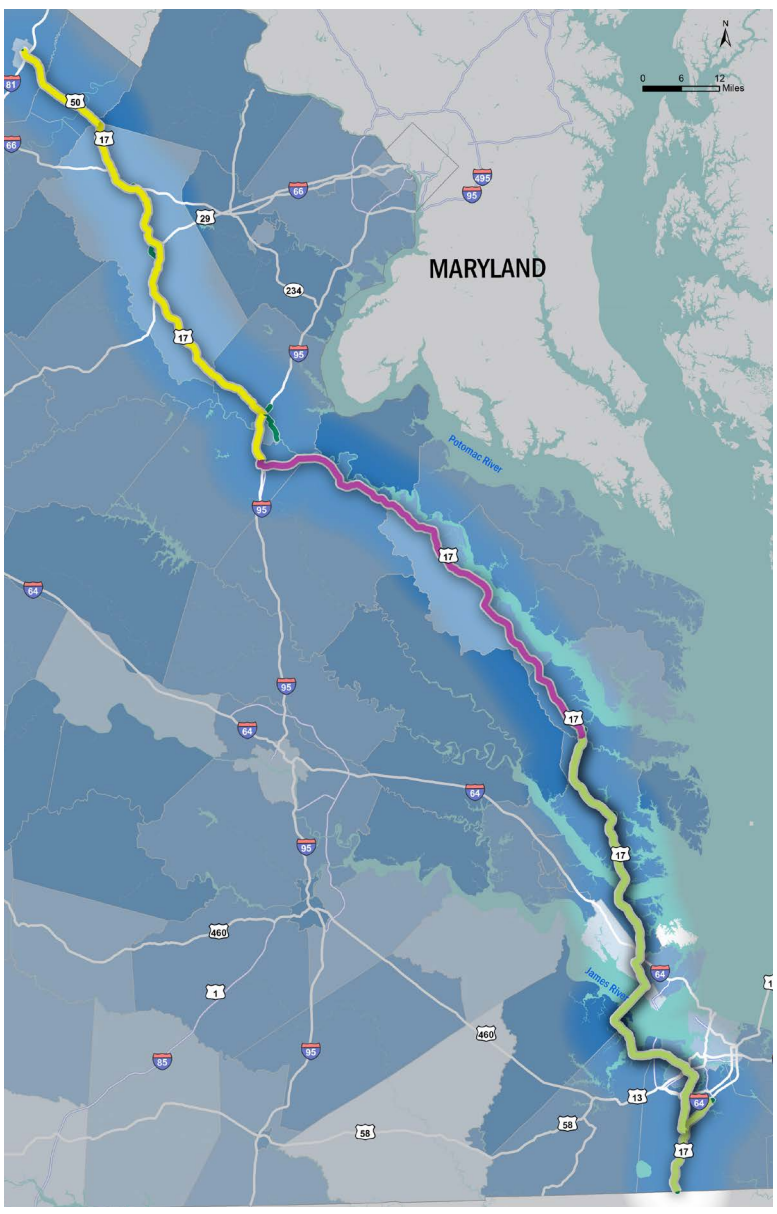
2012 Employment Density Jobs / Square Mile

< 25
25 - 100
100 - 250
250 - 500
> 500

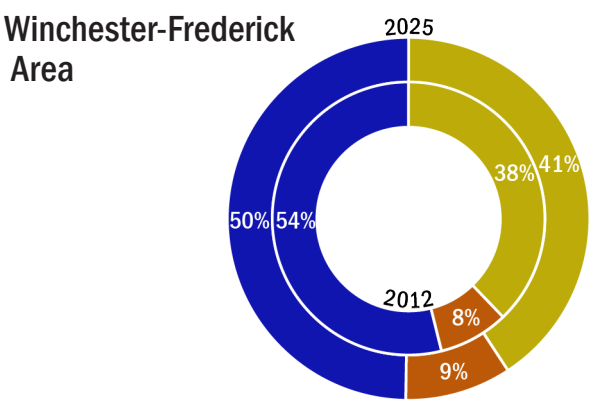


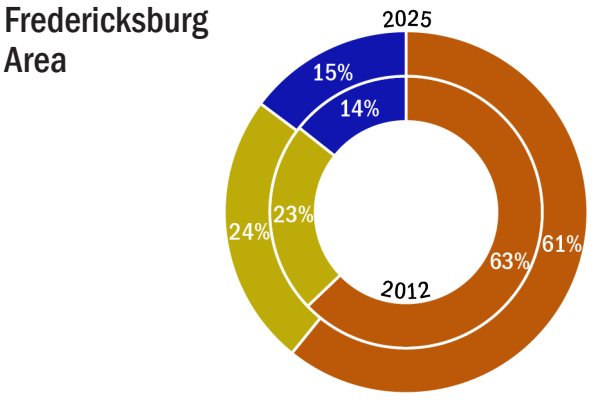
Employment Growth (2012-2025 Percent Change)

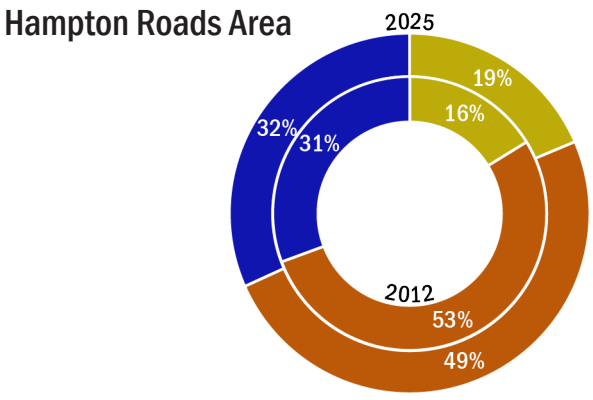
-7% - 0%
1% - 5%
6% - 10%
11% - 25%
26% - 69%



Corridor Travel Patterns







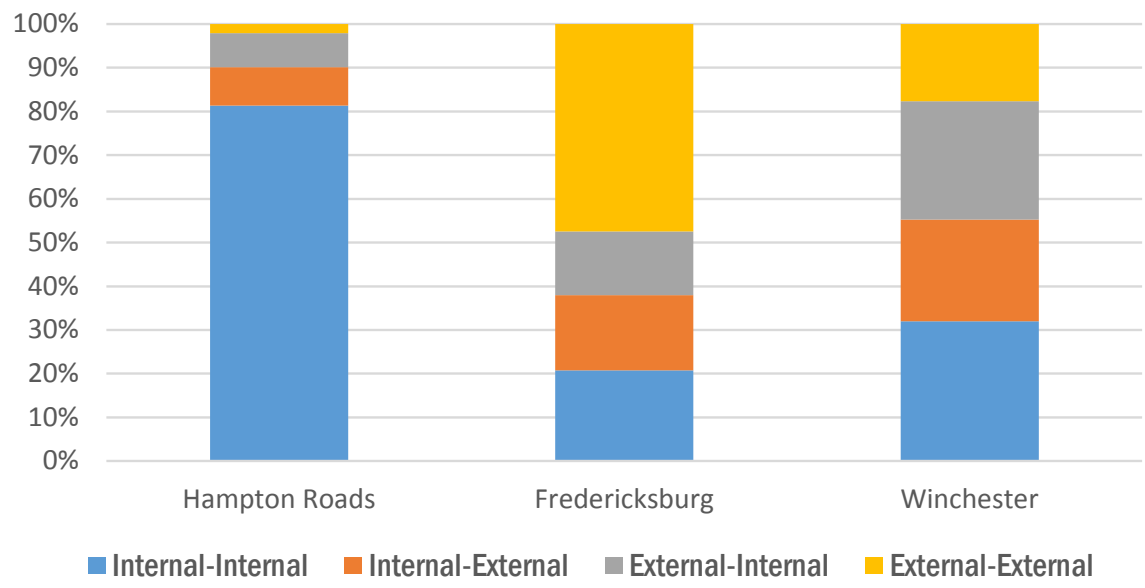
GDP by Sector, 2012 and 2025

- Freight Dependent
- Local Serving
- Knowledge-based

Passenger

Corridor A passes through three MPO areas - Hampton Roads, Fredericksburg, and Winchester-Frederick - and provides a connection to North Carolina. In the Hampton Roads Area, traffic on the corridor is predominantly local and internal traffic comprises more than 80 percent of the vehicle traffic on Corridor A. By contrast, in the Fredericksburg Area, much more of the traffic (47 percent) is pass-through traffic which has neither its origin nor destination in the MPO Area. Only 20 percent of the traffic along the corridor in this Area is internal traffic. In the Winchester-Frederick Area, traffic is much more evenly distributed between internal and external traffic; through-traffic accounts for 18 percent of the passenger traffic and local internal traffic accounts for 32 percent.

Distribution of Internal and External Travel



Freight

By truck, Corridor A carried 119 million tons of freight worth $181 billion in 2012, and is estimated to carry 163 million tons of freight worth $265 billion in 2025. The major truck freight flows in Corridor A are interstate through traffic, accounting for approximately 60 percent of truck freight tonnage and over 75 of truck freight value in the corridor in 2012 and 2025. The major travel patterns on Corridor A are similar to those on Corridor K, as US 17 (Segment A3) runs concurrently with I-95 (Segment K3) near Fredericksburg. Interstate truck freight traffic passing though Virginia accounts for over 40 percent of the total tonnage and 60 percent of the total freight value for both 2012 and 2025. Most of the major truck freight travel patterns on Corridor A are between the Middle Atlantic and Southeastern regions.

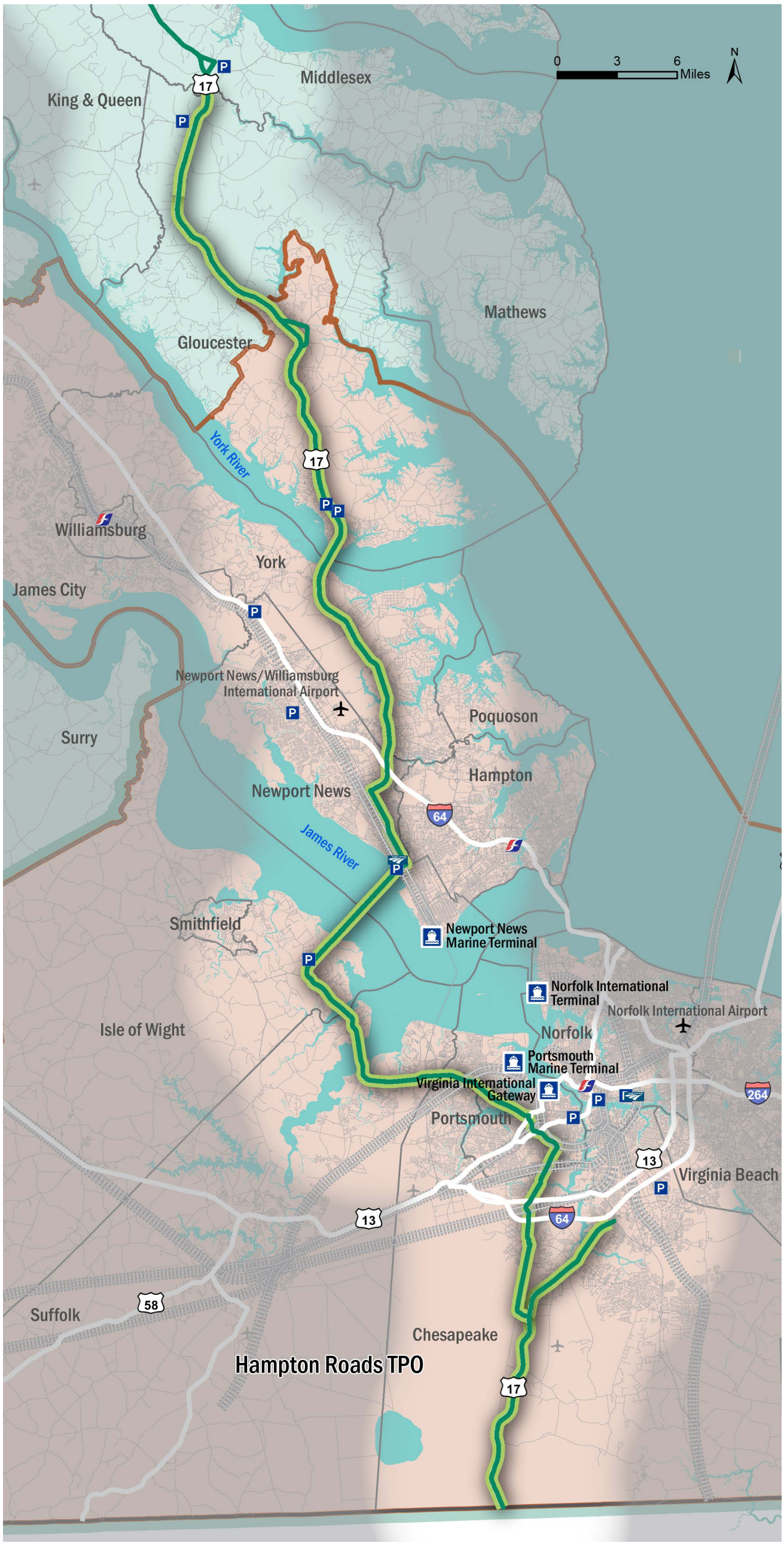
Truck Freight

	2012	2025
Truck Freight Value	$181 Billion	$265 Billion
Truck Freight Tonnage	119 Million Tons	163 Million Tons
Freight Value per Ton	$1517	$1626
Corridor Tonnage Passing Through	43%	42%

II. Segment A1

Corridor Segment A1 Components

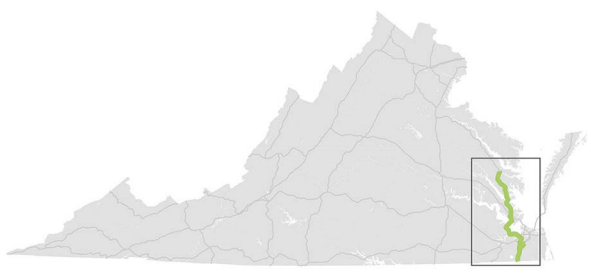
- US 17 and US 17 Business
- Newport News Marine Terminal
- Norfolk International Terminal
- Portsmouth Marine Terminal
- Virginia International Gateway
- Norfolk Southern Heartland Corridor
- Norfolk Southern Coal Corridor
- CSX National Gateway Corridor
- CSX Coal Corridor
- Amtrak
- Norfolk International Airport
- Newport News/Williamsburg International Airport
- Intercity Bus



Segment A1

Corridor Component Road
Railroad
Airport Facility
Amtrak Facility
Greyhound Facility
VRE Facility
Metrorail Facility
Port Facility
Park & Ride Facility

MPO Area
Planning District Area



A1 SEGMENT PROFILE

Segment A1 begins at the North Carolina border and progresses north to the Middlesex County Line, traversing the area of the Hampton Roads Transportation Planning Organization (TPO). This segment serves Isle of Wight, York, and Gloucester Counties, as well as the Cities of Suffolk, Chesapeake, Portsmouth, Newport News, and Norfolk.

Segment A1 functions as an alternative connection to Washington DC from the Port of Virginia facilities in the Hampton Roads region and, due to its general lack of rail facilities, is an important highway facility for freight. Segment A1 also provides tourists with access between the Middle Peninsula and destinations in Hampton Roads.

Highway Facilities: US 17 is primarily a four-lane facility throughout Segment A1, although it has a six-lane cross-section where it runs concurrently with Route 143 in the City of Newport News. Along the more urbanized areas of US 17, there is significant out-of-state freight and passenger travel. However, in the more rural areas, US 17 serves both through and local commuting traffic. No parallel highway facilities follow US 17, though US 17 does serve as an alternative route to I-95 and I-64 for traffic between Hampton Roads and Northern Virginia. Many alternatives are available through the Hampton Roads region.

Transit Service: In this area, the corridor is served by the Hampton Roads Transit (HRT) system, as well as several Park-and-Ride facilities. In addition, Greyhound and Amtrak each provide service that operates along the corridor with stations in Newport News, Hampton, and Norfolk. Other private intercity bus services also operate in the segment.

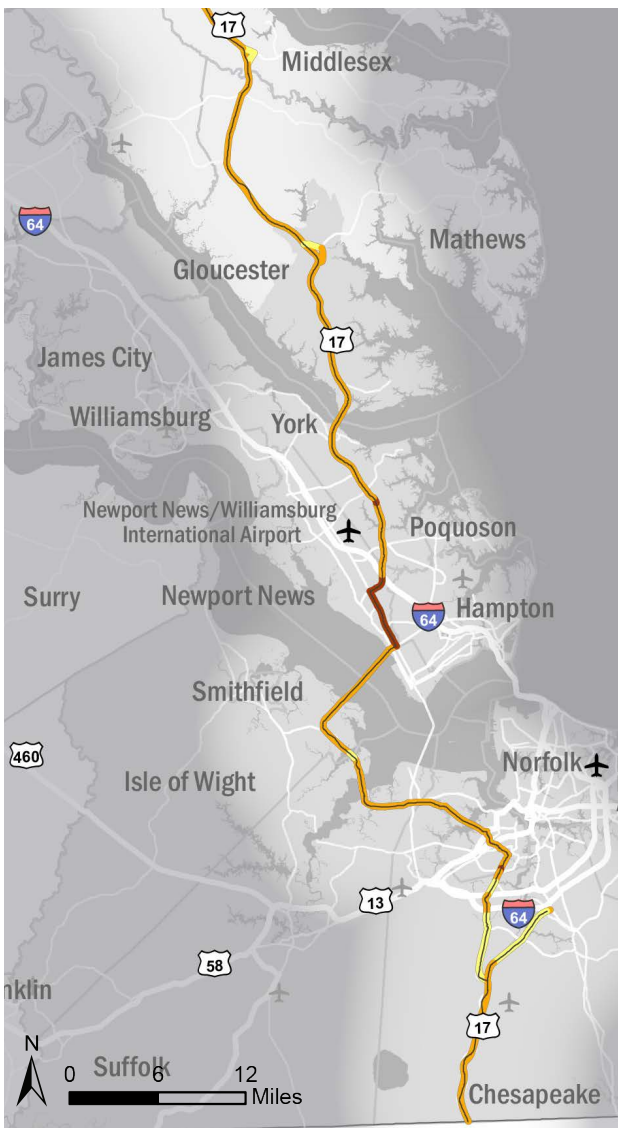
Port Facilities: The Newport News Marine Terminal, Norfolk International Terminal, Portsmouth Marine Terminal, and Virginia International Gateway port facilities lie within this segment.

Rail Facilities: There are no rail lines that run directly along this corridor segment, although access to Norfolk Southern and CSX lines is available at certain locations.

Airport Facilities: The Newport News-Williamsburg International Airport and the Chesapeake Regional Airport lie within this segment. Additionally, the Norfolk International Airport is within close proximity to the corridor.

Major planned and future projects include:

- Rehabilitation and replacement of electrical and mechanical systems of the James River Bridge
- Addition of two through lanes in York County
- Addition of left turn lanes at Route 619 in Gloucester County
- Implementation of the Route 17 Corridor Crossover Study
- Rehabilitation of pavement in Isle of Wight County
- Addition of a south-bound left turn lane and pedestrian infrastructure at Deep Creek Boulevard in Portsmouth
- Upgrade of traffic signals in Gloucester County
- Installation of a raised median in Gloucester County



Number of Lanes (both directions)

- 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 12
- Primary facility

Future Projects

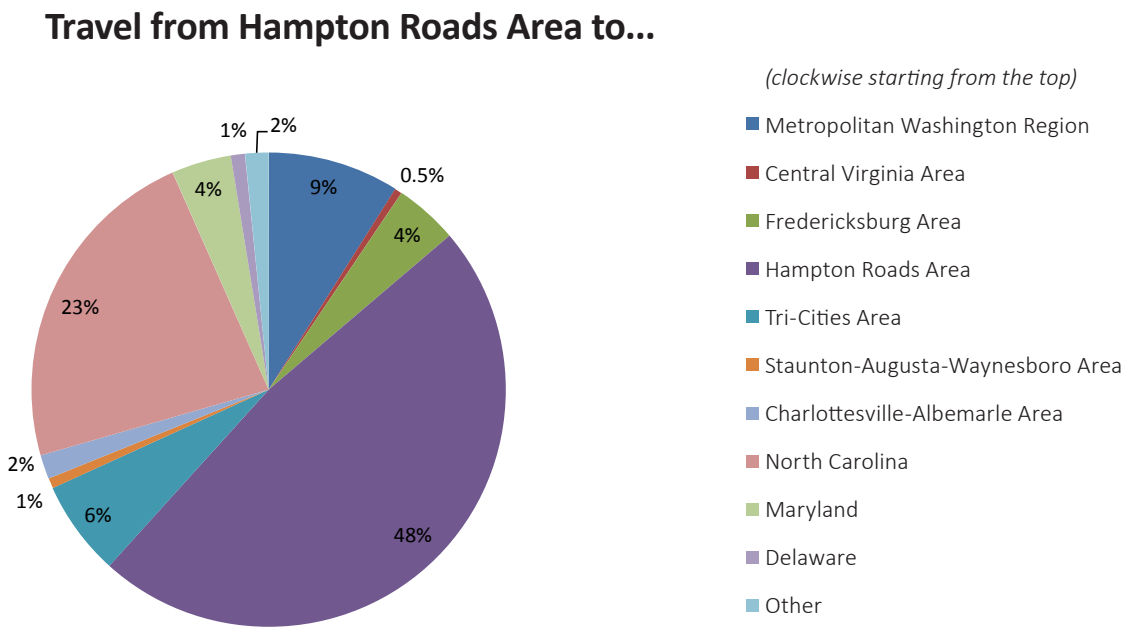
- Reconstruction with added capacity
- Safety improvements
- Primary facility

Travel Demand

Passenger Demand

The southernmost segment of Corridor A is entirely within the Hampton Roads TPO area and accommodates large amounts of traffic local to the region in addition to providing a route to North Carolina. Travel between the Hampton Roads region and North Carolina accounts for more than four percent of the intercity passenger traffic in the Commonwealth, and a portion of this traffic will use Segment A1, although other options are available depending on the specific locations of the origins and destinations.

Of the intercity passenger travel originating in the Hampton Roads Area, almost one-quarter (23 percent) is destined for North Carolina. Other notable markets that are likely to use Segment A1 include travel to the Metropolitan Washington region (nine percent) and the Fredericksburg area (four percent).



A1 SEGMENT PROFILE

Freight Demand

By truck, Segment A1 carried three million tons of freight worth $8 billion in 2012, and is estimated to carry four million tons of freight worth $12 billion in 2025. The major travel patterns on Corridor A are similar to those on Corridor K, as US 17 (Segment A3) runs concurrent with I-95 (Segment K3) near Fredericksburg. Interstate truck freight traffic passing though Virginia accounts for over 40 percent of the total tonnage and 60 percent of the total freight value for both 2012 and 2025. In terms of tonnage, North Carolina is the largest source of truck freight on Corridor A and Maryland is the largest destination outside of the Commonwealth. In terms of value, Florida is the largest destination for truck freight on Corridor A. Most of the major truck freight travel patterns on Corridor A are between the Middle Atlantic and Southeastern regions. Around 11 percent of the total truck freight value in Corridor A originates in the jurisdictions adjacent to Segment A1, with nearly eight percent of the total truck freight destined for those jurisdictions. The port facilities at Norfolk, Portsmouth, and Newport News, located near Segment A1, all serve as major origins and destinations for truck freight in Corridor A. Much of the freight traveling to and from these areas originates from or is destined for Maryland and Pennsylvania.

Truck Freight

Major Origins (by Tonnage)
1. Virginia (34% / 35%)
2. North Carolina (15% / 14%)
3. Pennsylvania (10% / 10%)
4. Maryland (8% / 8%)
5. Florida (6% / 5%)

Corridor Tonnage Originating in Segment A1: 7% / 8%

Major Origin-Destination Pairs for Freight
North Carolina and Maryland
North Carolina and Pennsylvania
North Carolina and New York
City of Norfolk* and North Carolina
City of Chesapeake and North Carolina

Percentages represent 2012 / 2025 values.
*Includes freight passing through the Port of Virginia.

Major Destinations (by Tonnage)
1. Virginia (34% / 36%)
2. Maryland (13% / 13%)
3. North Carolina (9% / 9%)
4. Pennsylvania (9% / 8%)
5. New York (8% / 7%)

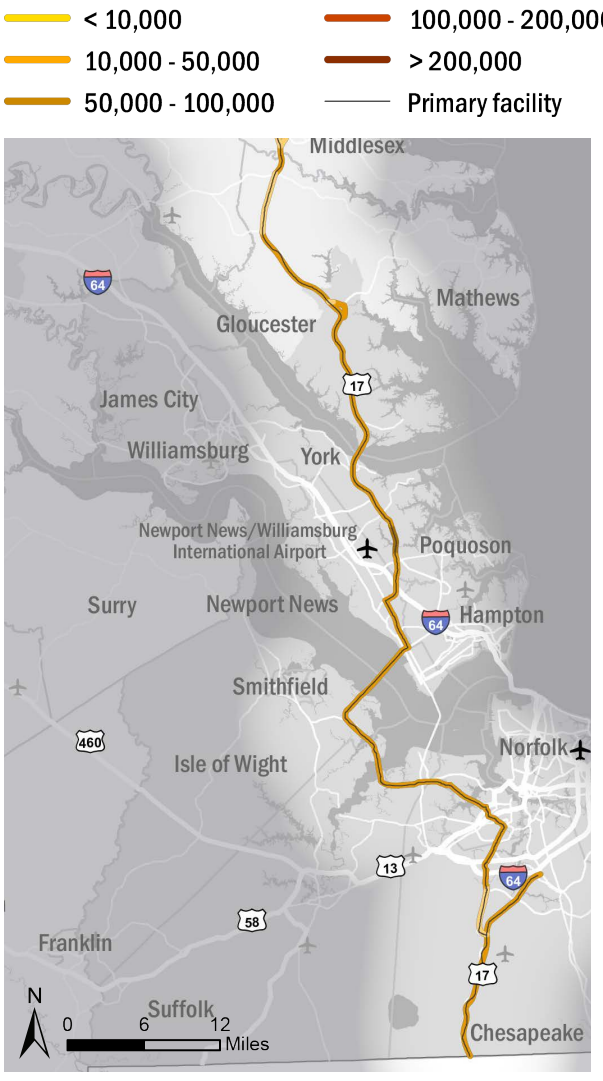
Corridor Tonnage Destined for Segment A1: 9% / 10%

Traffic Conditions

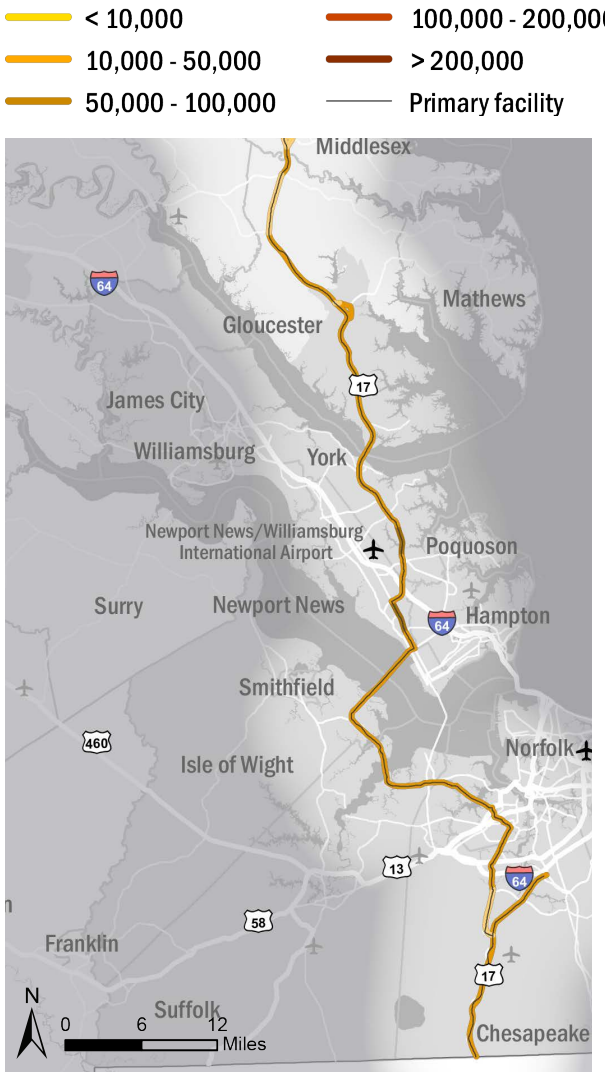
Traffic Volume and AADT

Traffic volume on Segment A1 is high relative to traffic volumes on the other segments in Corridor A. Along US 17 from southern Chesapeake to Newport News, traffic volumes range from 12,000 to 34,000 vehicles per day, with the highest traffic volumes occurring near the junction with I-664. The highest traffic volumes in the corridor occur just north of Route 171 in York County. By 2025, traffic volume is projected to increase on most portions of Segment A1 by less than 5,000 vehicles per day, with the highest projected increases occurring between I-64 and US 13 in the City of Chesapeake (14,000 additional vehicles per day). On the southern portion of Segment A1, traffic volumes in 2025 are projected to range from 13,000 to 39,000 vehicles per day, with the highest traffic volumes occurring near the junction with I-664. North of the James River, average daily traffic volumes in 2025 are projected to range from 30,000 to 59,000 vehicles per day with the highest volumes occurring in Newport News and York County.

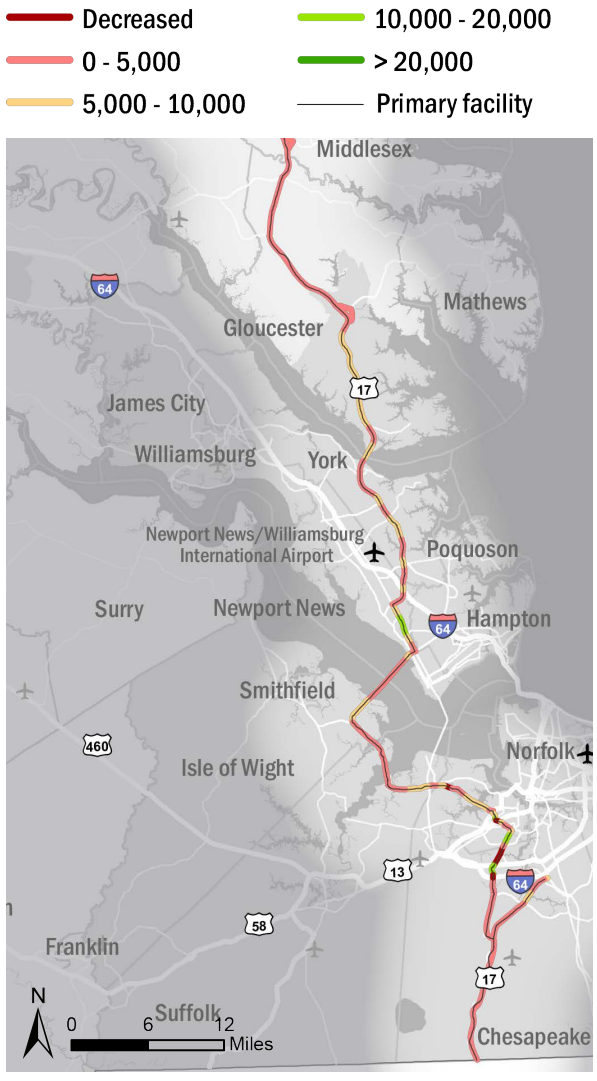
Traffic Volume 2014 (AADT)

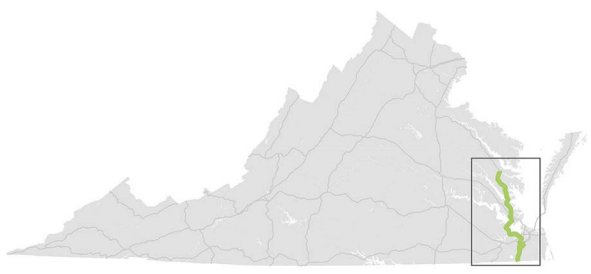


Traffic Volume 2025 (AADT)

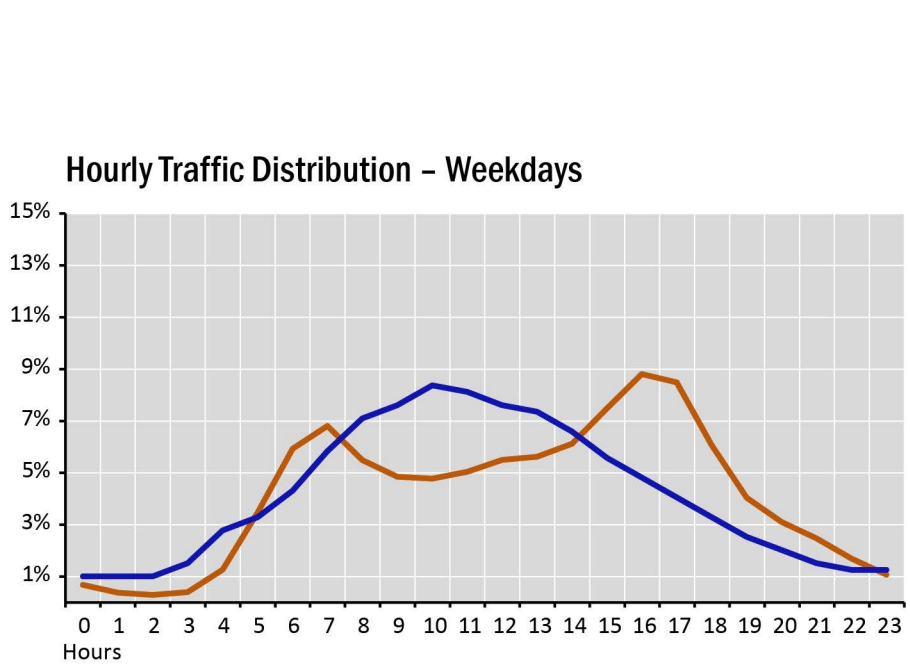


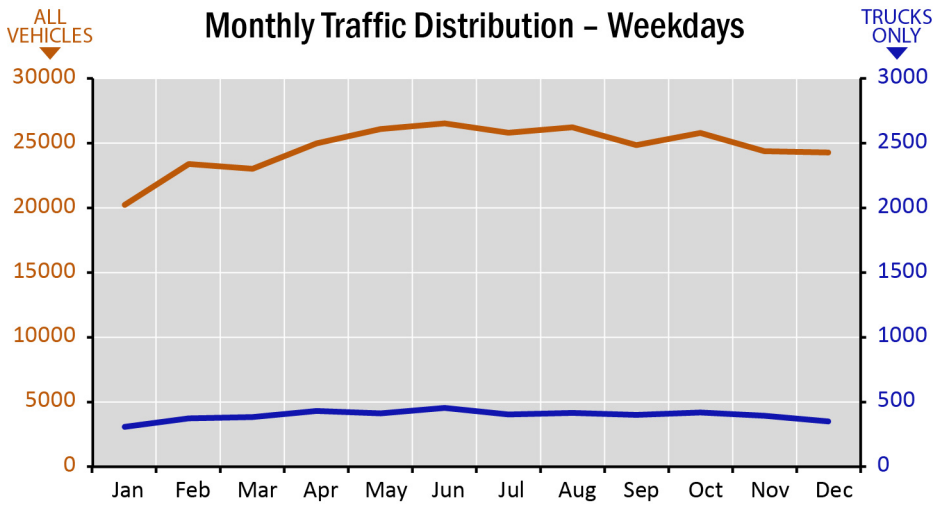
Change in Traffic Volume 2014- 2025 (AADT)

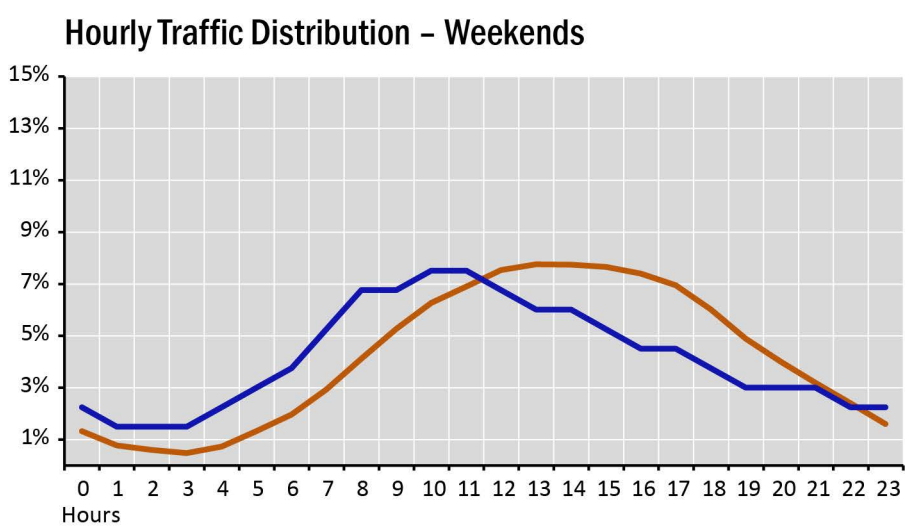


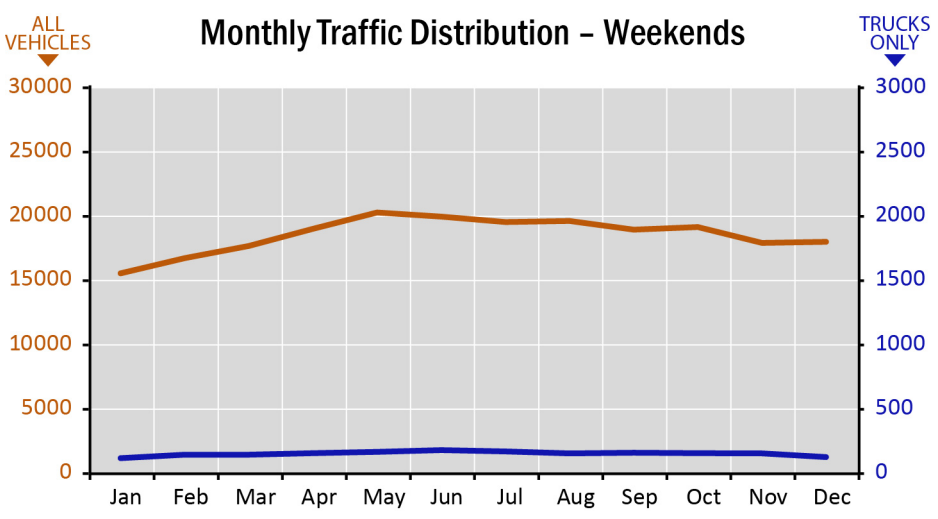


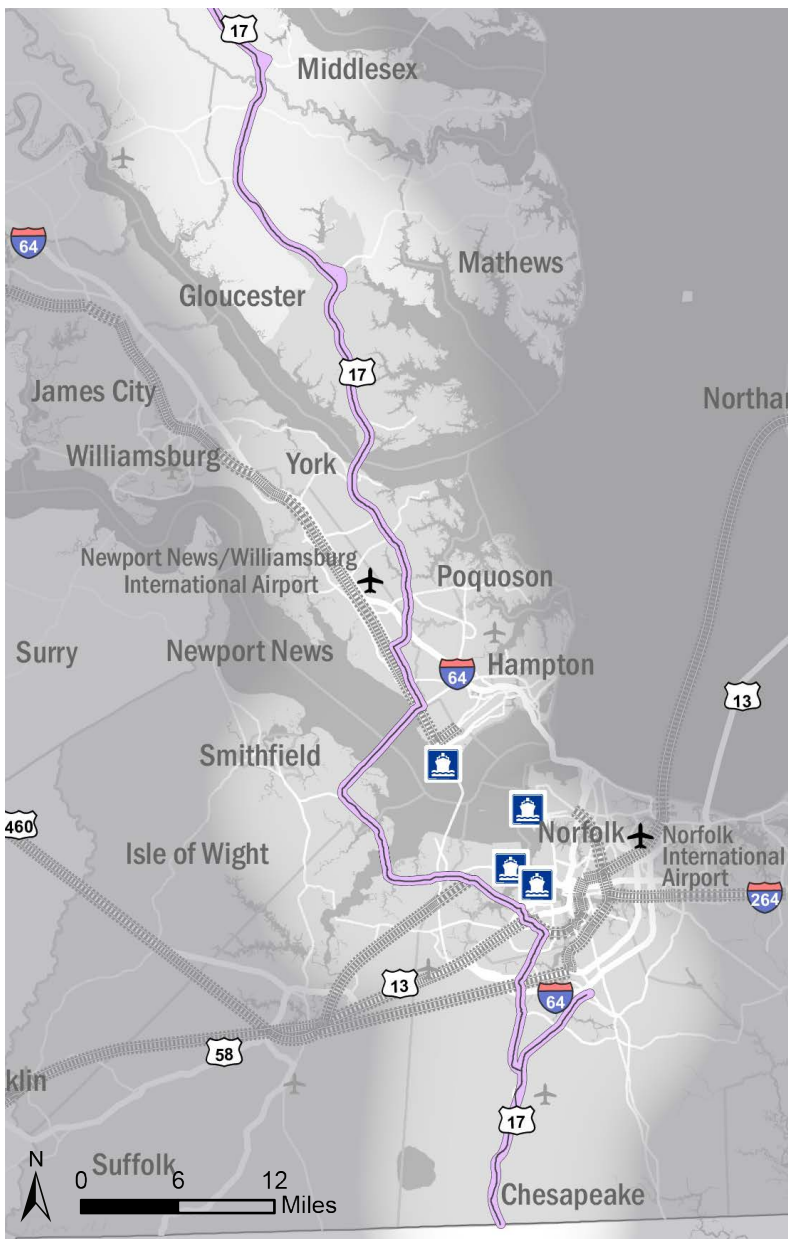
A1 SEGMENT PROFILE











Percent Heavy Trucks

- < 5%
- 5% - 10%
- 10% - 15%
- 15% - 20%
- > 20%
- Primary facility

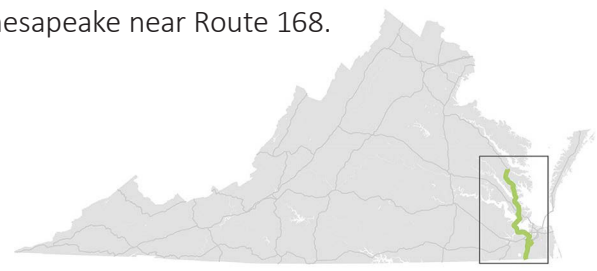
Traffic Distribution

On average, traffic on Segment A1 is distributed throughout the day as shown in the graphs below. Weekday traffic shows two peak periods over the course of the day, with the highest hourly traffic occurring between 4 and 5 p.m. which accounts for 8.8 percent of daily traffic. The morning peak hour is less busy, occurring between 7 and 8 a.m. accounting for 6.8 percent of daily traffic. The combined weekday traffic in the two peak periods (from 6 to 10 a.m. and from 3 to 7 p.m.) accounts for 54 percent of total daily traffic. Peaking patterns for truck traffic are different from commuter traffic, with a significant portion of truck traffic (over 45 percent of daily truck traffic) occurring between 9 a.m. to 2 p.m. Weekend traffic patterns are also different from the typical commute patterns, showing even distribution of traffic during the middle of the day, with the highest percentage of hourly traffic occurring between 1 p.m. to 2 p.m. (7.7 percent of daily traffic) for all traffic, and 11 a.m. to 1 p.m. (7.5 percent of daily traffic in each hour) for truck traffic.

Weekday traffic volumes on Segment A1 vary by as much as 31 percent throughout the year, with the highpoint in June (around 27,000 vehicles per day) and the low point in January (around 20,000 vehicles per day). Truck volumes vary somewhat more than passenger volumes throughout the year, with the June high being 47 percent higher than the January low. Weekend traffic levels also vary over the course of the year, and the highest levels of weekend traffic (May, around 20,000 vehicles per day) are 31 percent higher than January levels (around 15,000 vehicles per day). Weekend truck traffic is more variable than all vehicle traffic, with the June high being 65 percent higher than the January low. Since truck volumes account for a relatively very small portion of traffic on Segment A1 (less than two percent of overall daily traffic for weekdays and weekends), traffic conditions are much more responsive to variations in automobile traffic than truck traffic.

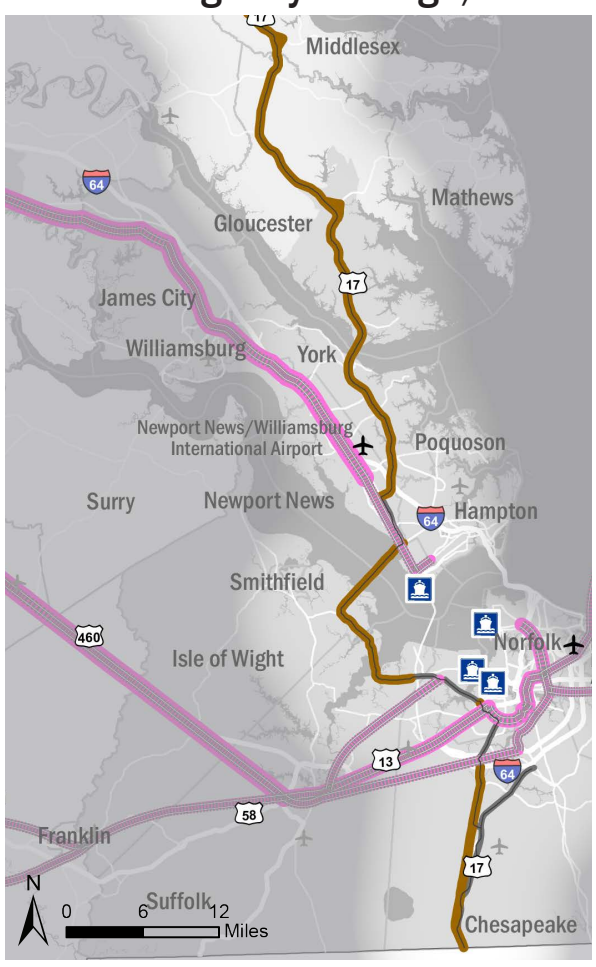
Truck Volume

The percent of average daily traffic comprised of heavy trucks on Segment A1 is low compared to the other segments in Corridor A. Throughout Segment A1, heavy trucks comprise less than four percent of total traffic. Heavy trucks comprise the highest percent of total traffic along US 17 in Chesapeake near Route 168.



A1 SEGMENT PROFILE

Annual Freight by Tonnage, 2012



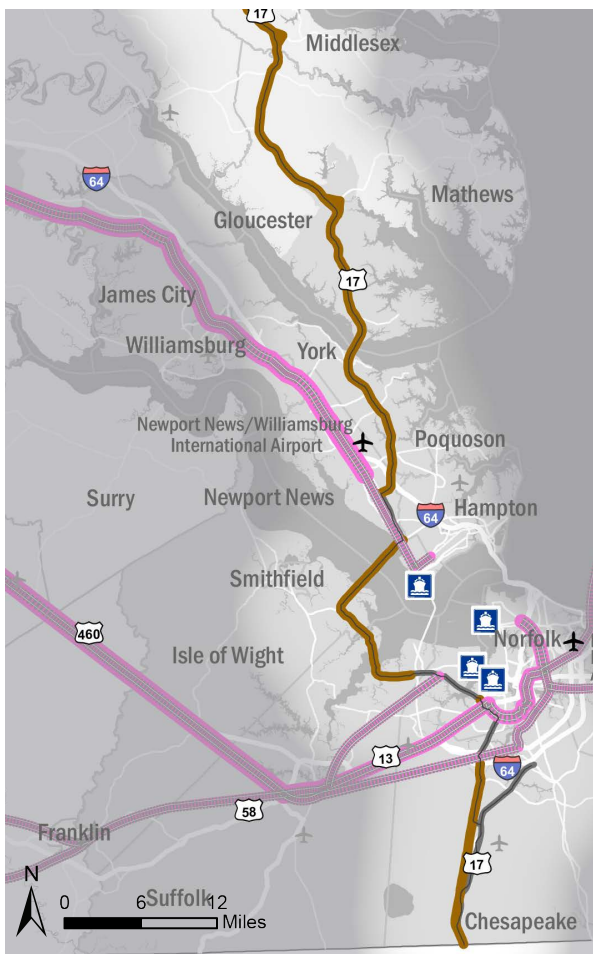
Freight Flows

In Segment A1 of the Coastal Corridor, proximity to the Port of Virginia influences whether freight is moved by truck or rail. While no rail facility exists that directly parallels US 17 throughout the segment, in the Hampton Roads Area other rail facilities that are components of other CoSS carry significant amounts of freight.

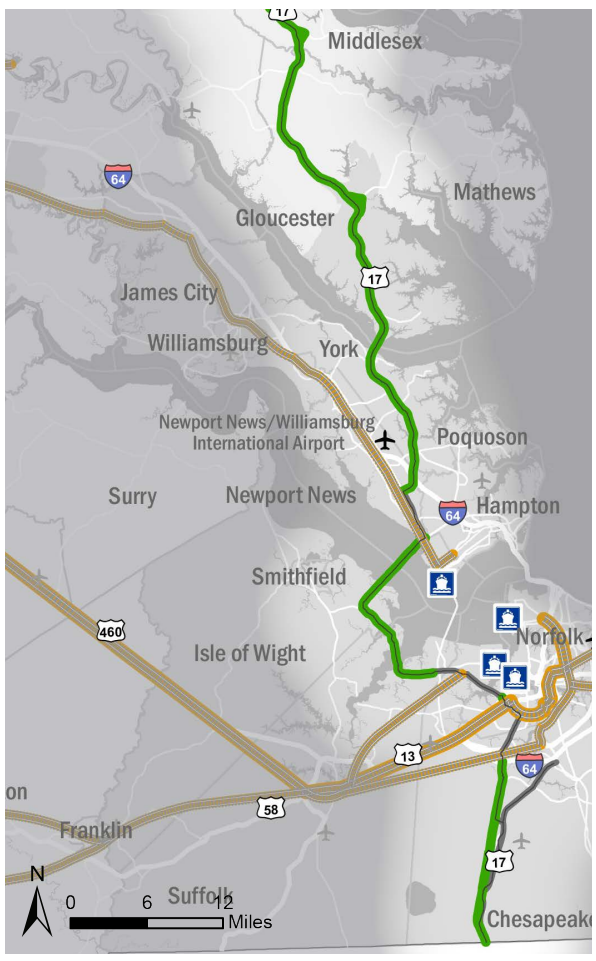
In the York County and Newport News section of Segment A1, freight is moved primarily by truck, in terms of both tonnage and value. In total, 1.2 million tons (83 percent) of freight is moved through this section of Segment A1 by truck, compared to 243,000 tons by rail (although these rail facilities are part of other CoSS). By value, the difference is even starker, with $3 billion (99.9 percent) of freight value traveling by truck, compared to $2 million by rail. On average, a ton of freight traveling through this section of Segment A1 by truck is worth $2,537 while a ton of freight traveling by rail is worth only $9. In 2025, both rail and truck freight tonnages and total values in the York County and Newport News area are expected to increase, but the percentages of tonnage and value moved by truck, and the values per ton on truck and rail, are expected to remain nearly the same.

In Portsmouth, near two of the Port of Virginia facilities, freight movements rely more heavily on rail, in terms of both tonnage and value (although these rail facilities are part of other CoSS). Only 2.5 million tons (ten percent) of freight travels through the Portsmouth section of Segment A1 by truck, compared to 22.5 million tons by rail. A higher portion of freight value than in the York County and Newport News section travels by truck, $8 billion (36 percent), although the majority of freight value through Portsmouth, $14 billion, travels by rail. Both truck freight and rail freight have higher value per ton than in the section of Segment A1 that travels through York County and Newport News, with $3,121 by truck and $616 by rail. In 2025, both rail and truck freight tonnages and total values in the Portsmouth area are expected to increase, and the percentage of freight traveling by truck is expected to increase slightly to 14 percent by tonnage and 41 percent by value. Values per ton on both truck and rail in 2025 are expected to remain nearly the same.

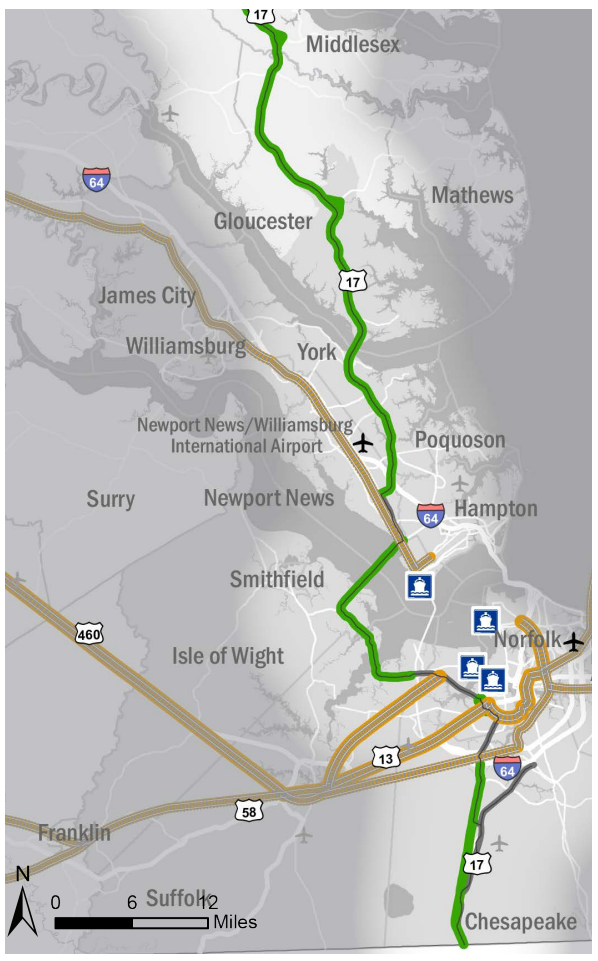
Annual Freight by Tonnage, 2025



Annual Freight by Value, 2012



Annual Freight by Value, 2025



Truck Freight (in tons)

- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Rail Freight (in tons)

- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Truck Freight Value

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility

Rail Freight Value

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility

A1 SEGMENT NEEDS

Redundancy and Mode Choice

Comparable Travel Options

Hampton Roads (Norfolk) to DC

Inter-City Bus	*Train*	*Air*
5 Trips per Day 5:30 Travel Time $18 Est. Cost	1 Trips per Day 4:45 Travel Time $42 Est. Cost	4 Trips per Day 1:05 Travel Time $115 Est. Cost

Auto

Via US 17: 3:45 Travel Time $117 Est. Cost
Via I-64/I-95: 3:10 Travel Time $109 Est. Cost

Hampton Roads (Norfolk) to Fredericksburg

Inter-City Bus	*Train*
2 Trips per Day 5:40 Travel Time $22 Est. Cost	1 Trips per Day 3:10 Travel Time $38 Est. Cost

Auto

Via US 17: 2:45 Travel Time $82 Est. Cost
Via I-64/I-95: 2:30 Travel Time $81 Est. Cost

Hampton Roads (Norfolk) to Winchester

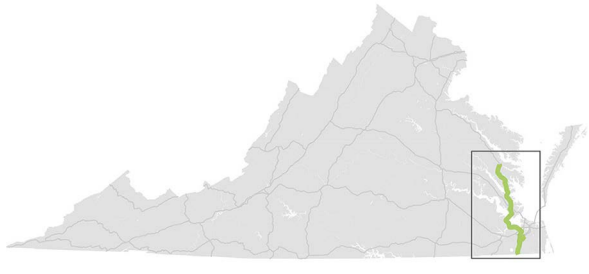
Inter-City Bus	*Train*
0 Trips per Day 0:00 Travel Time $0 Est. Cost	0 Trips per Day 0:00 Travel Time $0 Est. Cost

Auto

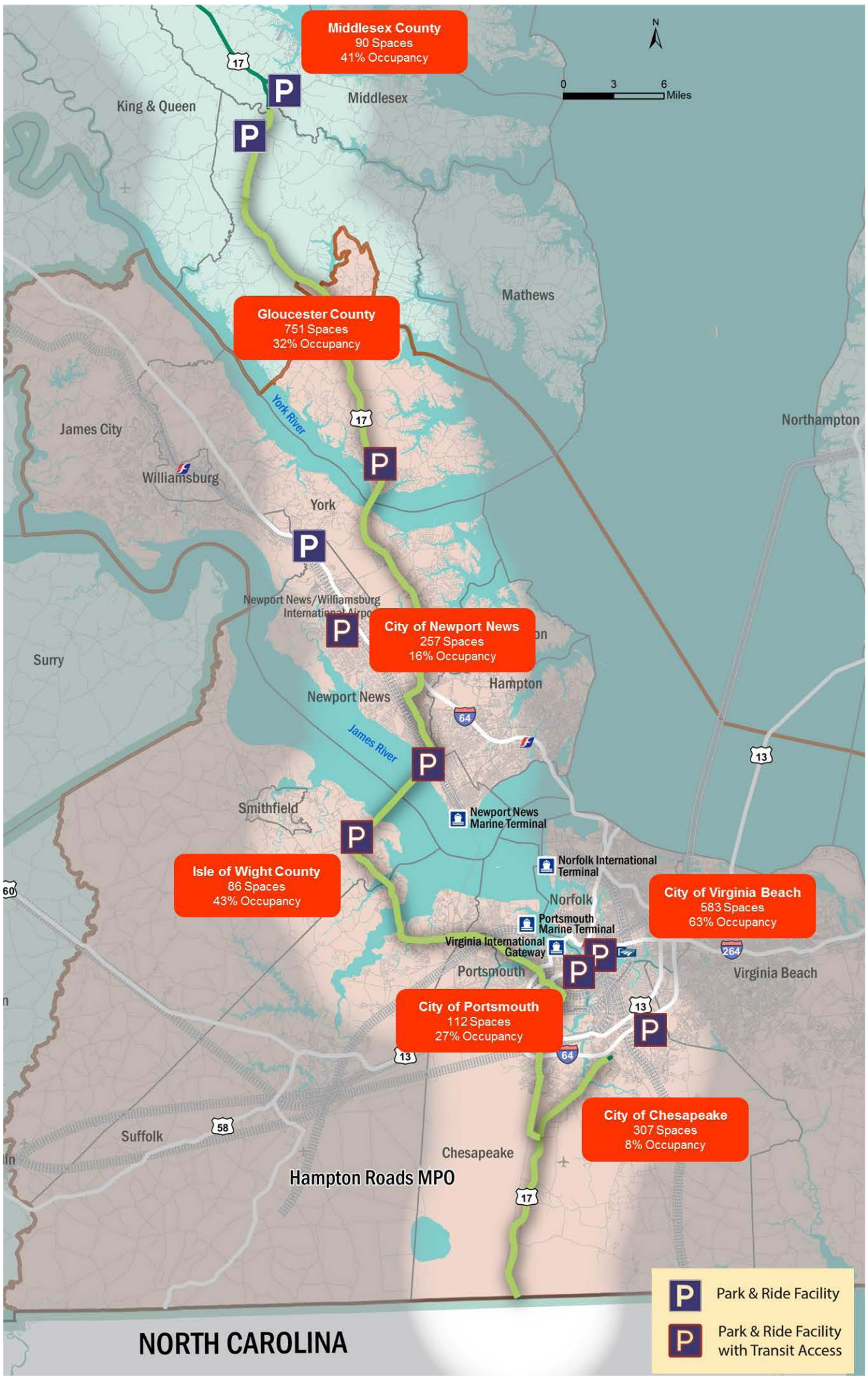
Via US 17: 4:20 Travel Time $132 Est. Cost
Via I-64/I-95/US 17: 4:00 Travel Time $125 Est. Cost

Park-and-Ride

Within Segment A1, commuters can utilize many Park-and-Ride locations, as well as commuter bus service from Hampton Roads Transit. Gloucester County provides the highest number of Park-and-Ride spaces and Park-and-Ride locations, while the City of Virginia Beach has the highest utilization rate of spaces available in the region. However, no county or city within the Segment A1 area has a rate higher than the statewide average for Park-and-Ride utilization, which is 76 percent.



Passenger trips on Segment A1 of the Coastal Corridor have a wide range of travel options, both in terms of travel path and mode choice. While US 17 does not have a parallel facility, passengers traveling from Hampton Roads to Northern Virginia and Washington DC can make the trip in similar time using I-64 and I-95. However, applying the 2014 federal standard mileage rate of 56 cents per mile, trips to Fredericksburg or Washington, DC would be more expensive by automobile than by other available modes. The alternate modes, including bus, rail, and air, are all limited by the frequency of service. Trips from Hampton Roads to areas west of I-95, including Winchester, can only be made by automobile.



A1 SEGMENT NEEDS

Safety

Performance Metrics

Number of Severe Crashes	454
Severe Crashes/Million VMT	1.7
Number of Railroad Crashes	2

Segment A1 experienced the highest number of severe crashes (454) between 2010 and 2014 along the Coastal Corridor. One of the largest concentrations of severe crashes in Segment A1 of the Coastal Corridor occurred along approximately 6.8 miles of US 17 in Newport News. From Old Oyster Point Road to River Road, there were 205 severe crashes on US 17. Specifically, at the intersection of US 17 (J. Clyde Morris Boulevard) and Old Oyster Point Road, east of I-64, 23 crashes occurred. In a span of approximately 0.9 miles of US 17 (J. Clyde Morris Boulevard) between Forrest Drive and Constance Drive), there were 68 crashes, with 34 of those crashes occurring at the intersection of US 17 and Constance Drive, just outside of the Newport Square Shopping Center. Over a span of about four miles on US 17 (Jefferson Avenue) between Route 312 (J. Clyde Morris Boulevard) and US 258 (West Mercury Boulevard) there were 100 crashes.

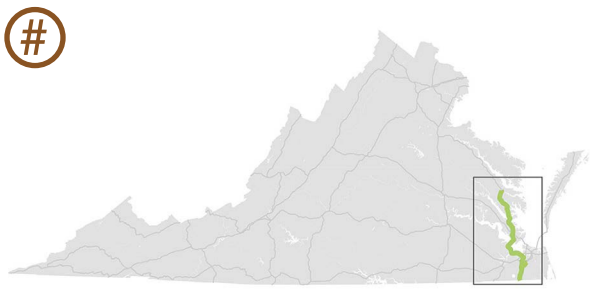
Another large concentration of severe crashes occurred along US 17 in the City of Portsmouth. There were 89 crashes along US 17 between Airline Boulevard and Victory Boulevard, 23 of which occurred at the intersection of US 17 (George Washington Highway) and Route 239 (Victory Boulevard). On US 17 (Frederick Boulevard), there were 21 crashes in the 0.51 miles between Airline Boulevard and Turnpike Road.

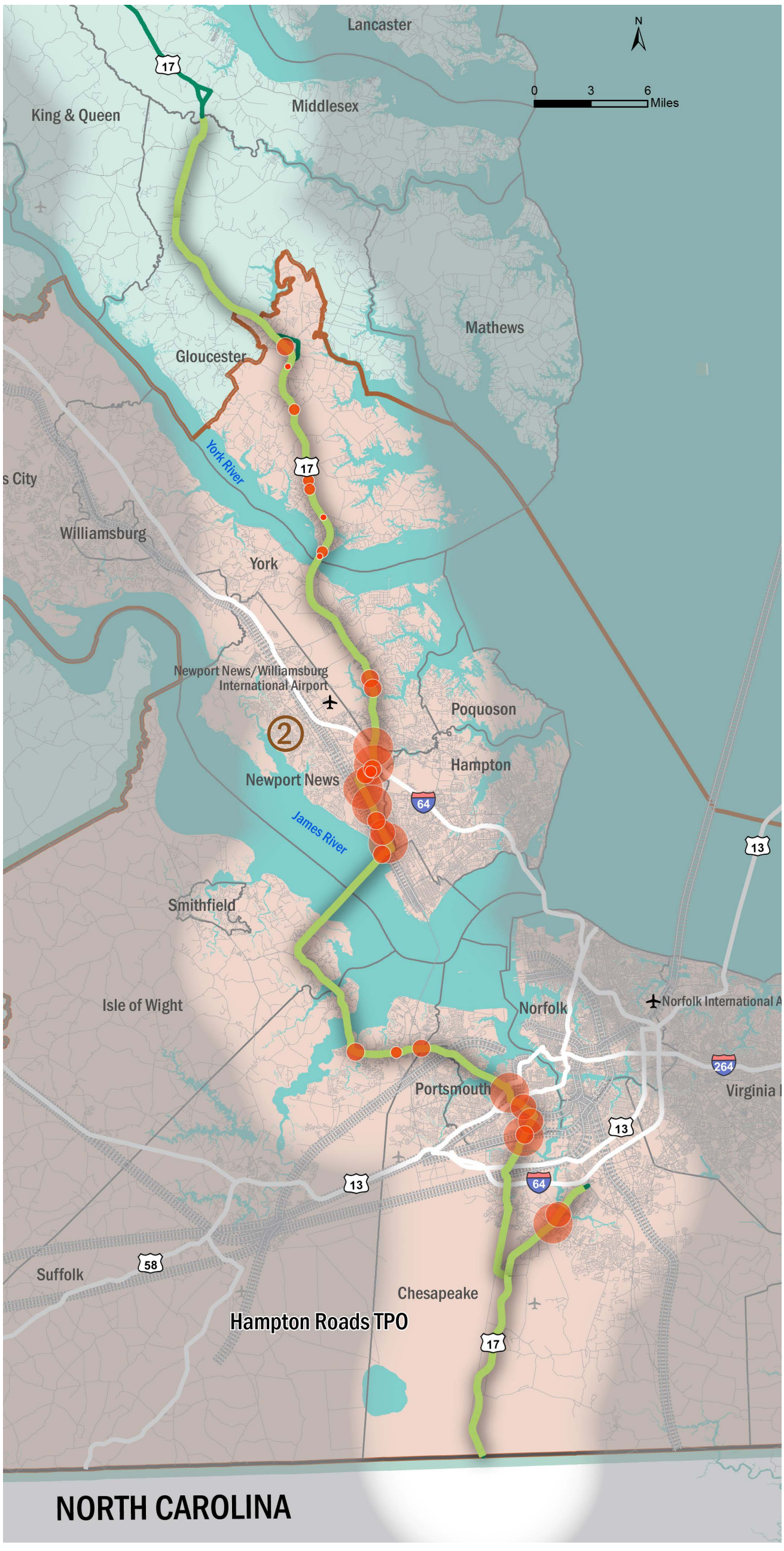
Another high-concentration crash area is located in the City of Chesapeake where 41 crashes occurred over a span of approximately one mile. Of the 41 crashes, 22 were located at the intersection of US 17 and Route 165. The remaining incidents occurred along US 17 north of its intersection with Route 165.

Fatality and Injury Crashes (2010 - 2012)

- < 5
- 5 - 10
- 11 - 15
- 16 - 20
- > 20

Railroad Incidents/Accidents per County (2011-2014)





Congestion

Performance Metrics

Person Hours of Delay per Mile	35
Freight Ton Hours of Delay per Mile	1.8K

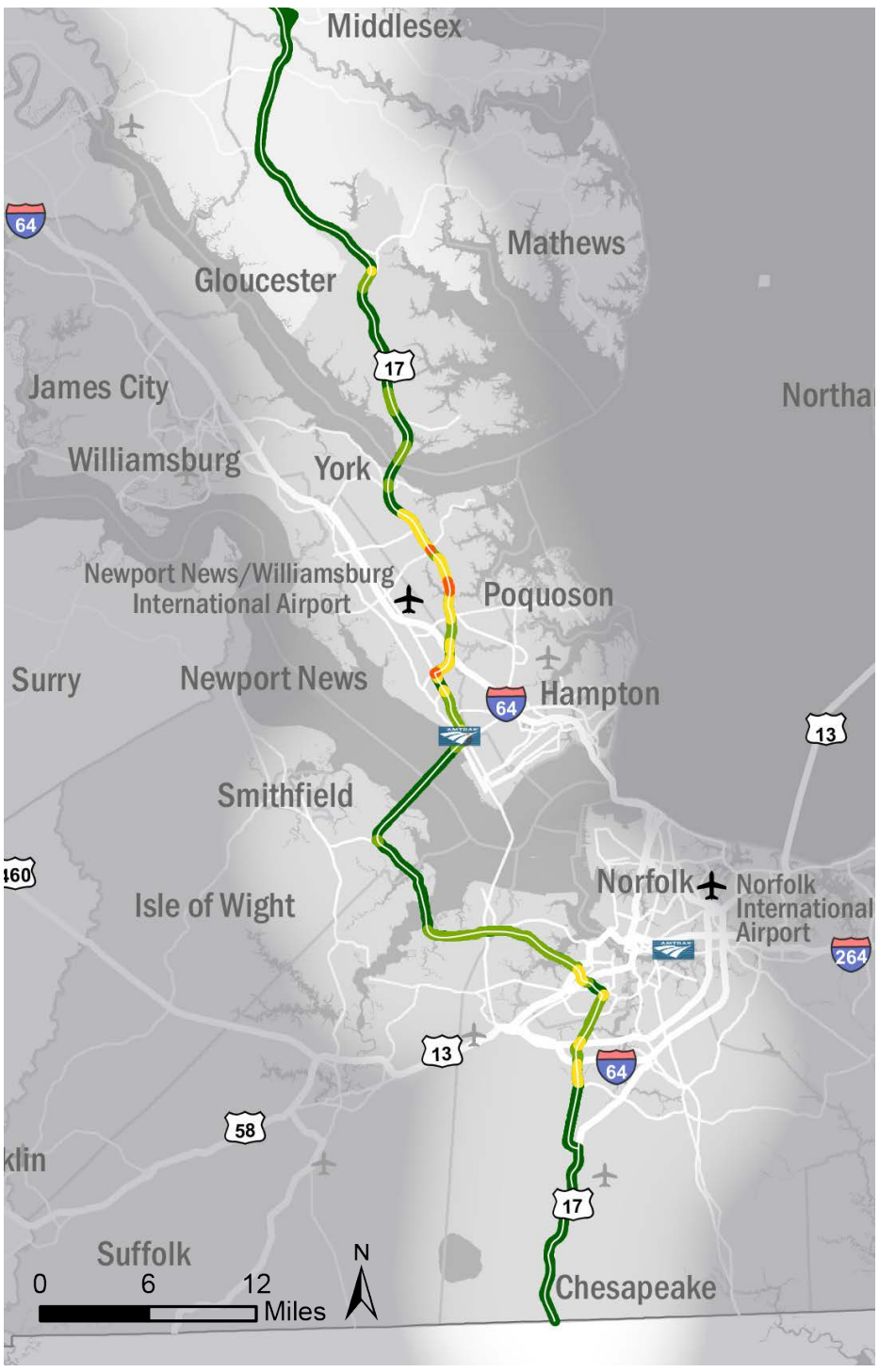
Passenger Delays

Segment A1 covers the sections of the Coastal Corridor (Corridor A) with the most congestion for passenger travel, with 6,400 person-hours of delay. The busiest parts of this segment are those passing through Portsmouth and on the peninsula between the James and York Rivers, with daily passenger delays reaching 400 person-hours per mile. Passenger delays along Segment A1 during the peak period (defined as 7 to 10 a.m. and 3 to 6 p.m.) account for 52 percent of daily congestion, a larger share than the average peak-period share of congestion on the CoSS segments.

Freight Delays

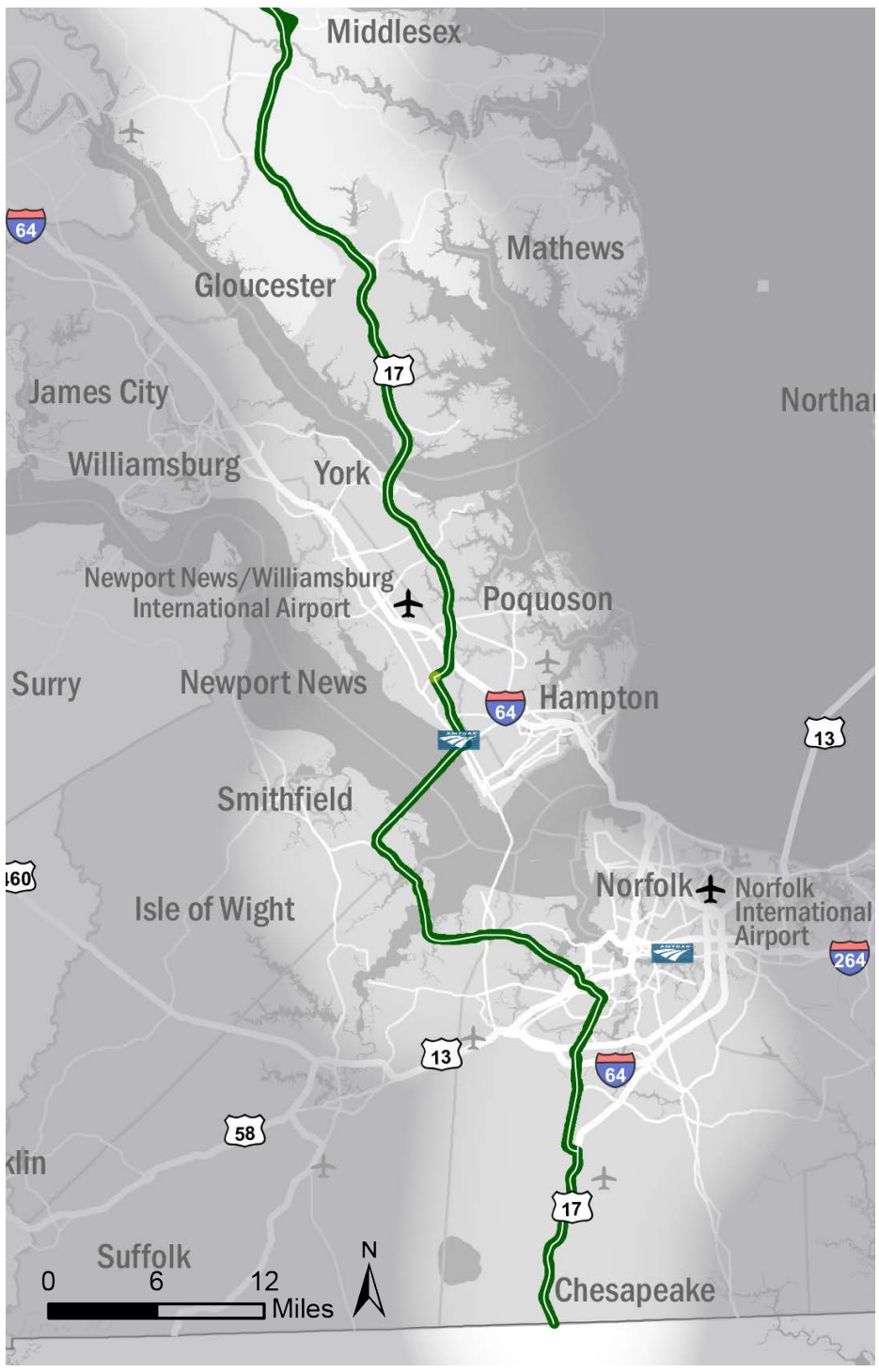
Although passenger delays along Segment A1 are significant, freight delays are not. Overall freight delays per mile along Segment A1 are among the lowest of the CoSS segments, possibly because I-64 carries most of the freight in the region. Peak-period freight delays account for about 44 percent of daily congestion, which is more than the average peak-period contribution to congestion along the CoSS segments.

Daily Person Hours of Delay per Mile



< 50
51 - 100
101 - 250
251 - 500
> 500

Daily Freight Ton Hours of Delay per Mile



< 100,000
100,001 - 250,000
250,001 - 500,000
500,001 - 1,000,000
> 1,000,000

Reliability

Weekday Peak

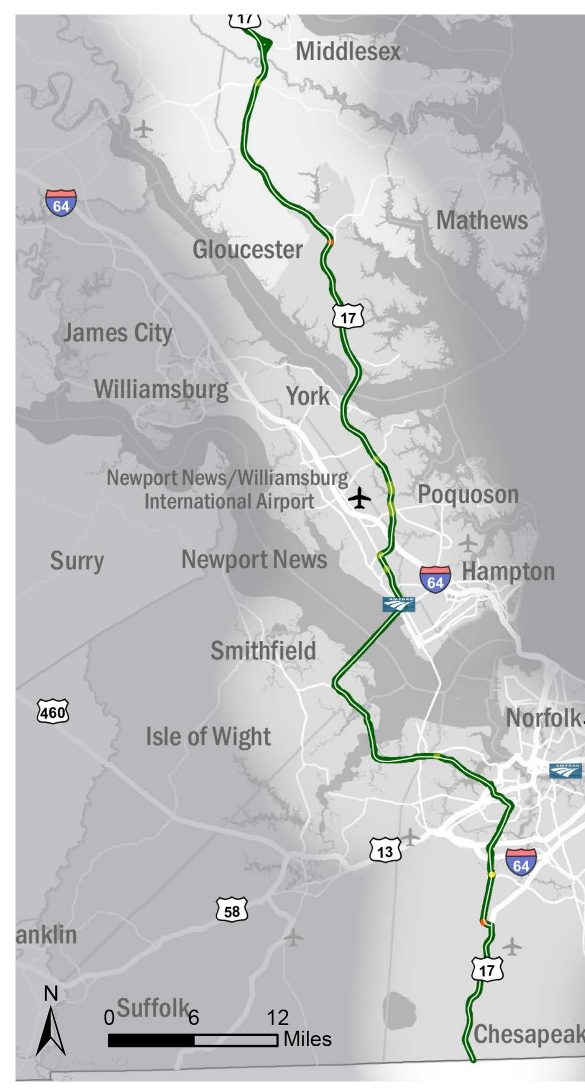
Reliability of travel during the peak period on a typical weekday on Segment A1 ranges from 0.02 to 0.79 in terms of reliability index, with an average value of 0.15. While this segment does have a peak period reliability index higher than average for the CoSS segments statewide, none of the locations along Segment A1 have reliability index values exceeding the statewide threshold.

Weekday

Reliability of travel on Segment A1 during a typical weekday ranges from 0.01 to 0.38 in terms of reliability index, with an average value of 0.13. While this segment does have a weekday reliability index higher than average for the CoSS segments statewide, none of the locations along Segment A1 have reliability index values exceeding the statewide threshold.

Weekend

Reliability of travel during a typical weekend ranges from 0.01 to 0.77 in terms of reliability index, with an average value of 0.12. Overall, Segment A1 has a higher weekend reliability index than average for the CoSS segments statewide. Two segments have weekend reliability indices over the statewide threshold: a short portion on US 17 Business in the City of Chesapeake and a short segment of US 17 near US 17 Business in Gloucester. A higher reliability index during weekends compared to weekdays suggests that weekend travel times are more unpredictable than weekday travel times.

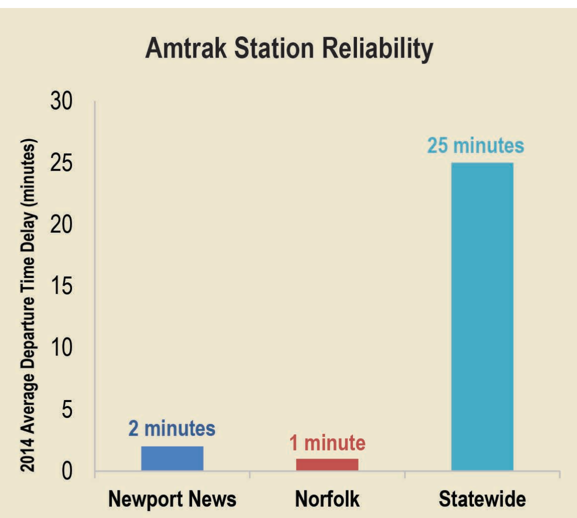


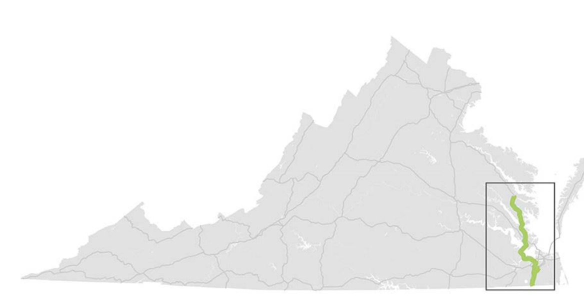
Reliability Index

- < 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- > 0.8
- Primary facility (in white)

Statewide reliability index thresholds have been set for weekday peak, weekday and weekend travel to assess the reliability of travel on each segment on all corridors of statewide significance. A higher reliability index indicates that travel times are more unreliable. The following are the reliability index thresholds:

- Weekday Peak - 0.80
- Weekday - 0.40
- Weekend - 0.60





A1 SEGMENT NEEDS

Summary of Needs

Identified locations are approximate. See "Summary of Needs" table on the following page for details.

Redundancy

Mode Choice

Safety

Congestion

Bottlenecks

Reliability

O P

N

M

K, L

B

J

A

H, I

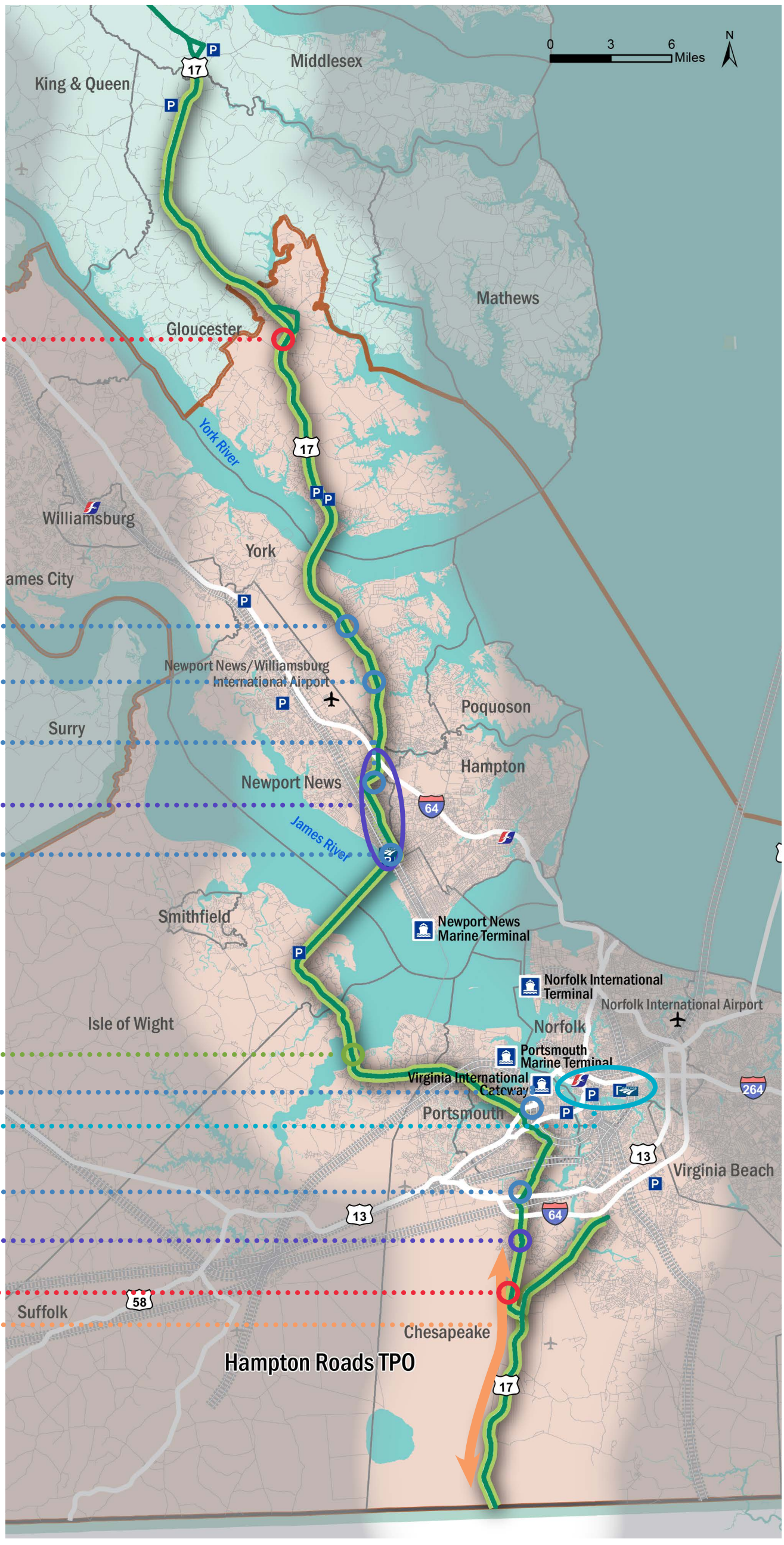
D

G

C, F

Q

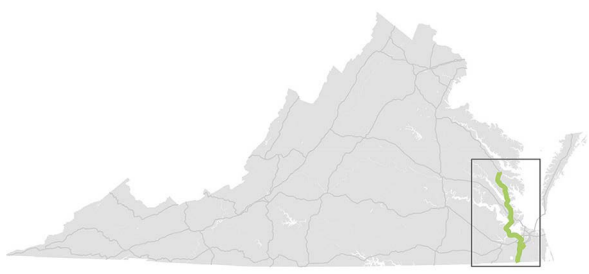
E



A1 SEGMENT NEEDS

Summary of Needs - A1 Segment

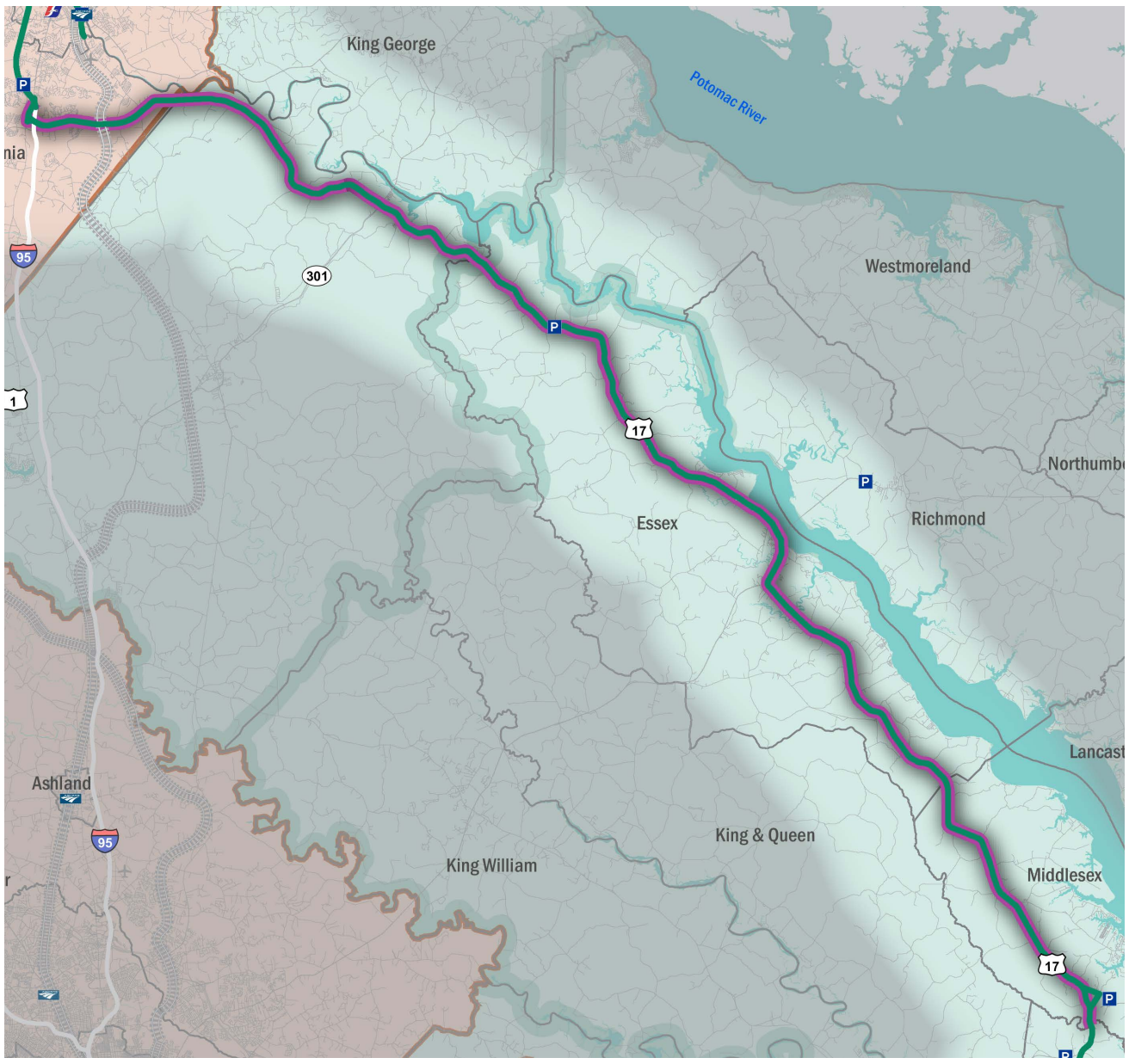
A.	Mills Godwin Bridge on US 17: Bottleneck to 2-lane roadway, remainder of US 17 is 4-lane facility
B.	US 17 Old Oyster Point Rd to River Rd: 205 severe crashes including: 23 severe crashes at intersectionof US 17 and Old Oyster Point Rd, 34 severe crashes at US 17 and Constance Drive
C.	US 17 in Chesapeake near intersection with Route 165: 41 severe crashes
D.	Limited availability of transit options from Hampton Roads to Metropolitan Washington region (5 buses, 1 rail trips daily) and Fredericksburg (2 buses, 1 rail trip daily). No transit options from Hampton Roads to Winchester.
E.	No parallel highway facilities for US 17
F.	Congestion issue on US 17 Business between VA Route 165 and I-64
G.	Congestion issue at US 17 and US 460 intersection in Chesapeake
H.	Congestion issue at US 17 and VA Route 141 intersection in Portsmouth
I.	Congestion issue on US 17 between I-264 and US 58 in Portsmouth
J.	Congestion issue at US 17 (Mercury Boulevard) and US 17/VA Route 143 (Jefferson Avenue) in Newport News
K.	Congestion issue at US 17/VA Route 143 (Jefferson Avenue) and Harpersville Road intersection in Newport News
L.	Congestion issue on US 17 from US 17/VA Route 143 (Jefferson Avenue) to I-64 in Newport News
M.	Congestion issue on US 17 from Harperville Road to Wolf Trap Road in York County
N.	Congestion issue on US 17 from VA Route 173 (Goodwin Neck Road) to north of Cook Road in York County
O.	Congestion issue at US 17 and US 17 Business intersection south of Gloucester Courthouse
P.	Reliability issue at US 17 and US 17 Business intersection south of Gloucester Courthouse
Q.	Reliability issue at US 17 Business and Great Dismal Swamp Canal Trail



III. Segment A2

Corridor Segment A2 Components

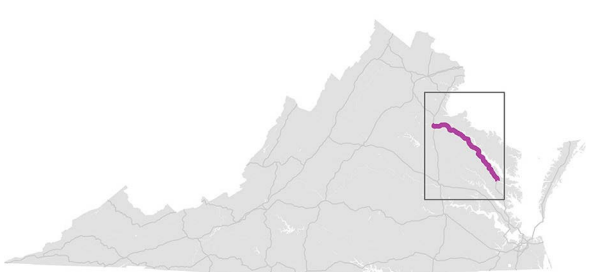
- US 17 and US 17 Business
- Rappahannock River



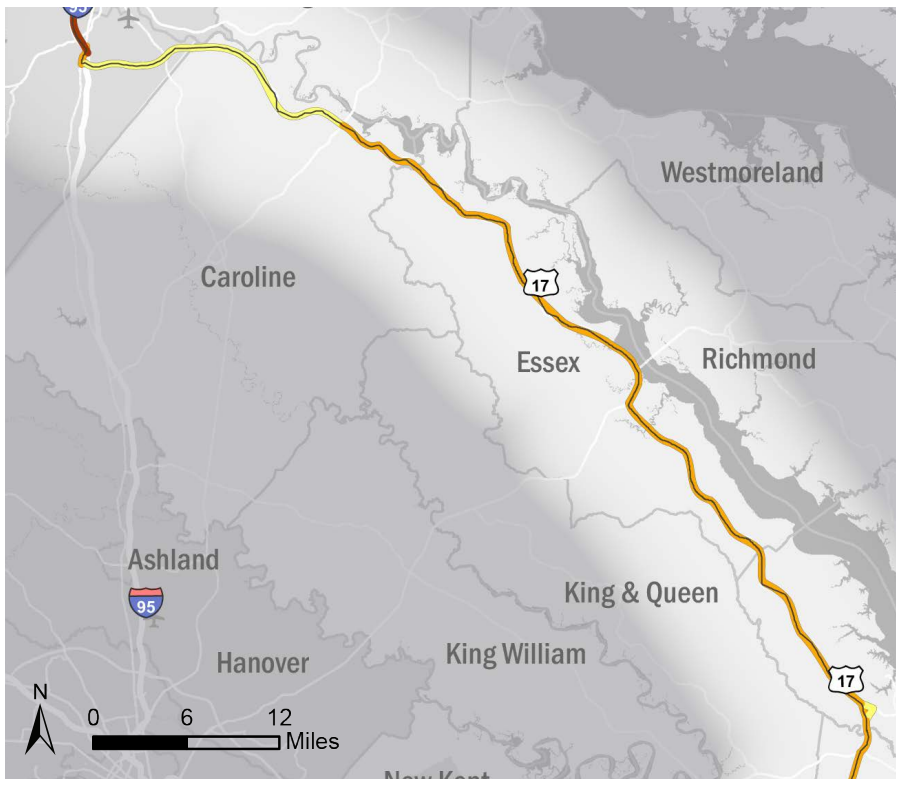
Segment A2

Corridor Component Road
Railroad
Airport Facility
Amtrak Facility
Greyhound Facility
VRE Facility
Metrorail Facility
Port Facility
Park & Ride Facility

MPO Area
Planning District Area

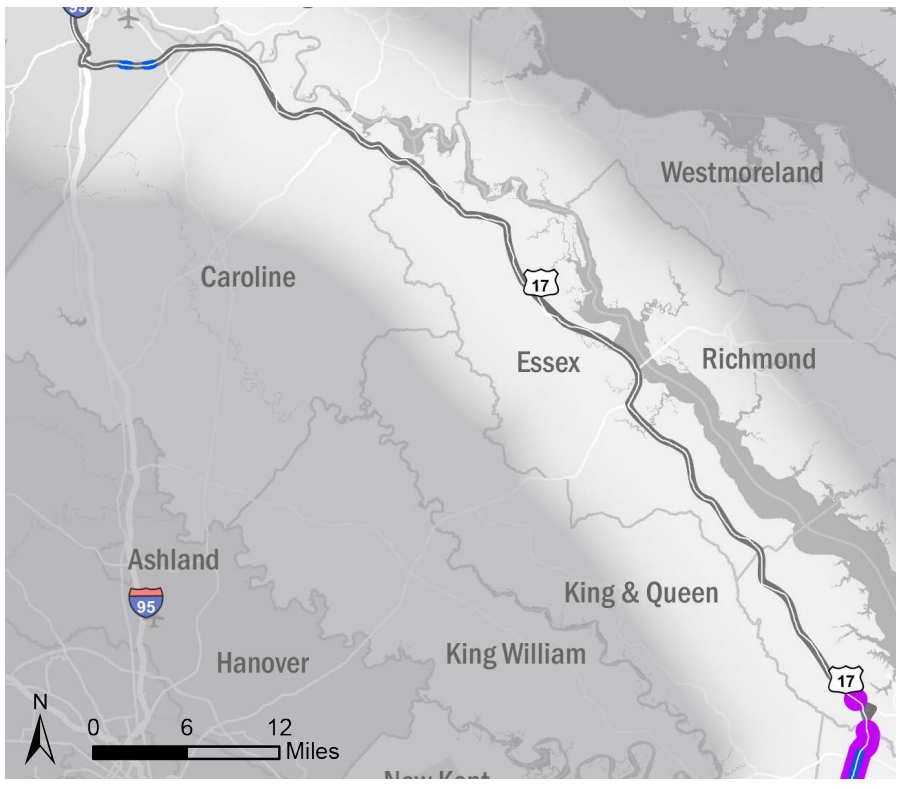


A2 SEGMENT PROFILE



Number of Lanes (both directions)

- 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 12
- Primary facility



Future Projects

- Reconstruction with added capacity
- Safety improvements
- Primary facility

Segment A2 begins in Middlesex County and progresses north, serving Essex, Caroline, and Spotsylvania Counties. The segment ends in the Fredericksburg Area at exit 126 from I-95, where I-95, US 1, and US 17 intersect.

Highway Facilities: US 17 is primarily a four-lane facility through Middlesex and Essex Counties. Further north, US 17 narrows to a two-lane roadway until its intersection with US 1. Along US 17, there is significant out-of-state freight and passenger traffic that travels along the highway. US 17 serves both through and local commuting traffic in rural areas. There are no parallel highway facilities that follow US 17, though US 17 does serve as an alternative route to I-64 and I-95 for traffic between Hampton Roads and Northern Virginia. Segment A2 also provides access to the Middle Peninsula and Northern Neck.

Transit Service: There is no line-haul transit, Amtrak, or Greyhound service available in Segment A2. There are several Park-and-Ride locations available in this segment.

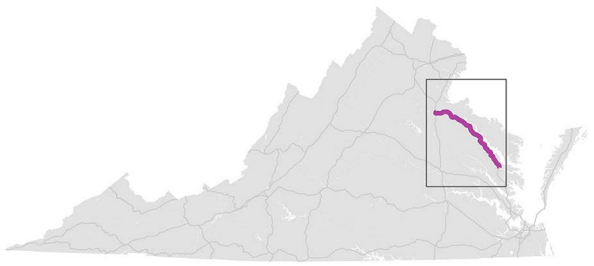
Rail Facilities: A short rail line runs directly along US 17 from CSX's National Gateway Corridor to Sealston on the Northern Neck.

Port Facilities: US 17 provides access to the Rappahannock River navigational channels.

Airport Facilities: No commercial air service is available in Segment A2; however, four general aviation airports are present.

Major planned and future projects include:

- Lengthening the right turn lane at Route 616
- Constructing left turn lanes and installation of traffic signals at Route 609
- Constructing left turn lanes at Route 608

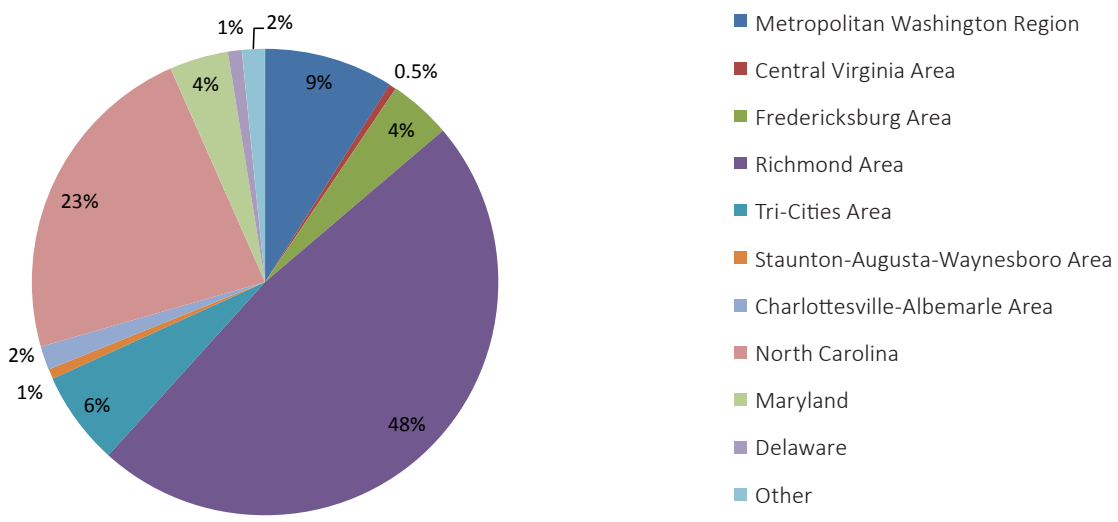


Travel Demand

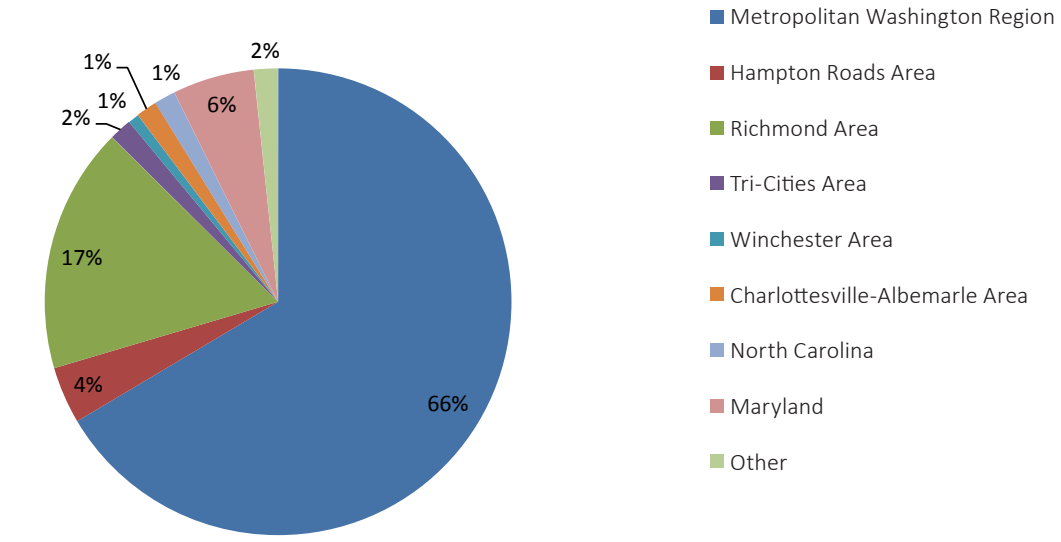
Passenger Demand

Segment A2 connects the Hampton Roads Area to the Fredericksburg Area. Of the intercity passenger travel originating in the Hampton Roads Area, nine percent is destined for the Metropolitan Washington region and an additional four percent is destined for the Fredericksburg Area. Since most of the intercity passenger traffic originating in Fredericksburg is oriented north towards Northern Virginia, only small portions of this traffic will use Segment A2. Four percent of Fredericksburg traffic is destined for the Hampton Roads Area and will likely use this segment.

Travel from Hampton Roads Area to... *(clockwise starting from the top)*



Travel from Fredericksburg Area to... *(clockwise starting from the top)*



A2 SEGMENT PROFILE

Freight Demand

By truck, Segment A2 carried 1.4 million tons of freight worth $740 million in 2012, and is estimated to carry 2 million tons of freight worth $1.0 billion in 2025. The major travel patterns on Corridor A are similar to those on Corridor K, as US 17 (Segment A3) runs concurrently with I-95 (Segment K3) near Fredericksburg. Interstate truck freight traffic passing though Virginia on Corridor A accounts for more than 40 percent of the total tonnage in both 2012 and 2025, as well as 60 percent of the total freight value for both years. In terms of tonnage, North Carolina is the largest source of truck freight on Corridor A and Maryland is the largest destination outside of the Commonwealth. In terms of value, Florida is the largest destination for truck freight on Corridor A. Most of the major truck freight travel patterns on Corridor A are between the Middle Atlantic and Southeastern regions. Only three percent of the corridor's truck freight tonnage, representing around one percent of the total freight value, originates from or is destined for the jurisdictions adjacent to Segment A2.

Truck Freight

Major Origins (by Tonnage)
1. Virginia (34% / 35%)
2. North Carolina (15% / 14%)
3. Pennsylvania (10% / 10%)
4. Maryland (8% / 8%)
5. Florida (6% / 5%)

Corridor Tonnage Originating in Segment A2: 3% / 3%

Major Origin-Destination Pairs for Freight
North Carolina and Maryland
North Carolina and Pennsylvania
North Carolina and New York
City of Norfolk* and North Carolina
City of Chesapeake and North Carolina

Percentages represent 2012 / 2025 values.
*Includes freight passing through the Port of Virginia.

Major Destinations (by Tonnage)
1. Virginia (34% / 36%)
2. Maryland (13% / 13%)
3. North Carolina (9% / 9%)
4. Pennsylvania (9% / 8%)
5. New York (8% / 7%)

Corridor Tonnage Destined for Segment A2: 3% / 3%

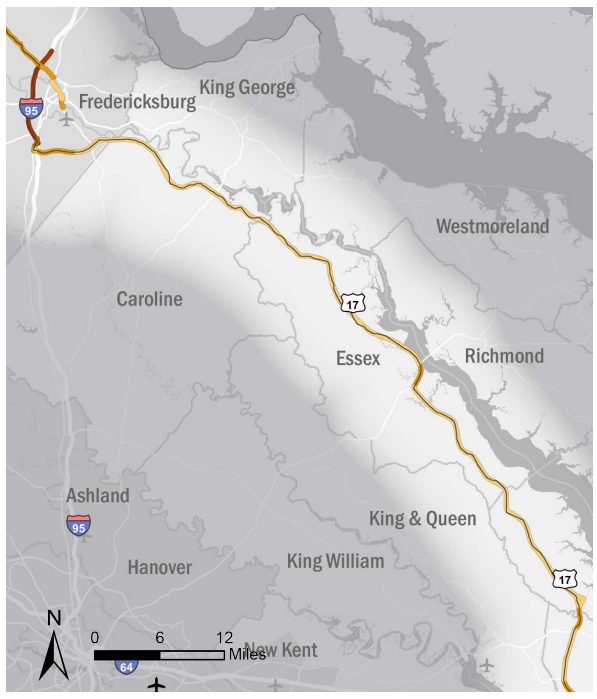
Traffic Conditions

Traffic Volume and AADT

Traffic volume on Segment A2 is low relative to traffic volumes throughout the rest of Corridor A. The highest traffic volume in Segment A2 occurs on the section south of Fredericksburg where US 17 runs concurrently with US 1, with an average daily traffic volume of over 50,000 vehicles. The section in Tappahannock where US 17 runs concurrently with US 360 sees daily traffic of more than 21,000 vehicles. On almost all other sections of Segment A2, average daily traffic volumes range from 5,000 to 13,000 vehicles. Traffic volumes are expected to increase minimally (by less than 5,000 vehicles per day) by 2025 along almost all of Segment A2, except the small portion where US 17 runs concurrently with US 1 near Fredericksburg where increases are expected to be much higher.

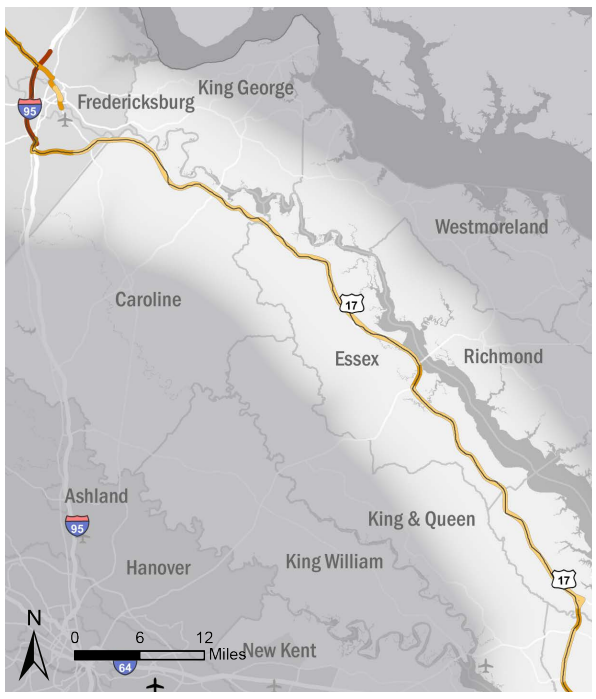
Traffic Volume 2014 (AADT)

- < 10,000
- 10,000 - 50,000
- 50,000 - 100,000
- 100,000 - 200,000
- > 200,000
- Primary facility



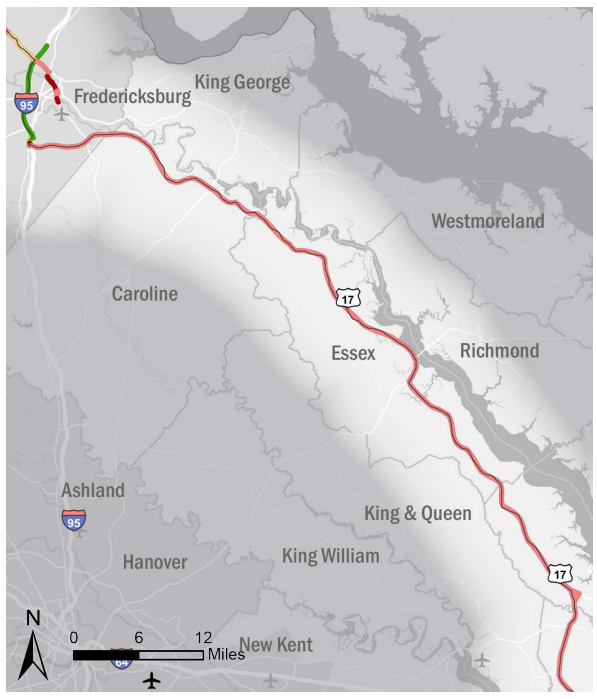
Traffic Volume 2025 (AADT)

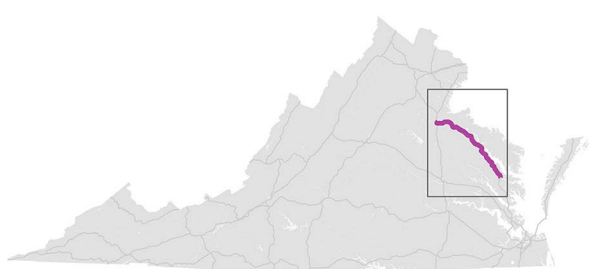
- < 10,000
- 10,000 - 50,000
- 50,000 - 100,000
- 100,000 - 200,000
- > 200,000
- Primary facility



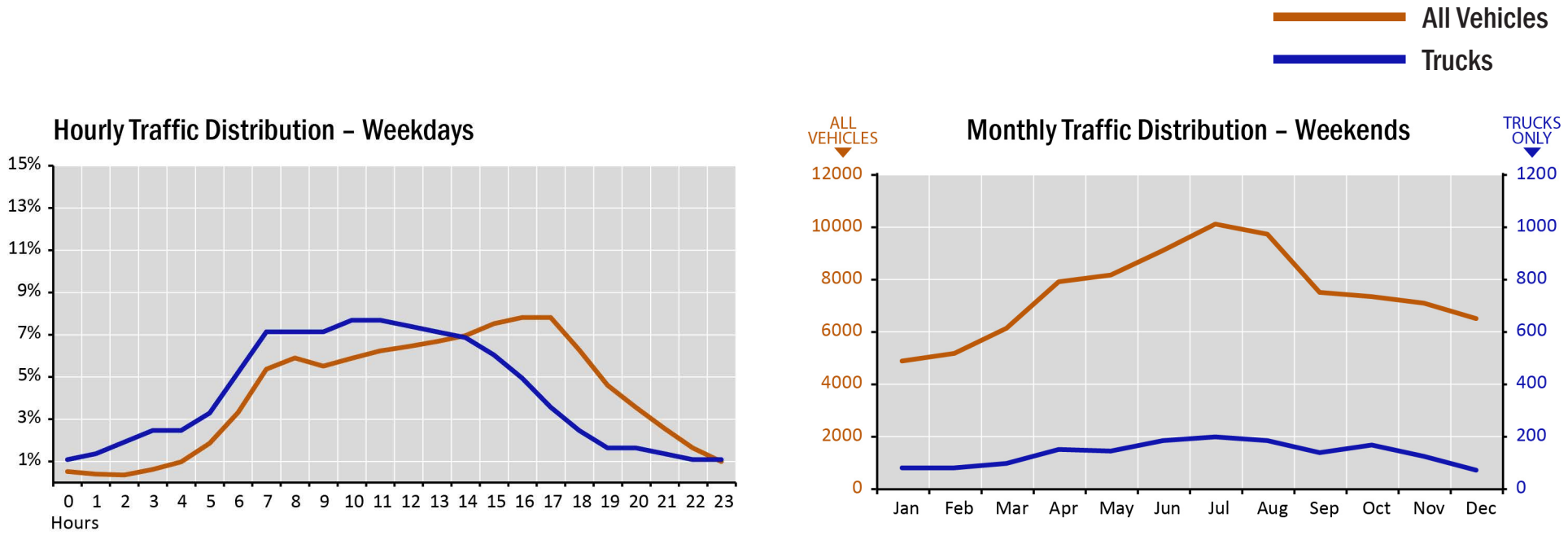
Change in Traffic Volume 2014- 2025 (AADT)

- Decreased
- 0 - 5,000
- 5,000 - 10,000
- 10,000 - 20,000
- > 20,000
- Primary facility





A2 SEGMENT PROFILE



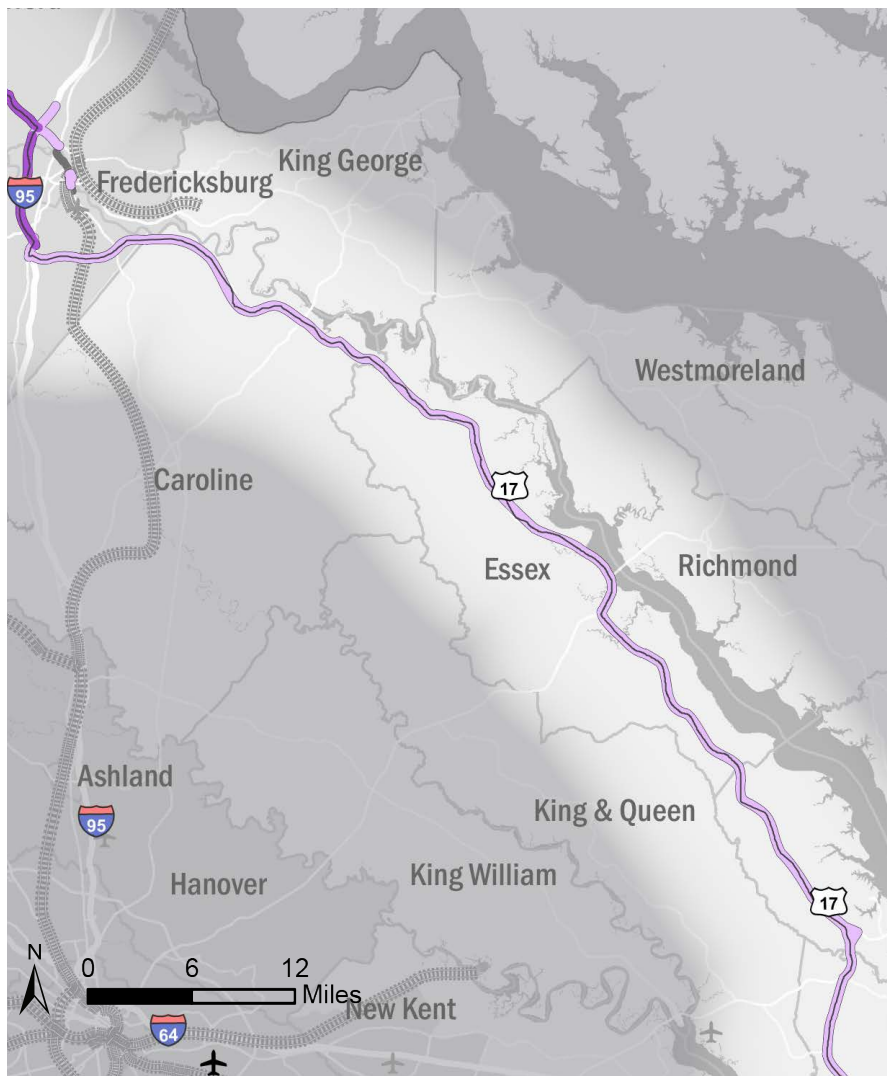
Traffic Distribution

On average, traffic on Segment A2 is distributed throughout the day as shown in the graphs below. Weekday traffic shows a steady increase in the flow from 7 a.m. to 5 p.m., which is quite different from the typical commute pattern. The highest hourly traffic occurs between 4 and 6 p.m. which each account for 7.8 percent of daily traffic. A slight morning peak is visible from 8 a.m. to 9 a.m. accounting for 5.9 percent of daily traffic. The combined weekday traffic in the two peak periods (from 6 to 10 a.m. and from 3 to 7 p.m.) accounts for almost 50 percent of total daily traffic. Peaking patterns for truck traffic are different from general traffic, with a relatively steady flow of trucks between 8 a.m. and 3 p.m., and a peak hourly flow of 7.6 percent of daily truck traffic between 10 a.m. and noon. Weekend traffic patterns are also different from the typical commute patterns, showing a distribution of traffic that peaks during the middle of the day, with the highest percentage of hourly traffic occurring between 2 and 3 p.m. (8.4 percent of daily traffic) for all traffic, and a more distinct peak for truck traffic between 11 a.m. and noon (10.3 percent of daily traffic in each hour) for truck traffic.

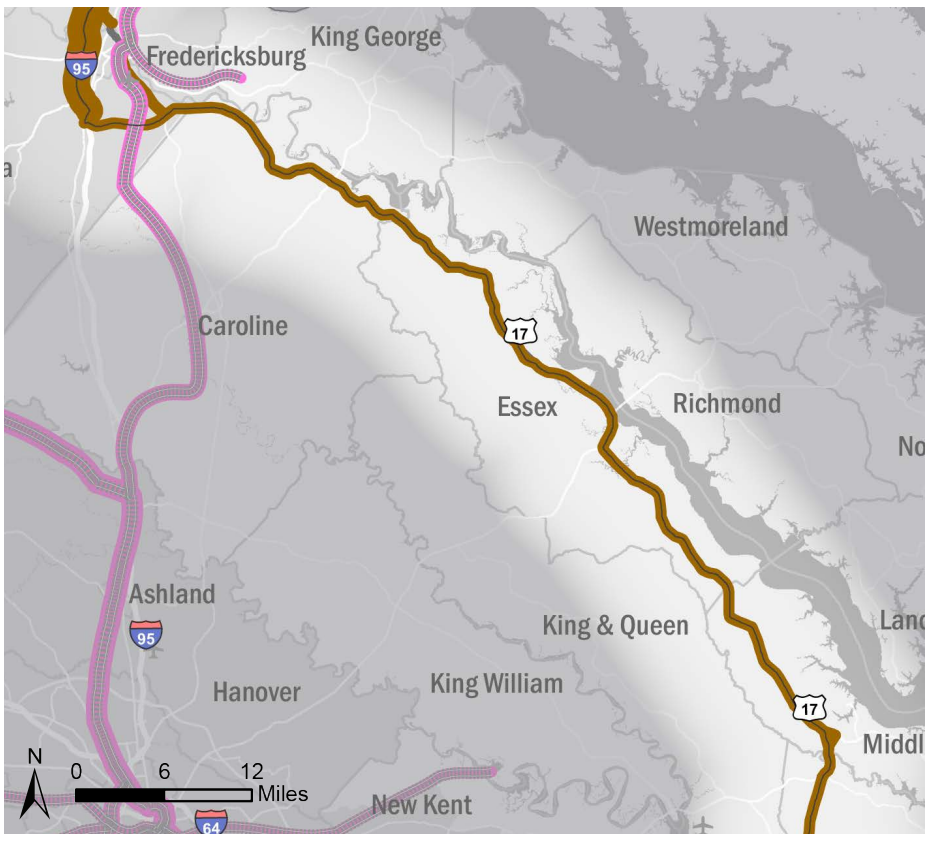
Weekday traffic volumes on Segment A2 vary by as much as 54 percent throughout the year, with the highpoint in August (around 8,000 vehicles per day) and the low point in January (around 5,000 vehicles per day). Truck volumes vary more than passenger volumes, with the June high being 69 percent higher than the January low. Weekend traffic levels also vary over the course of the year, and the highest levels of weekend traffic (July, around 10,000 vehicles per day) are 109 percent higher than January levels (around 5,000 vehicles per day), highlighting the severe seasonal peaking that occurs during the weekends on this segment. Since truck volumes account for a relatively small portion of traffic on Segment A2, five percent of daily traffic for weekdays and two percent of daily traffic weekends, traffic conditions are much more responsive to variations in automobile traffic than truck traffic.

Truck Volume

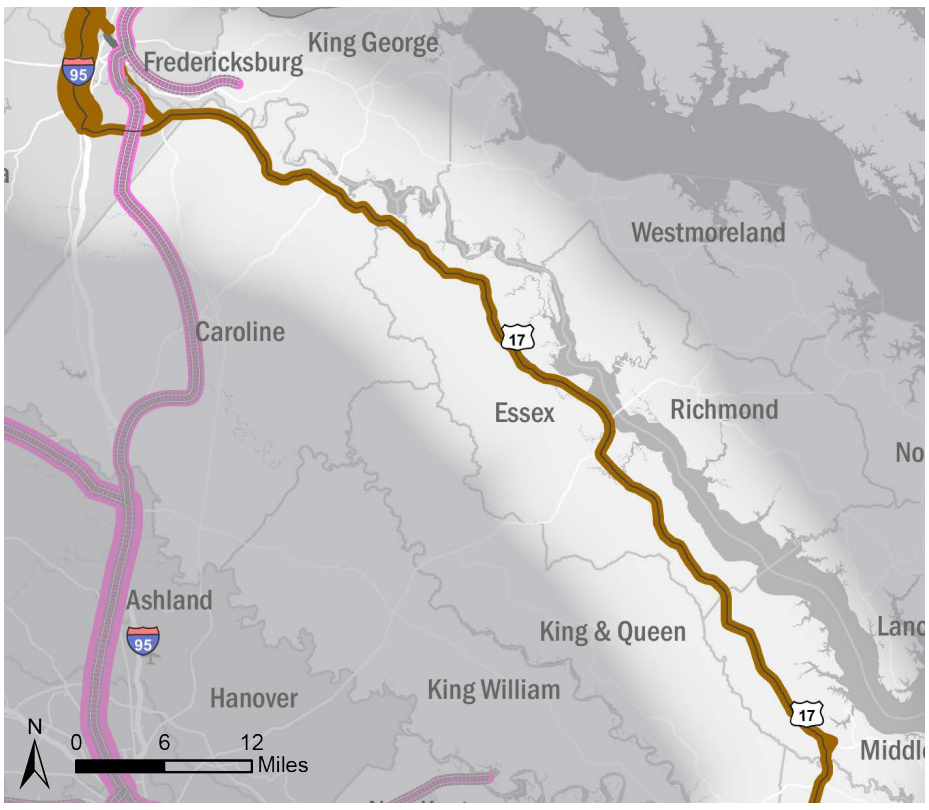
The percent of average daily traffic comprised of heavy trucks on Segment A2 is low relative to other parts of Corridor A. Heavy trucks account for 3 percent or less of total traffic throughout Segment A2. Heavy trucks comprise about 3 percent of total traffic in Segment A2 in central to northern Essex County and in Spotsylvania County.



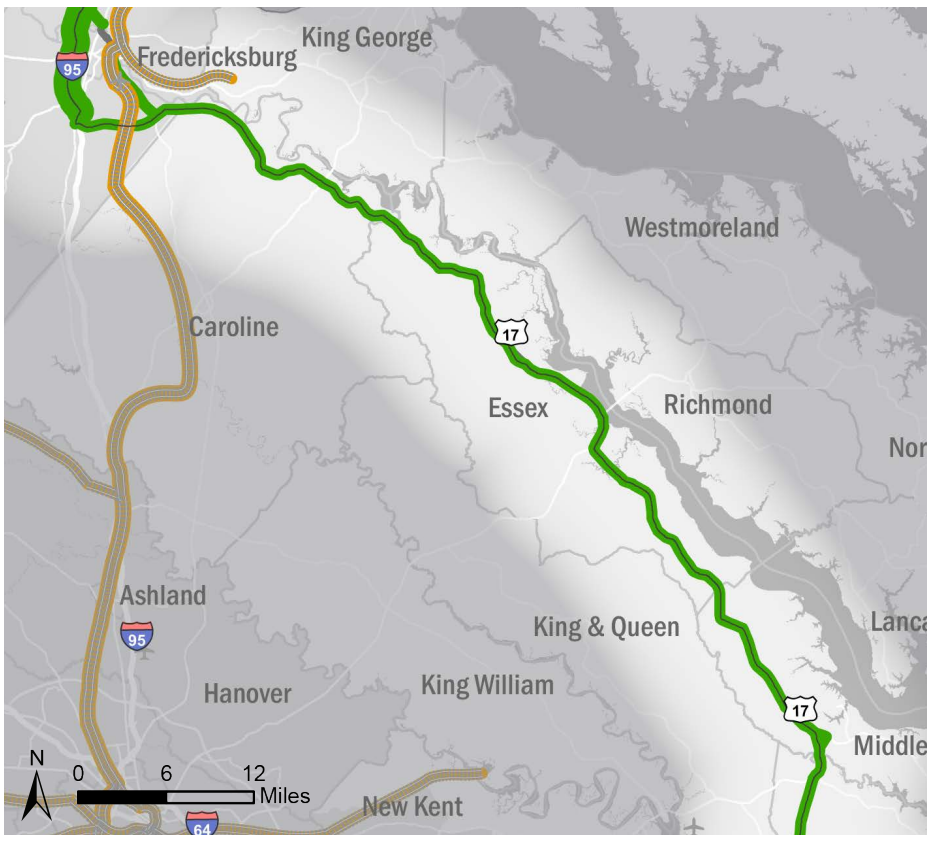
A2 SEGMENT PROFILE



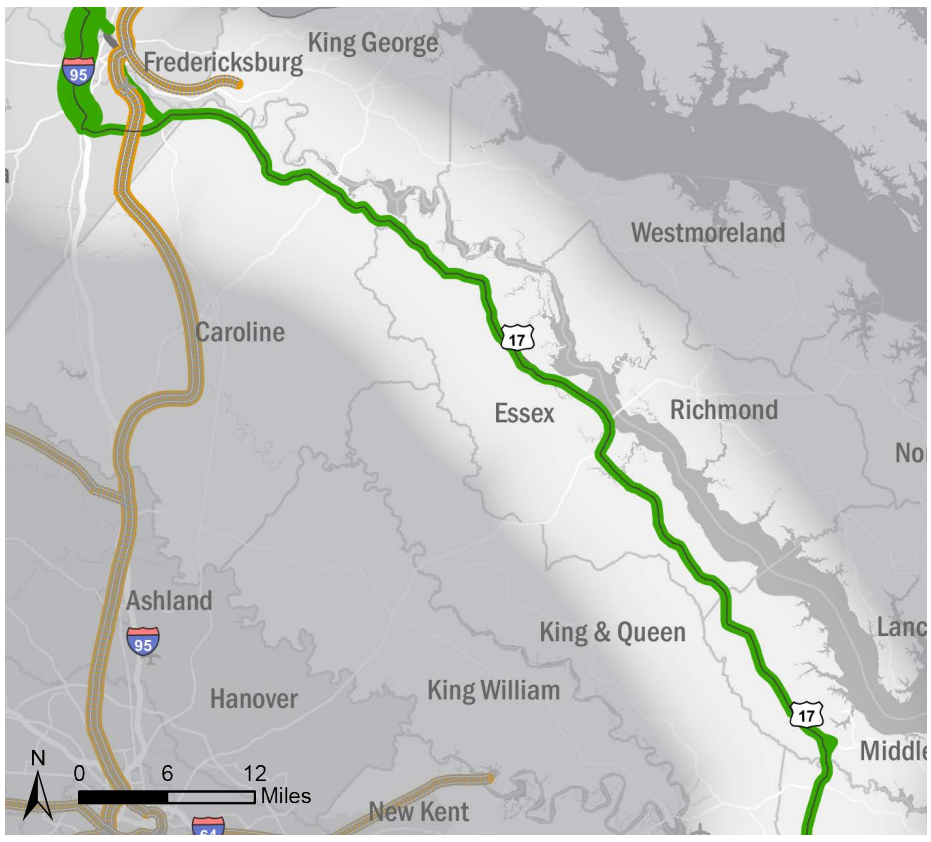
Annual Freight by Tonnage, 2012



Annual Freight by Tonnage, 2025



Annual Freight by Value, 2012



Annual Freight by Value, 2025

Freight Flows

Although rail does not run parallel to US 17 for the entire length of Segment A2, a short branch owned by CSX, the Sealston Branch, does connect industries on the western end of the Northern Neck to Fredericksburg. In this area east of Fredericksburg, the majority of freight still moves by truck, in terms of both tonnage and value. In total, 1.3 million tons (65 percent) of freight travels through this section of Segment A2 by truck, compared to 751,000 tons by rail. By value, the difference is even starker, with $740 million (79 percent) of freight value traveling by truck, compared to $195 million by rail. On average, a ton of freight traveling through this section of Segment A2 by truck is worth $533 while a ton of freight traveling by rail is worth $259. In 2025, both rail and truck freight tonnages and total values in Segment A2 are expected to increase, and the percentage of freight traveling by truck is expected to increase slightly to 72 percent by tonnage and 80 percent by value. Value per ton on trucks is expected to slip to $429, while value per ton on rail should remain nearly the same, at $267.

Truck Freight (in tons)

- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Rail Freight (in tons)

- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Truck Freight

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility

Rail Freight

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility

Redundancy and Mode Choice

Comparable Travel Options

Hampton Roads (Norfolk) to DC

Inter-City Bus	Train	Air
5 Trips per Day 5:30 Travel Time $18 Est. Cost	1 Trips per Day 4:45 Travel Time $42 Est. Cost	4 Trips per Day 1:05 Travel Time $115 Est. Cost

Auto

Via US 17: 3:45 Travel Time $117 Est. Cost
Via I-64/I-95: 3:10 Travel Time $109 Est. Cost

Hampton Roads (Norfolk) to Fredericksburg

Inter-City Bus	Train
2 Trips per Day 5:40 Travel Time $22 Est. Cost	1 Trips per Day 3:10 Travel Time $38 Est. Cost

Auto

Via US 17: 2:45 Travel Time $82 Est. Cost
Via I-64/I-95: 2:30 Travel Time $81 Est. Cost

Fredericksburg to Winchester

Inter-City Bus	Train
0 Trips per Day 0:00 Travel Time $0 Est. Cost	0 Trips per Day 0:00 Travel Time $0 Est. Cost

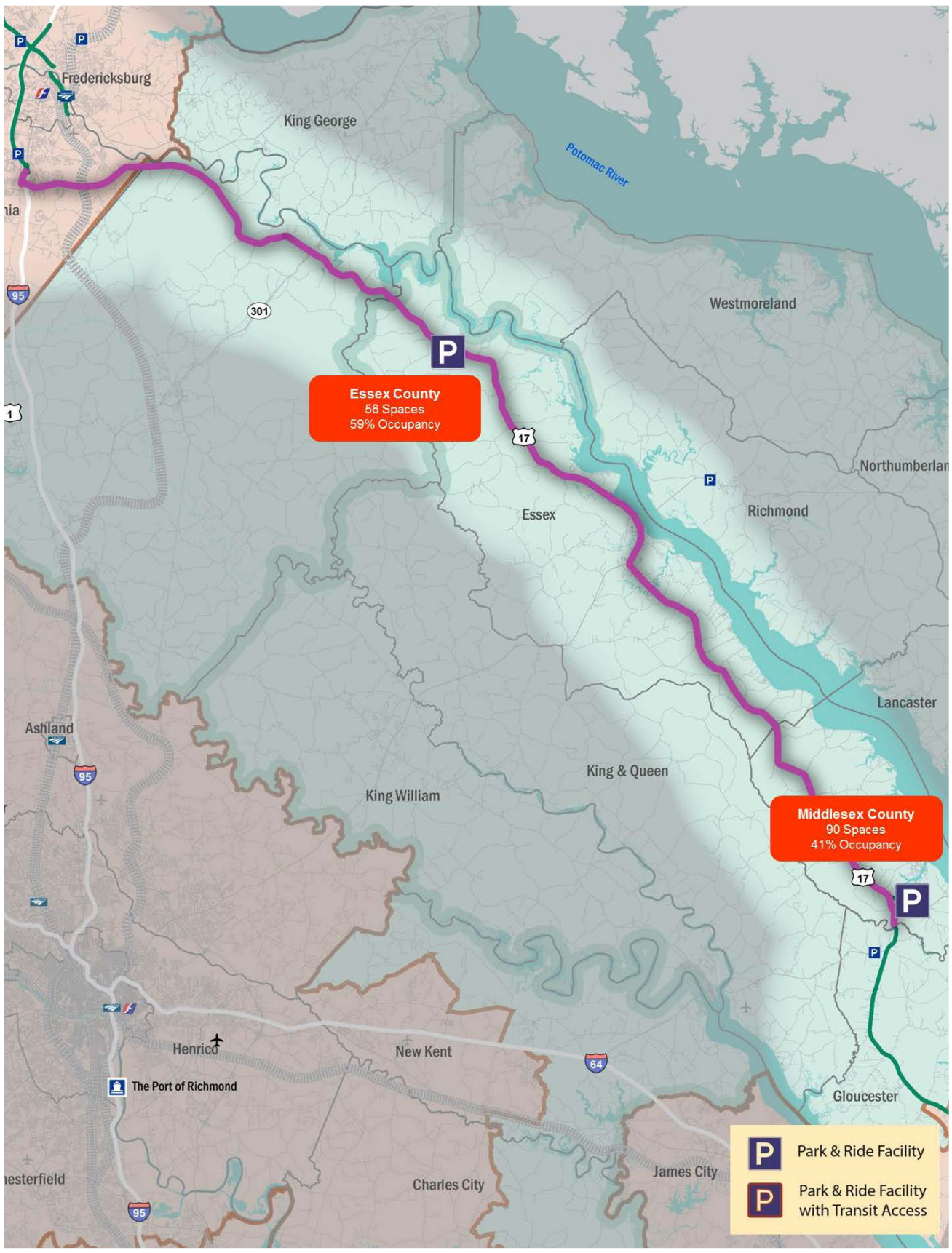
Auto

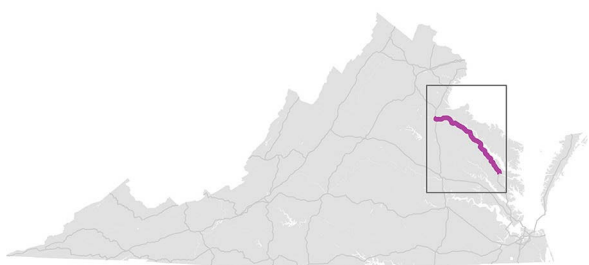
Via US 17: 1:35 Travel Time $45 Est. Cost

Passenger trips on Segment A2 of the Coastal Corridor have few travel options, both in terms of travel path and mode choice. While US Highway 17 does not have a parallel facility, passengers traveling from Hampton Roads to Northern Virginia and Washington DC can make the trip in similar time using I-64 and I-95. However, applying the 2014 federal standard mileage rate of 56 cents per mile, trips from Hampton Roads to Fredericksburg or Washington DC would be more expensive by automobile than by the other available modes. Trips from Hampton Roads to areas west of I-95, including Winchester, can only be made by automobile.

Park-and-Ride

Within Segment A2, commuters can utilize several Park-and-Ride locations. Mathews County provides the highest number of Park-and-Ride spaces and locations, while Essex County has the highest utilization rate of spaces available in the region. However, no county or city within the Segment A2 area has a rate higher than the statewide average for Park and Ride utilization, which is 76 percent.





A2 SEGMENT NEEDS

Safety

Performance Metrics

Number of Severe Crashes	85
Severe Crashes/Million VMT	2.5
Number of Railroad Crashes	1

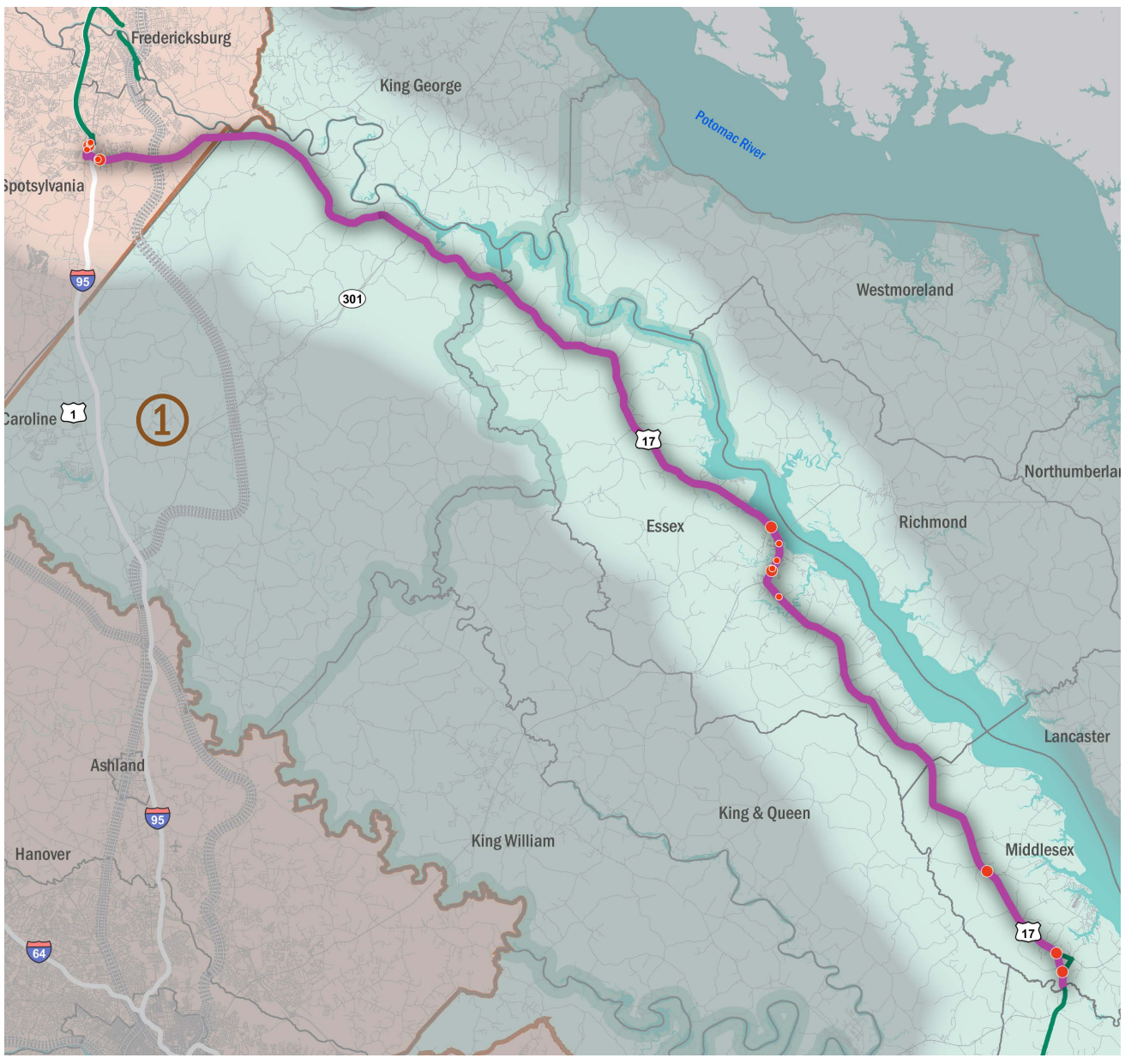
While only 85 severe crashes occurred on Segment A2 between 2010 and 2012, this result is the highest crash rate in the corridor (2.5 crashes per million VMT). There are few areas with high concentrations of severe crashes in Segment A2. In one area, 22 crashes occurred over about 2.5 miles of US 17 in the Town of Tappahannock. All incidents along this span occurred at intersections between Airport Road and Ball Street.

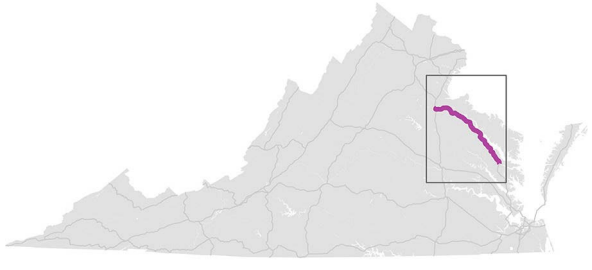
Fatality and Injury Crashes (2010 - 2012)

- < 5
- 5 - 10
- 11 - 15
- 16 - 20
- > 20

Railroad Incidents/ Accidents per County (2011-2014)

#





A2 SEGMENT NEEDS

Congestion

Performance Metrics

Person Hours of Delay per Mile 6

Freight Ton Hours of Delay per Mile 4.1K

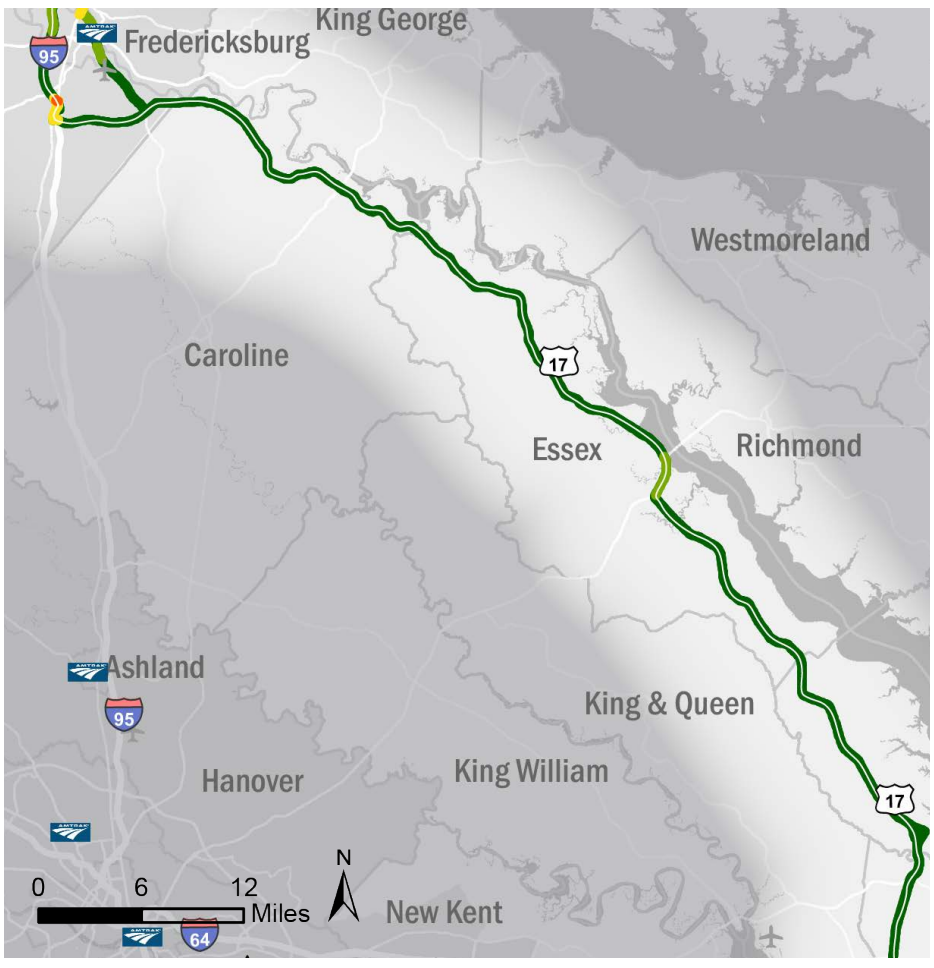
Passenger Delays

Segment A2 covers the sections of the Coastal Corridor (Corridor A) with the least congestion for passenger travel, with only 920 person-hours of delay. Passenger delay throughout most of the segment is less than 50 person-hours per mile. The only portion of Segment A2 with passenger congestion issues is an area where US 17 runs concurrently with US 1 south of Fredericksburg, where congestion reaches almost 170 person-hours of delay. Peak-period passenger delays account for 46 percent of daily congestion.

Freight Delays

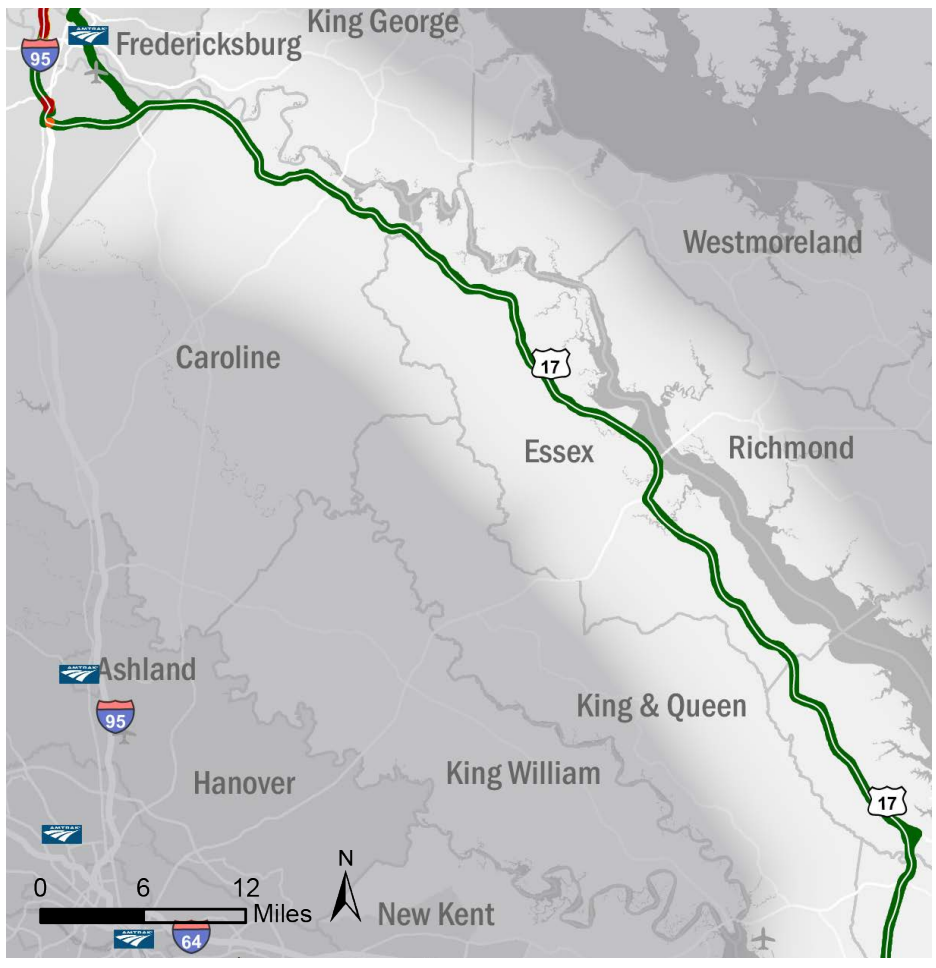
Freight delays along Segment A2 are higher than Segment A1, although the ton-hours of delay per mile are significantly less than the CoSS statewide average. Freight delays throughout most of the segment are less than 100,000 ton-hours per mile. The only portion of Segment A2 with freight congestion issues is an area where US 17 runs concurrently with US 1 south of Fredericksburg, where congestion reaches almost 900,000 ton-hours of delay. Peak-period freight delays account for about 45 percent of daily congestion, more than the average peak-period contribution to congestion along CoSS segments.

Daily Person Hours of Delay Per Mile

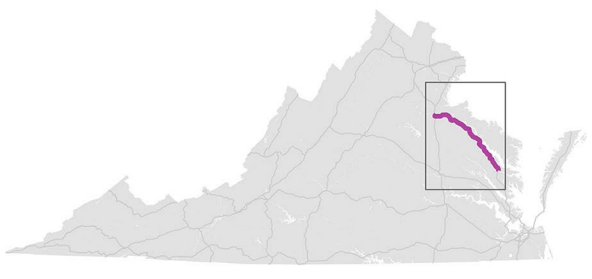


< 50
51 - 100
101 - 250
251 - 500
> 500

Daily Freight Ton Hours of Delay Per Mile



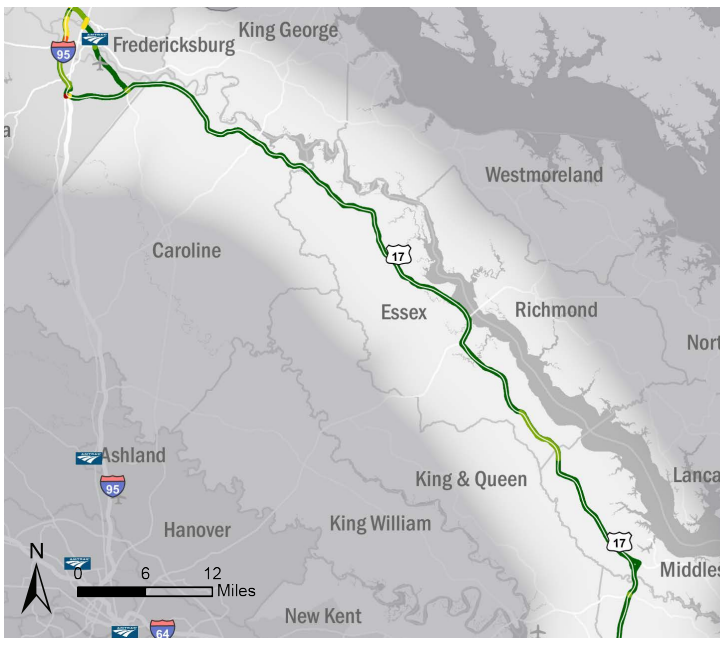
< 100,000
100,001 - 250,000
250,001 - 500,000
500,001 - 1,000,000
> 1,000,000



Reliability

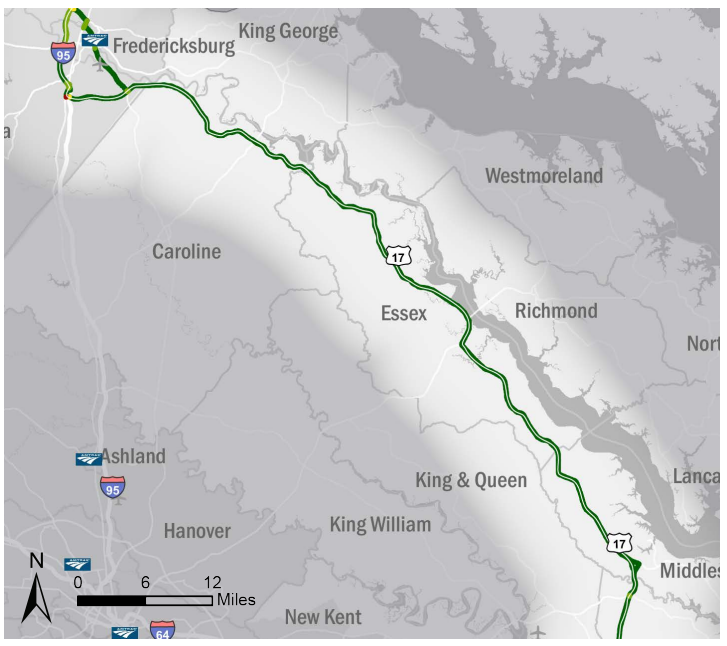
Weekday Peak Period

Reliability of travel during the peak period on a typical weekday on Segment A2 ranges from 0.00 to 0.93 in terms of reliability index, with an average value of 0.12. While this segment has an average level peak period reliability index, only a short segment where US 17 runs concurrently with US 1 in Spotsylvania County has a reliability index value exceeding the statewide threshold. Higher peak period reliability index values indicate that peak period travel (often related specifically to commuter traffic) is the most unpredictable.



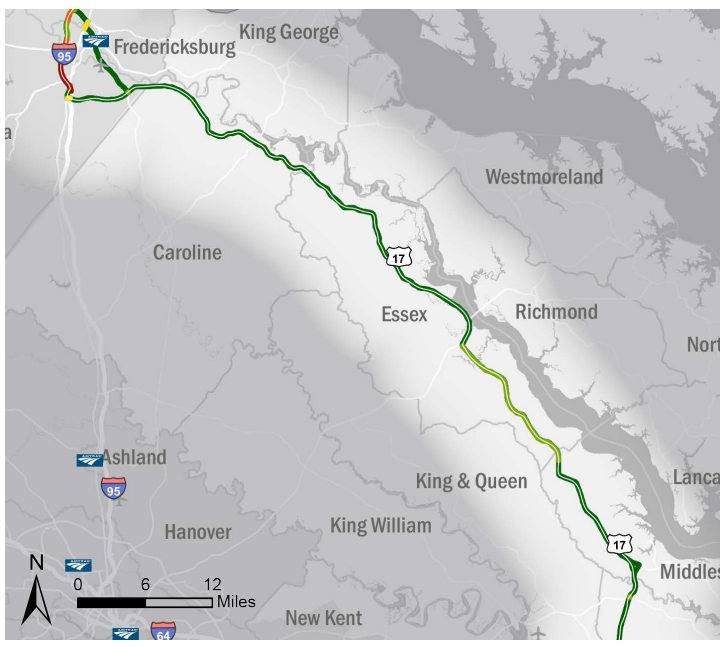
Weekday

Reliability of travel during a typical weekday ranges from 0.02 to 0.84 in terms of reliability index, with an average value of 0.1. While this segment has an average level weekday reliability index, only a short segment at the intersection with US 1 in Spotsylvania County has a reliability index value exceeding the statewide threshold. Higher weekday reliability index values indicate that daily weekday traffic is more unpredictable than weekend traffic.



Weekend

Reliability of travel during a typical weekend ranges from 0.03 to 0.52 in terms of reliability index, with an average value of 0.13. While this segment does have a weekend reliability index higher than average for the CoSS segments statewide, none of the locations along Segment A2 have reliability index values exceeding the statewide threshold.

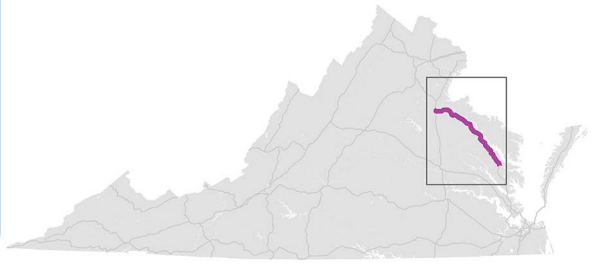


Reliability Index

- < 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- > 0.8
- Primary facility (in white)

Statewide reliability index thresholds have been set for weekday peak, weekday and weekend travel to assess the reliability of travel on each segment on all corridors of statewide significance. A higher reliability index indicates that travel times are more unreliable. The following are the reliability index thresholds:

- Weekday Peak - 0.80
- Weekday - 0.40
- Weekend - 0.60



A2 SEGMENT NEEDS

Summary of Needs

Identified locations are approximate. See "Summary of Needs" table on the following page for details.

Redundancy

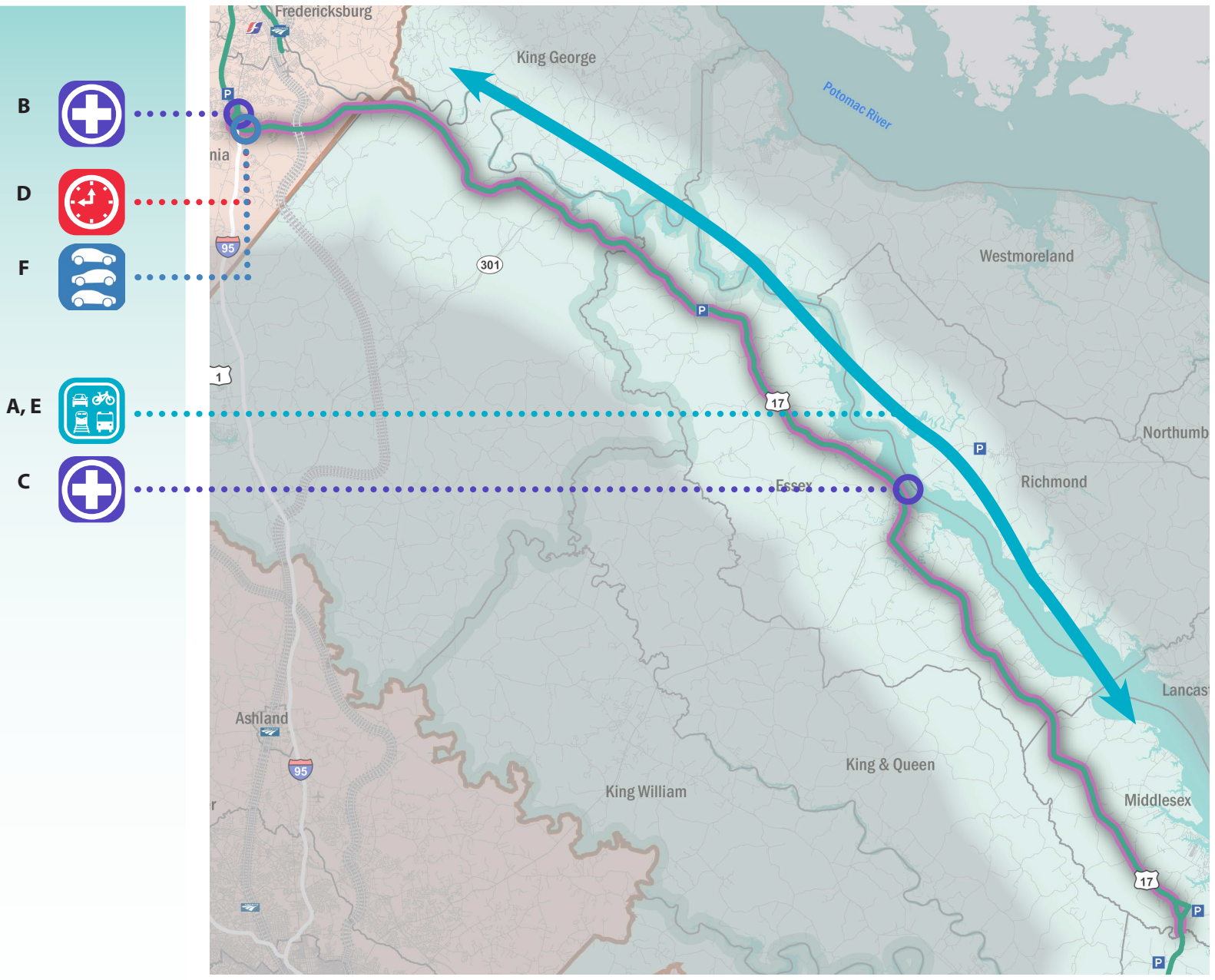
Mode Choice

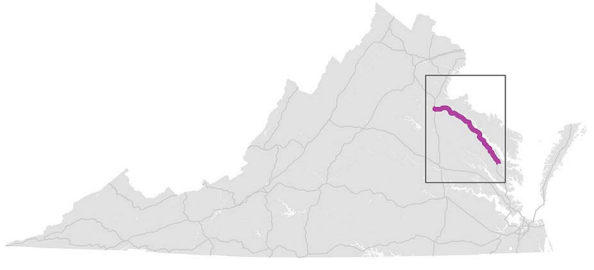
Safety

Congestion

Bottlenecks

Reliability

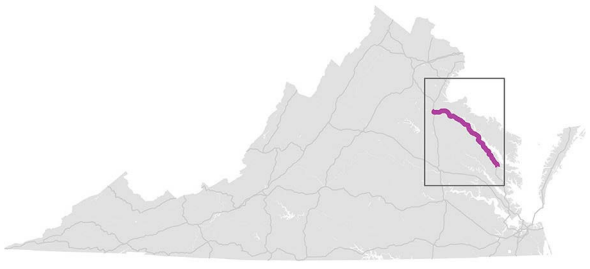




A2 SEGMENT NEEDS

Summary of Needs - A2 Segment

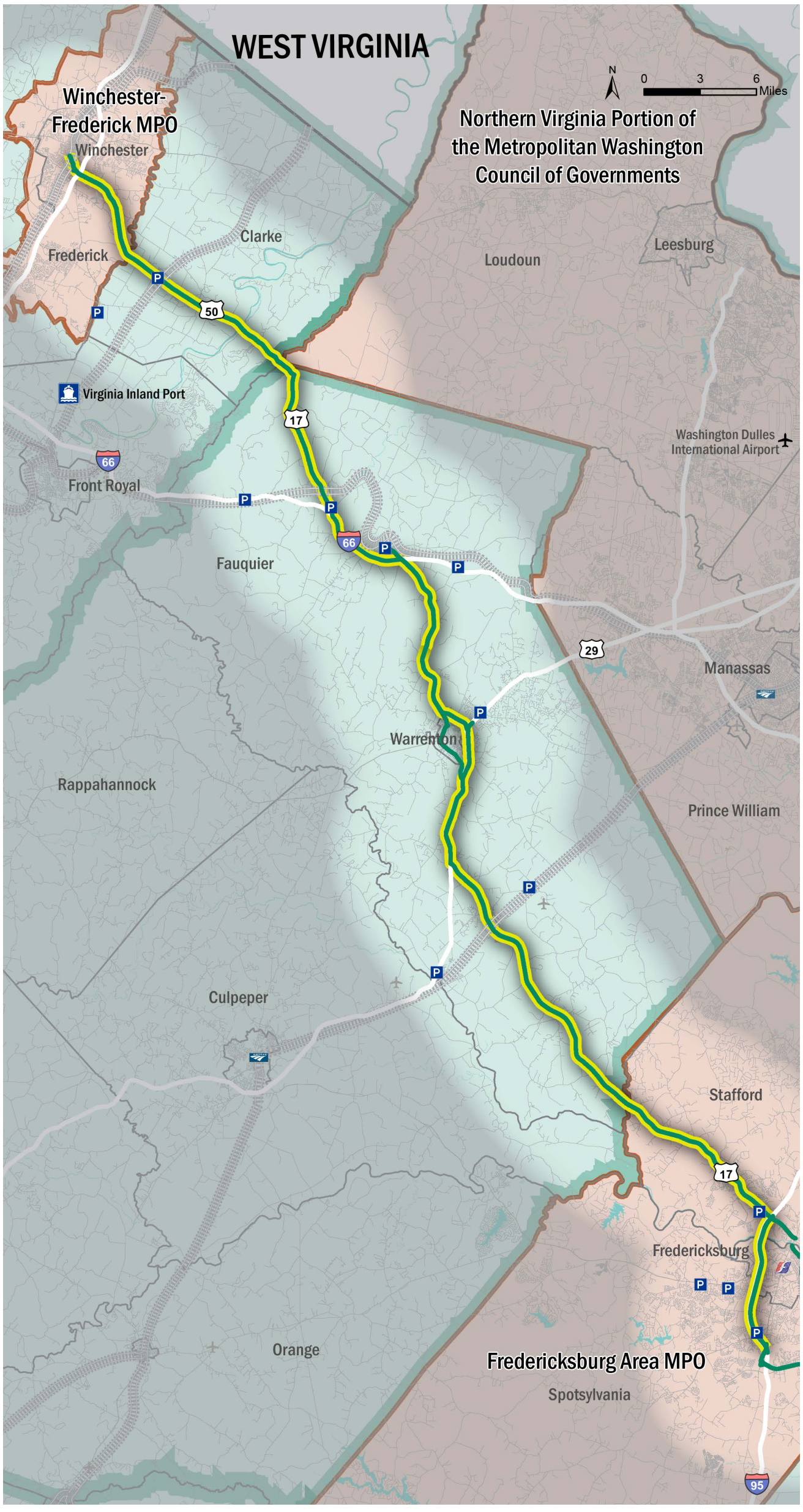
A.		Limited multi-modal commute options along US 17 in the Northern Neck and Middle Penninsula north to Fredericksburg/DC regions
B.		Safety issues at interchange of US 17/US 1/I-95
C.		US 17 in Tappahannock: 22 severe crashes at intersections
D.		Reliability issue at US 17 and I-95 south of Fredericksburg
E.		Limited availability of transit options from Hampton Roads to Metropolitan Washington region (5 buses, 1 rail trips daily) and Fredericksburg (2 buses, 1 rail trip daily). No transit options from Hampton Roads to Winchester.
F.		Congestion issue on US 17 between US 1 and I-95 south of Fredericksburg



IV. Segment A3

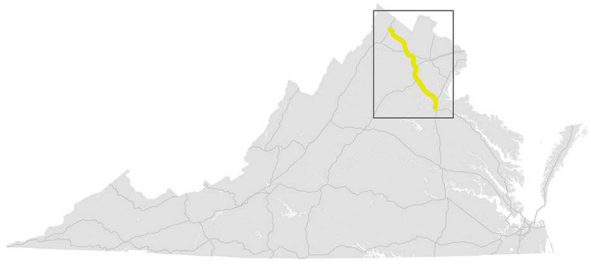
Corridor Segment A3 Components

- US 17 and US 17 Business

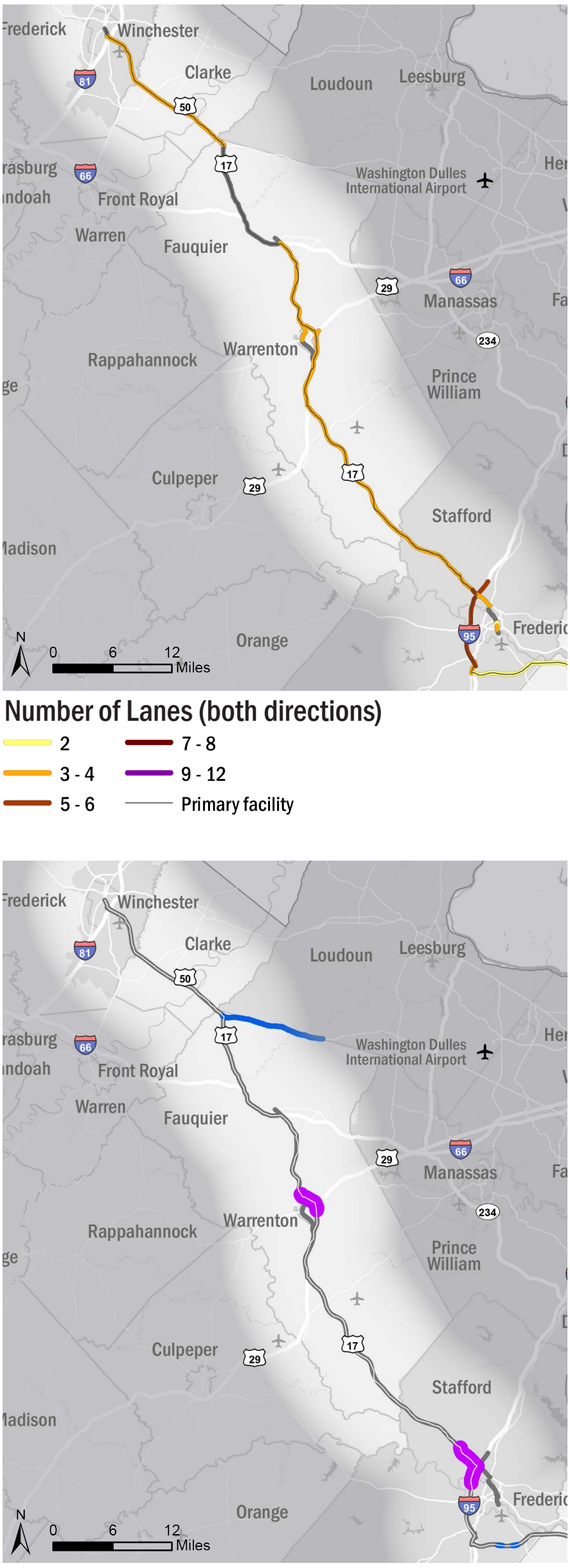


A3
Corridor Component Road
Railroad
Airport Facility
Amtrak Facility
Greyhound Facility
VRE Facility
Metrorail Facility
Port Facility
Park & Ride Facility

MPO Area
Planning District Area



A3 SEGMENT PROFILE



Number of Lanes (both directions)

- 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 12
- Primary facility

Segment A3 begins in Spotsylvania County, where US 17 joins I-95, and progresses north, leaving I-95 north of Fredericksburg, and serves Stafford, Fauquier, Clarke and Frederick Counties, as well as the Cities of Fredericksburg and Winchester. The segment travels through the Fredericksburg Area and the Winchester Area. The segment includes portions that overlap with I-66, I-95, US 1, US 29, and US 50.

Highway Facilities: US 17 is primarily a four-lane facility throughout its length, although it is a six-lane facility where it runs concurrently with I-95. Along US 17, there is significant out-of-state freight and passenger traffic that travels along the roadway. US 17 serves both through and local commuting traffic in rural areas. There are no parallel highway facilities that follow US 17. Segment A3 functions as an alternative connection from I-95 to I-81 and the Virginia Inland Port. Restrictions on US 17 between I-66 and US 50 prohibit through tractor trailers.

Transit Service: Transit services provide connections from Segment A3 to Northern Virginia and Washington DC, including Virginia Railway Express (VRE) service at Fredericksburg and commuter bus services throughout the segment. Amtrak and Greyhound provide service from Fredericksburg, and Park-and-Ride locations are available, especially near Fredericksburg.

Rail Facilities: Rail facilities parallel Segment A3 in the area where US 17 runs concurrently with I-95 and travel parallel to CSX's National Gateway Corridor.

Port Facilities: US 17 provides a connection to the Virginia Inland Port via I-66.

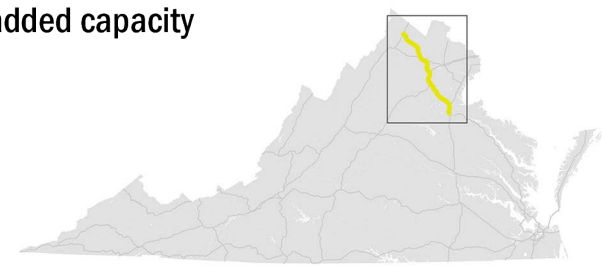
Airport Facilities: No commercial air service is available in Segment A3, though two reliever airports and two general aviation airports are present.

Major planned and future projects include:

- Ramp improvements of I-95 at Exit 133 (US 17)
- Addition of two through-lanes in Stafford County

Future Projects

- Reconstruction with added capacity
- Safety improvements
- Primary facility

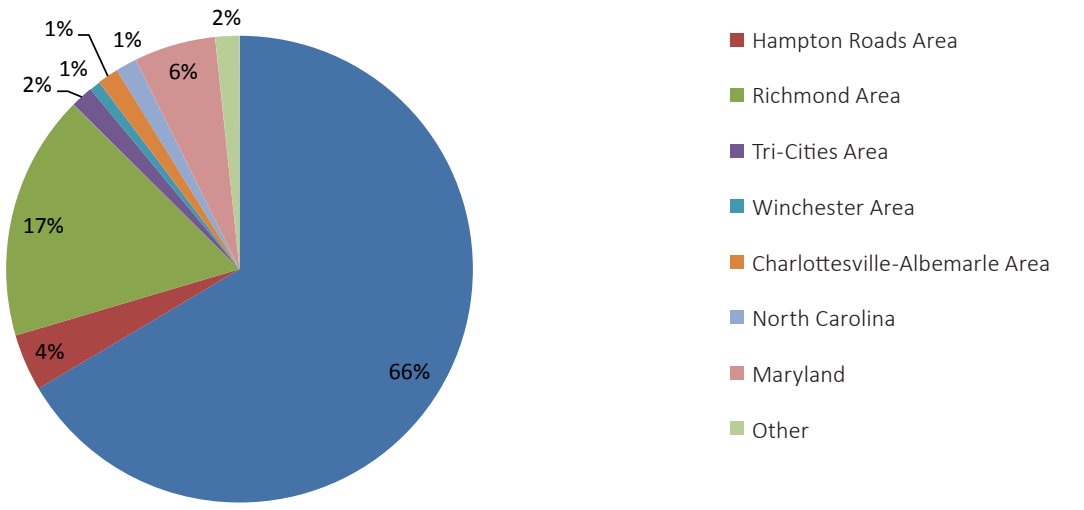


Travel Demand

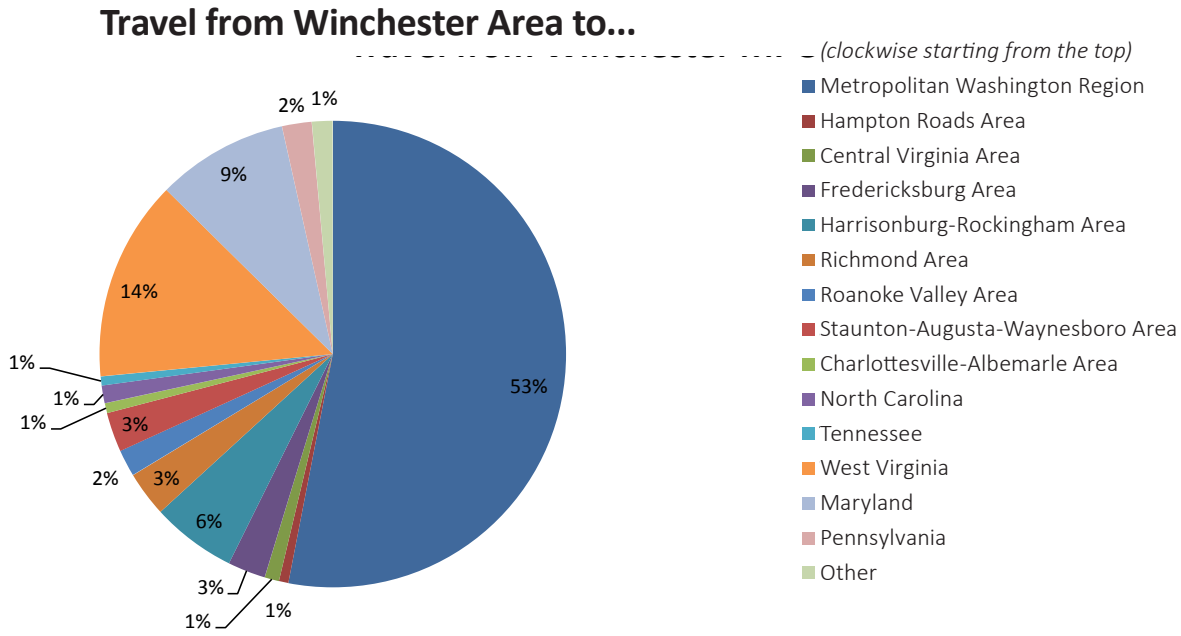
Passenger Demand

The northernmost segment of Corridor A connects the Fredericksburg Area with the Winchester area in the far northwest portion of the state. Travel between Winchester and the Metropolitan Washington region, which would likely use a portion of Segment A3, accounts for just over three percent of the intercity passenger travel in the Commonwealth. Of the intercity passenger traffic originating in the Fredericksburg Area, only a very small portion (the one percent destined for Winchester) is likely to use this segment. More of the intercity passenger travel originating in Winchester is likely to use Segment A3, including the 53 percent destined for the Metropolitan Washington region and the three percent destined for Fredericksburg.

Travel from Fredericksburg Area to...



Travel from Winchester Area to...



A3 SEGMENT PROFILE

Freight Demand

By truck, Segment A3 carried 103 million tons of freight worth $160 billion in 2012, and is estimated to carry 143 million tons of freight worth $236 billion in 2025. The major travel patterns on Corridor A are similar to those on Corridor K, as US 17 (Segment A3) runs concurrently with I-95 (Segment K3) near Fredericksburg. Interstate truck freight traffic passing though Virginia on Corridor A accounts for more than 40 percent of the total tonnage in both 2012 and 2025, as well as 60 percent of the total freight value for both years. In terms of tonnage, North Carolina is the largest source of truck freight on Corridor A and Maryland is the largest destination outside of the Commonwealth. In terms of value, Florida is the largest destination for truck freight on Corridor A. Most of the major truck freight travel patterns on Corridor A are between the Middle Atlantic and Southeastern regions. Approximately five to six percent of freight on Corridor A originates from the jurisdictions adjacent to Segment A3, representing only around one percent of the total corridor truck freight value.

Truck Freight

Major Origins (by Tonnage)
1. Virginia (34% / 35%)
2. North Carolina (15% / 14%)
3. Pennsylvania (10% / 10%)
4. Maryland (8% / 8%)
5. Florida (6% / 5%)

Corridor Tonnage Originating in Segment A3: 6% / 5%

Major Origin-Destination Pairs for Freight
North Carolina and Maryland
North Carolina and Pennsylvania
North Carolina and New York
City of Norfolk* and North Carolina
City of Chesapeake and North Carolina

Percentages represent 2012 / 2025 values.
*Includes freight passing through the Port of Virginia.

Major Destinations (by Tonnage)
1. Virginia (34% / 36%)
2. Maryland (13% / 13%)
3. North Carolina (9% / 9%)
4. Pennsylvania (9% / 8%)
5. New York (8% / 7%)

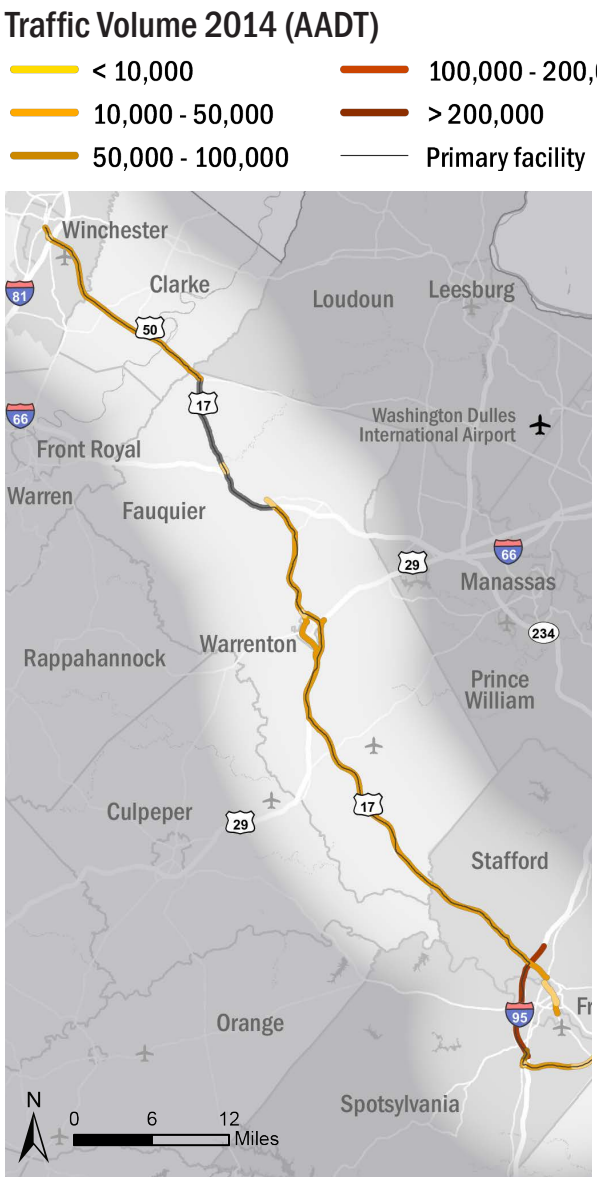
Corridor Tonnage Destined for Segment A3: 3% / 3%

Traffic Conditions

Traffic Volume and AADT

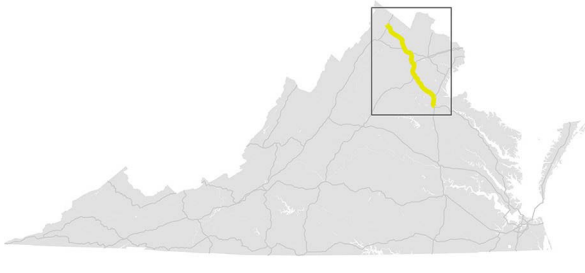
Traffic volume on Segment A3 is moderate relative to traffic volumes on the other segments of Corridor A. The highest levels of traffic in 2014 occurred on the portion where US 17 runs concurrently with I-95, where daily volumes reached over 140,000 vehicles per day. Elsewhere along the segment, 2014 volumes are less than 45,000 vehicles per day. The concurrent portion of I-95/US 17 is projected to have the highest growth in traffic volumes by 2025 (more than 25,000 additional vehicles per day) and will continue to have the highest traffic volumes of anywhere on Segment A3. The segment of US 17 that runs concurrently with US 29 south of Warrenton is projected to experience traffic volumes greater than 50,000 vehicles per day by 2025.

Traffic Volume 2014 (AADT)

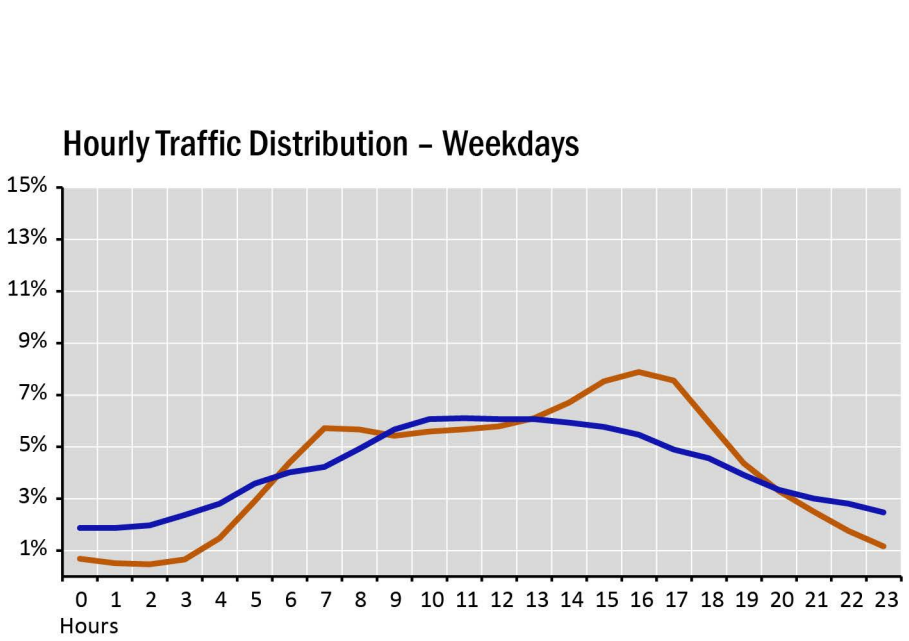


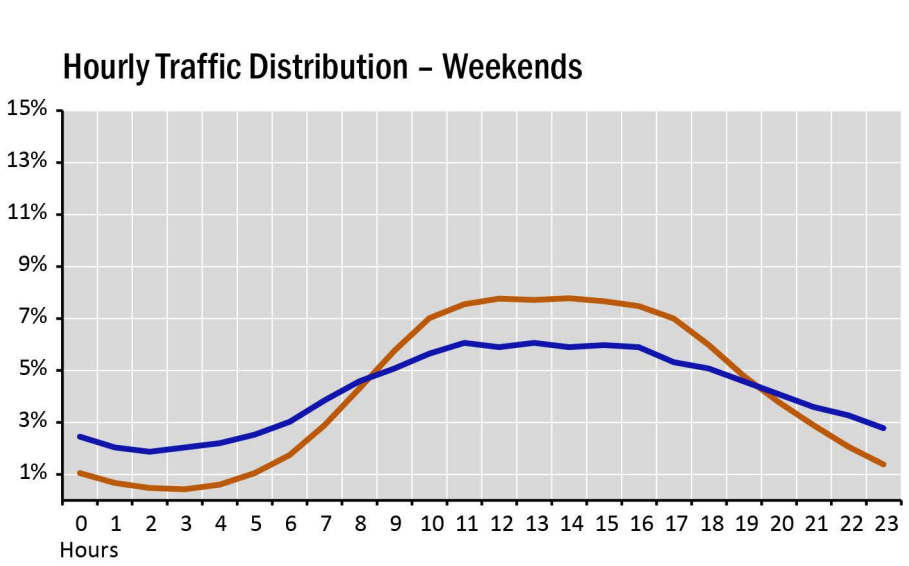
Traffic Volume 2025 (AADT)

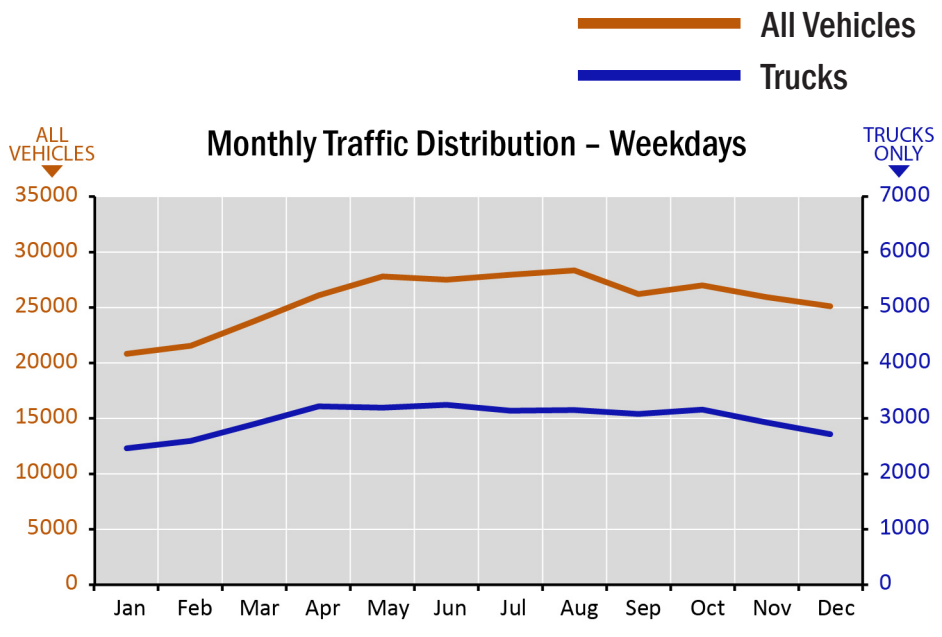
Change in Traffic Volume 2014- 2025 (AADT)

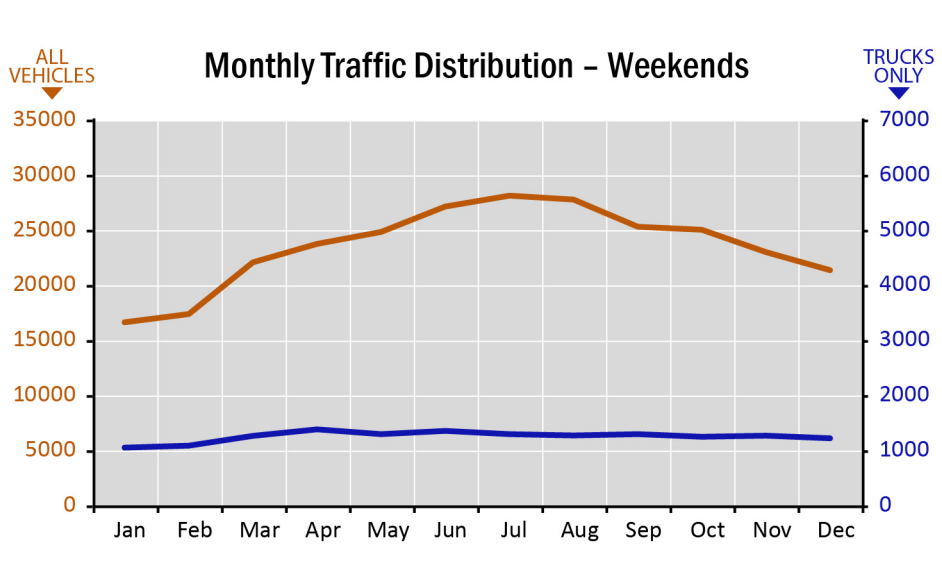


A3 SEGMENT PROFILE









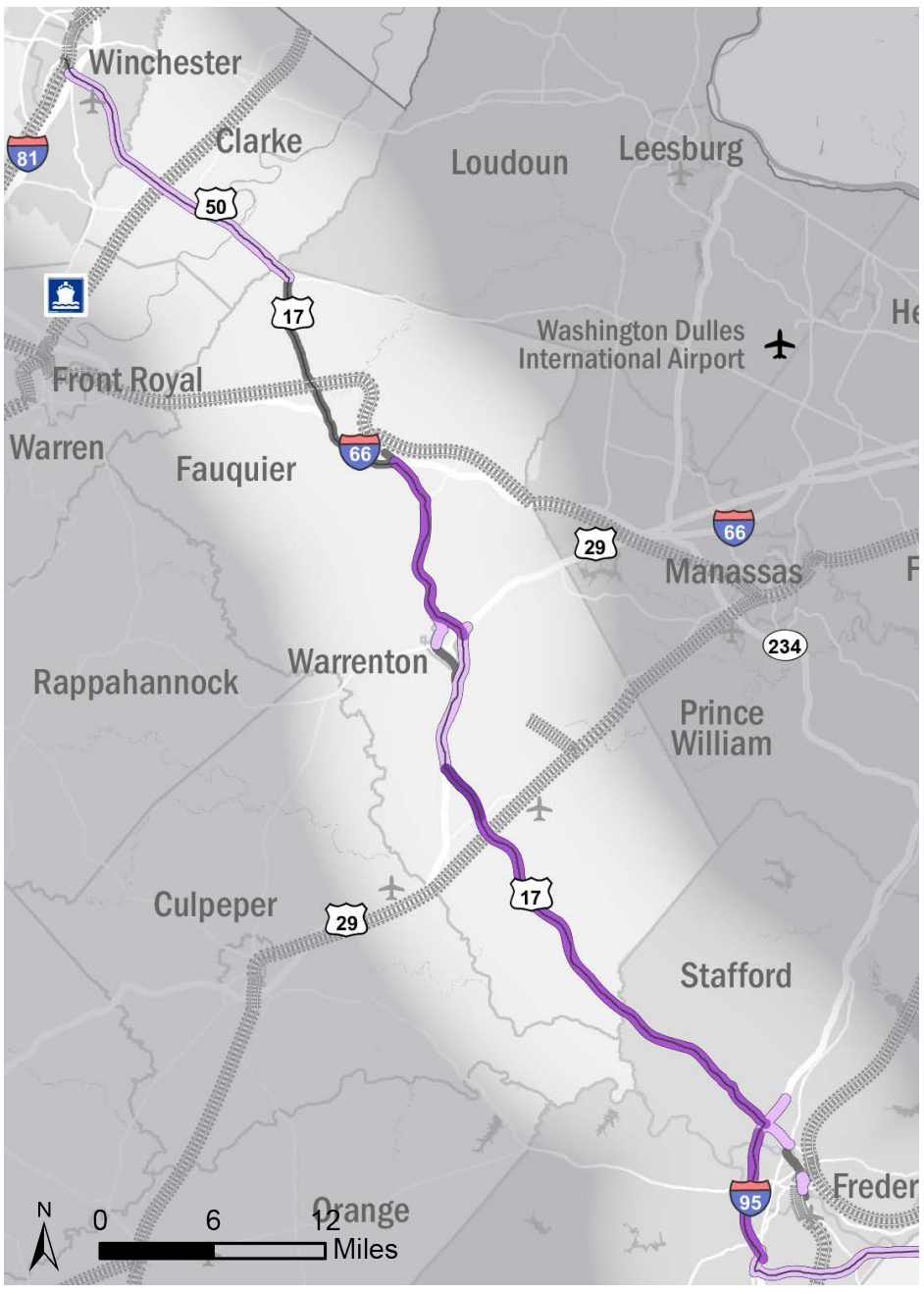
Traffic Distribution

On average, traffic on Segment A3 is distributed throughout the day as shown in the graphs below. Weekday traffic shows two peak periods over the course of the day, although traffic levels remain relatively high throughout the middle of the day. The highest hourly traffic occurs between 4 and 5 p.m. and accounts for 7.8 percent of daily traffic. The morning peak hour is less busy, with the 7 to 8 a.m. hour accounting for 5.7 percent of daily traffic. The combined weekday traffic in the two peak periods (from 6 to 10 a.m. and from 3 to 7 p.m.) accounts for 50 percent of total daily traffic. Patterns for truck traffic are different from passenger traffic, with a smaller midday peak between 10 a.m. and 4 p.m. Weekend traffic patterns are also different from the typical commute patterns, showing an even distribution of traffic during the middle of the day, between 11 a.m. and 6 p.m., which accounts for over 60 percent of daily traffic. Weekend truck traffic peaks between 11 a.m. and 5 p.m.

Weekday traffic volumes on Segment A3 vary by as much as 36 percent throughout the year, with the highpoint in August (around 28,000 vehicles per day) and the low point in January (around 21,000 vehicles per day). Truck volumes vary less than passenger volumes throughout the year, with the June high (around 3,200 vehicles per day) being 32 percent higher than the January low (around 2,500 vehicles per day). Weekend traffic levels vary even more, and the highest levels of weekend traffic (July, around 28,000 vehicles per day) are 70 percent higher than January levels (around 16,000 vehicles per day), indicating significant seasonal traffic variation on this segment. Weekend truck traffic is highest in April and 32 percent higher than the January low. Traffic conditions on Segment A3 are much more responsive to variations in automobile traffic than truck traffic, as truck traffic accounts for only five percent of daily traffic.

Truck Volume

The percent of average daily traffic comprised of heavy trucks on Segment A3 is high relative to other segments in Corridor A. On I-95/US 17 in Segment A3, heavy trucks make up seven percent of total traffic. To the north, between I-95 and US 29, heavy trucks along US 17 comprise 8 to 11 percent of total traffic. North of Warrenton, heavy vehicles account for less than six percent of total vehicle traffic on US 17.

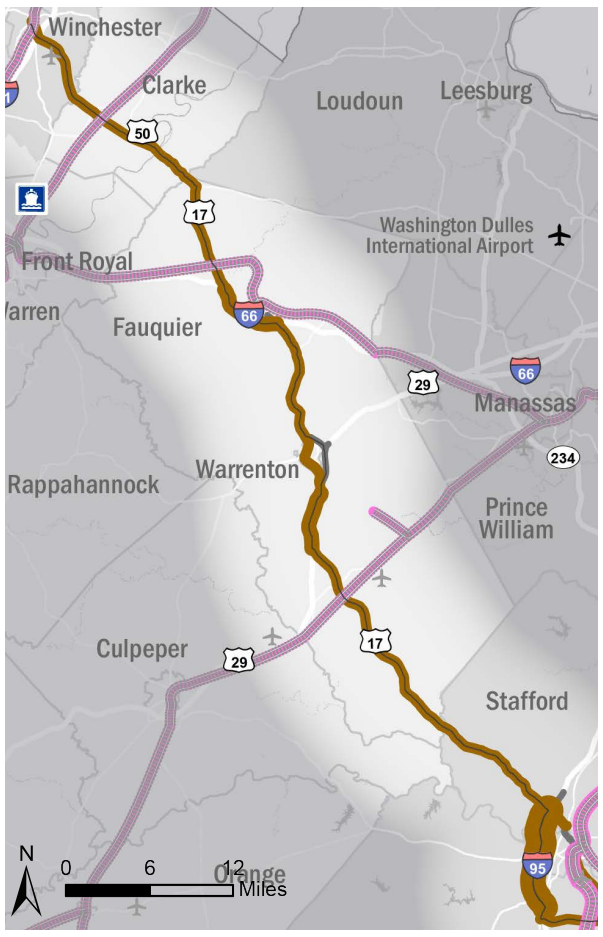


Percent Heavy Trucks

- < 5%
- 5% - 10%
- 10% - 15%
- 15% - 20%
- > 20%
- Primary facility

A3 SEGMENT PROFILE

Annual Freight by Tonnage, 2012

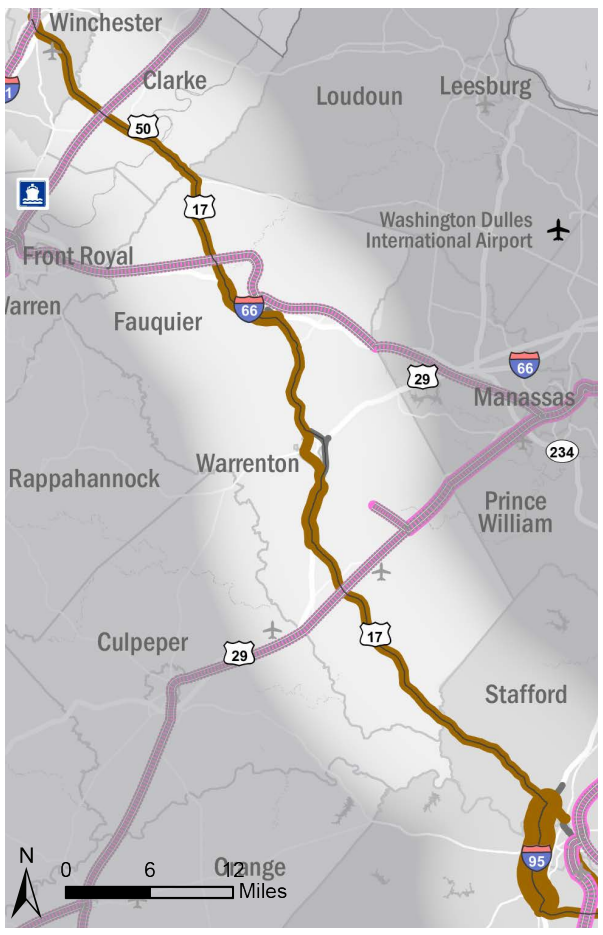


Freight Flows

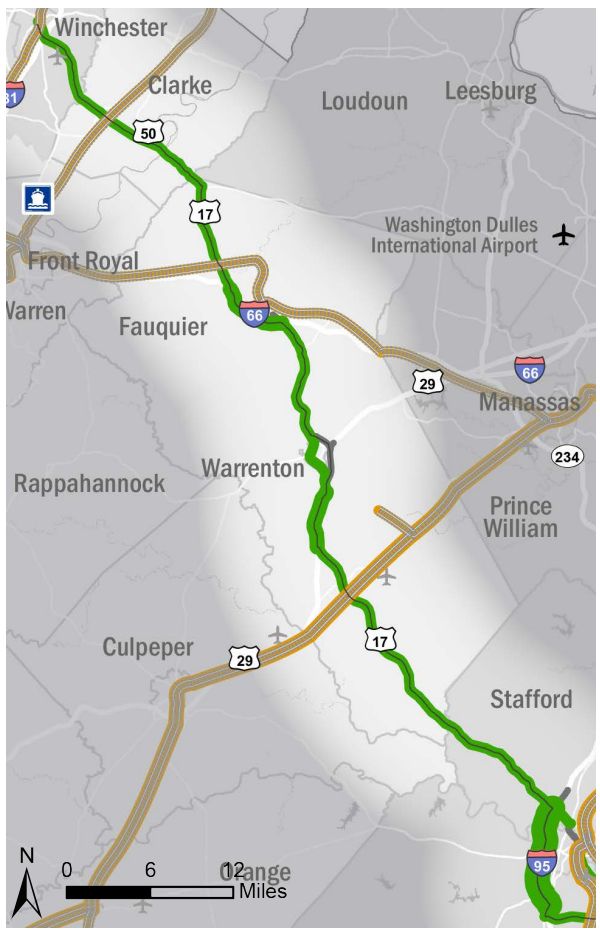
In the Fredericksburg area, where Segment A3 runs concurrently with I-95, freight is moved primarily by truck, in terms of both tonnage and value. In total, 103 million tons (87 percent) of freight travels through this section of Segment A3 by truck, compared to 16 million tons by rail. By value, the difference is even starker, with $160 billion (90 percent) of freight value traveling by truck, compared to $18 billion by rail. On average, a ton of freight traveling through the Fredericksburg section of Segment A3 by truck is worth $1,553 while a ton of freight traveling by rail is worth $1,129. In 2025, both rail and truck freight tonnages and total values in the Fredericksburg area are expected to increase, but the percentages of tonnage and value moved by truck, and the values per ton on truck and rail, are expected to remain nearly the same.

Similarly, in Fauquier County where Segment A3 runs concurrently with I-66, freight is moved primarily by truck, in terms of both tonnage and value, but the value per ton on rail is higher than the value on truck. 10 million tons (96 percent) of freight travels through this section of Segment A3 by truck, compared to 478,000 tons by rail. By value, truck is still the primary carrier of freight, with $13 billion (92 percent) traveling by truck, compared to $1.1 billion by rail. On average, a ton of freight traveling through this section of Segment A3 by truck is worth $1,241 while a ton of freight traveling by rail is worth $2,378. In 2025, both rail and truck freight tonnages and total values in this section of Segment A3 are expected to increase, but the percentages of tonnage and value moved by truck, and the values per ton on truck and rail, are expected to remain nearly the same.

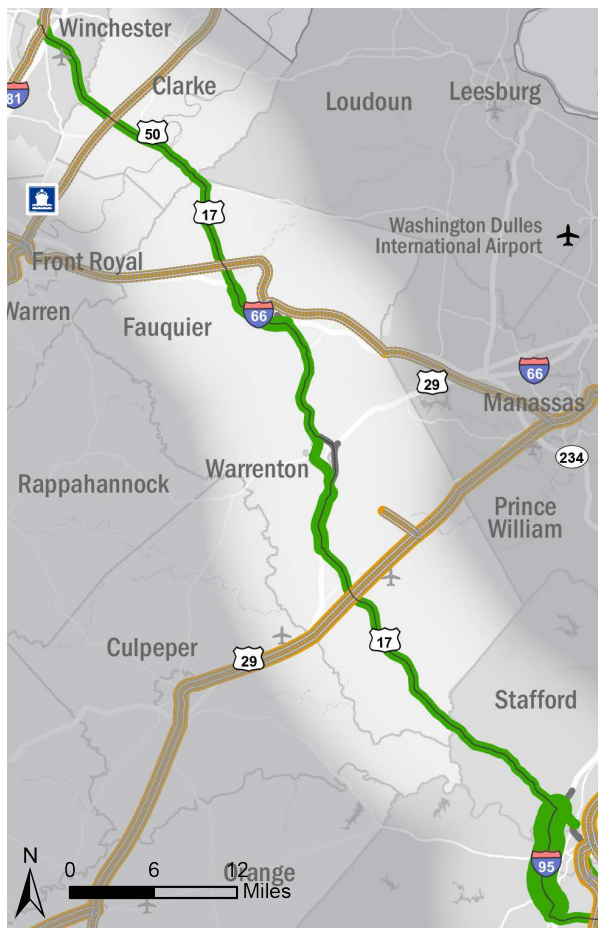
Annual Freight by Tonnage, 2025



Annual Freight by Value, 2012



Annual Freight by Value, 2025



Truck Freight (in tons)

- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Rail Freight (in tons)

- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Truck Freight Value

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility

Rail Freight Value

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility

Redundancy and Mode Choice

Passenger trips on Segment A3 of the Coastal Corridor have few travel options, both in terms of travel path and mode choice. Near Fredericksburg, there are an ample number and variety of mode choices, but those options are related to trips to Northern Virginia and Washington, DC, not following US 17 as it travels northwest towards Winchester. For trips from Fredericksburg to Washington, DC, automobile trips are cost-competitive with the alternate modes, although bus and rail trips occur with far more frequency than in other regions. Trips from the Hampton Roads Area and Fredericksburg to areas west of I-95, including Winchester, can only be made by automobile.

Comparable Travel Options

Fredericksburg to Winchester

Inter-City Bus	*Train*
0 Trips per Day 0:00 Travel Time $0 Est. Cost	0 Trips per Day 0:00 Travel Time $0 Est. Cost

Auto

Via US 17: 1:35 Travel Time $45 Est. Cost

Hampton Roads (Norfolk) to Winchester

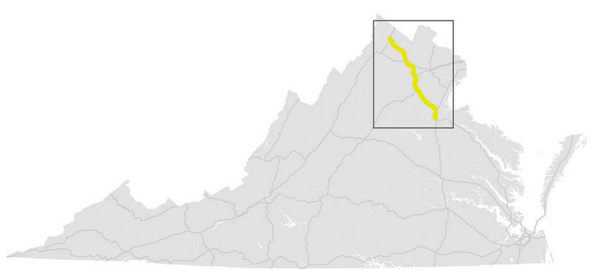
Inter-City Bus	*Train*
0 Trips per Day 0:00 Travel Time $0 Est. Cost	0 Trips per Day 0:00 Travel Time $0 Est. Cost

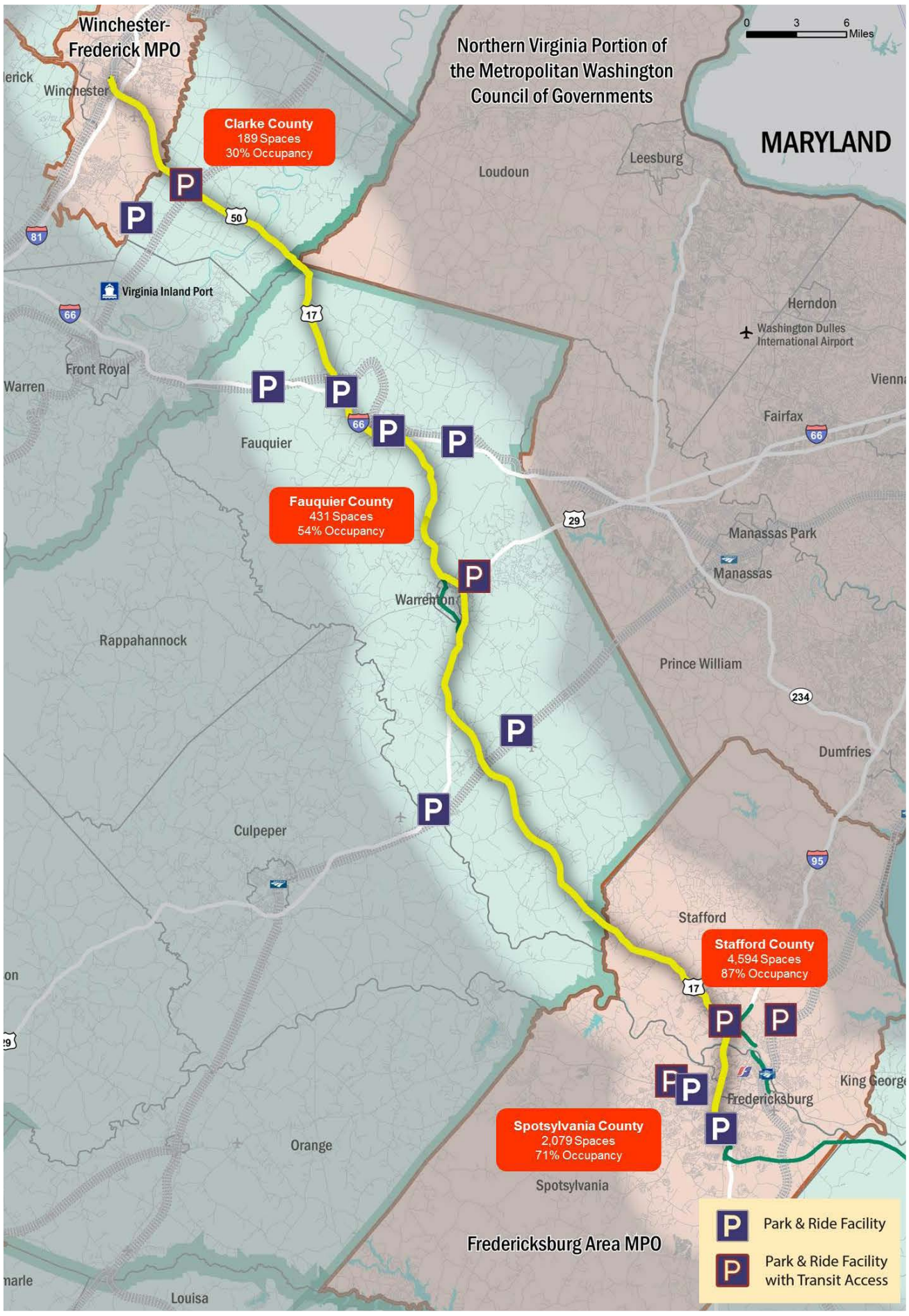
Auto

Via US 17: 4:20 Travel Time $132 Est. Cost
Via I-64/I-95/US 17: 4:00 Travel Time $125 Est. Cost

Park-and-Ride

Within Segment A3, commuters can utilize many Park-and-Ride locations, especially near Fredericksburg. Stafford County provides the highest number of Park-and-Ride spaces and locations, while the City of Fredericksburg has the highest utilization rate of spaces available in the Commonwealth. Stafford County and the City of Fredericksburg both have higher rates for Park-and-Ride utilization (87 percent and 124 percent, respectively) than the statewide average, which is 76 percent.





A3 SEGMENT NEEDS

Safety

Performance Metrics

Number of Severe Crashes	224
Severe Crashes/Million VMT	1.3
Number of Railroad Crashes	5

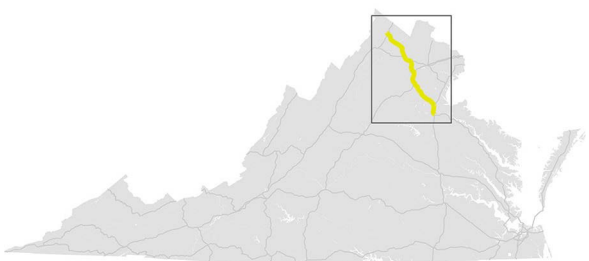
Between 2010 and 2012, 224 severe crashes occurred on Segment A3, resulting in the lowest crash rate (1.3 crashes per million VMT) on the Coastal Corridor. The largest concentration of severe crashes occurred on US 17 (Warrenton Road) just north of I-95, north of Fredericksburg, over a span of about 1.6 miles. Between Sanford Drive and International Parkway, there were 58 crashes. Of the 58 crashes, 11 occurred at the intersection with International Parkway and 12 occurred at the intersection with Sanford Drive. Another area with a high concentration of crashes is along approximately 1.5 miles of Warrenton Road/US 17 Business in Falmouth. There were 41 crashes along the span between I-95 and US 1, of which 14 occurred at the intersection with Washington Street. Another high-crash area is a 0.9-mile span along US 17 (Millwood Pike) near the intersection with I-81 in Winchester. North of I-81, 14 crashes occurred at the intersection of US 17 with Pleasant Valley Road. South of I-81, another five crashes occurred, totaling 19 severe crashes in a span of less than one mile. Additionally, in Warrenton, on US 17 Business, there were 21 crashes over 1.65 miles between Broadview Avenue and Keith Street.

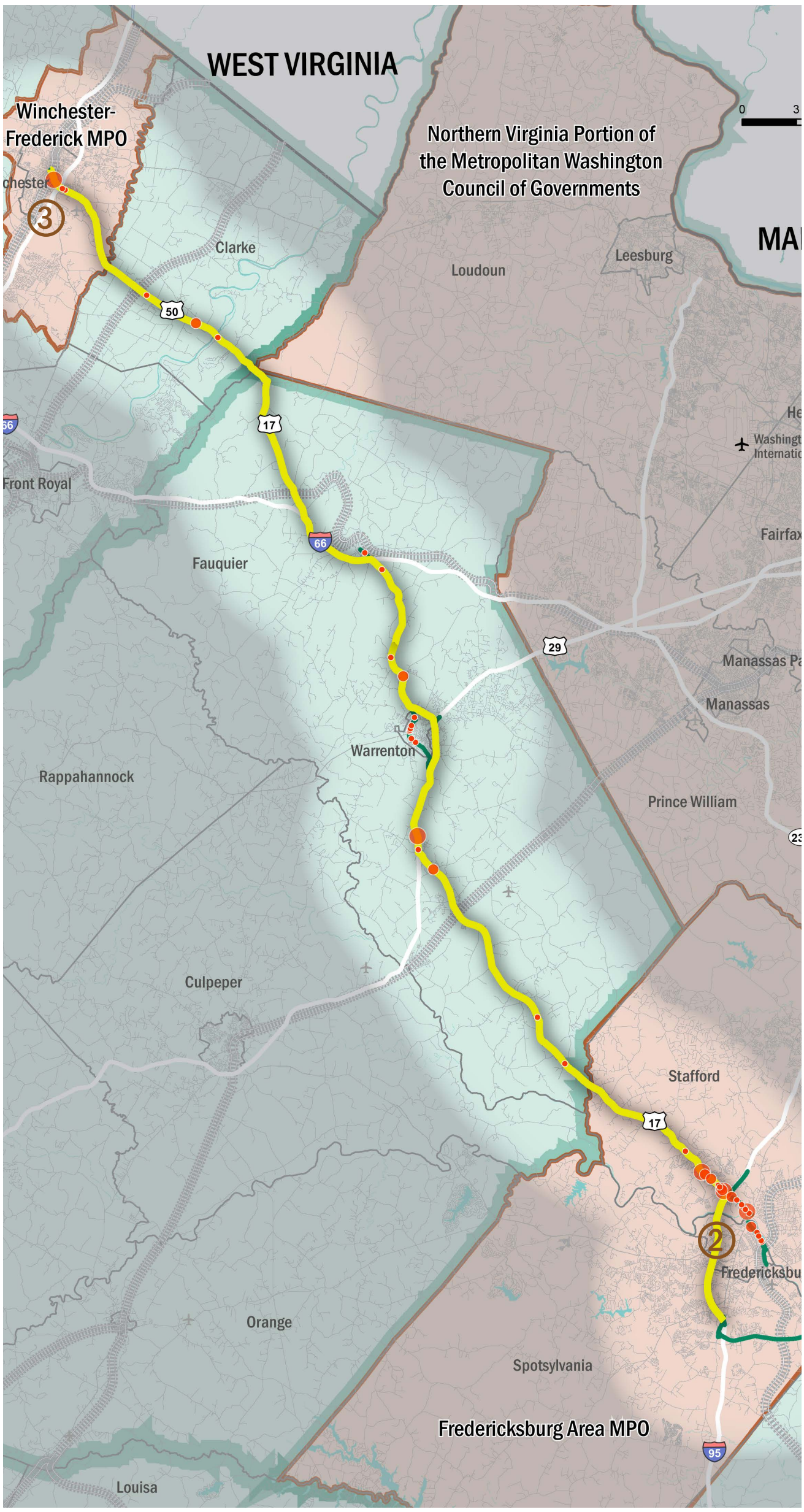
Fatality and Injury Crashes (2010 - 2012)

- < 5
- 5 - 10
- 11 - 15
- 16 - 20
- > 20

Railroad Incidents/ Accidents per County (2011-2014)

#





A3 SEGMENT NEEDS

Congestion

Performance Metrics

Person Hours of Delay per Mile	22
Freight Ton Hours of Delay per Mile	56K

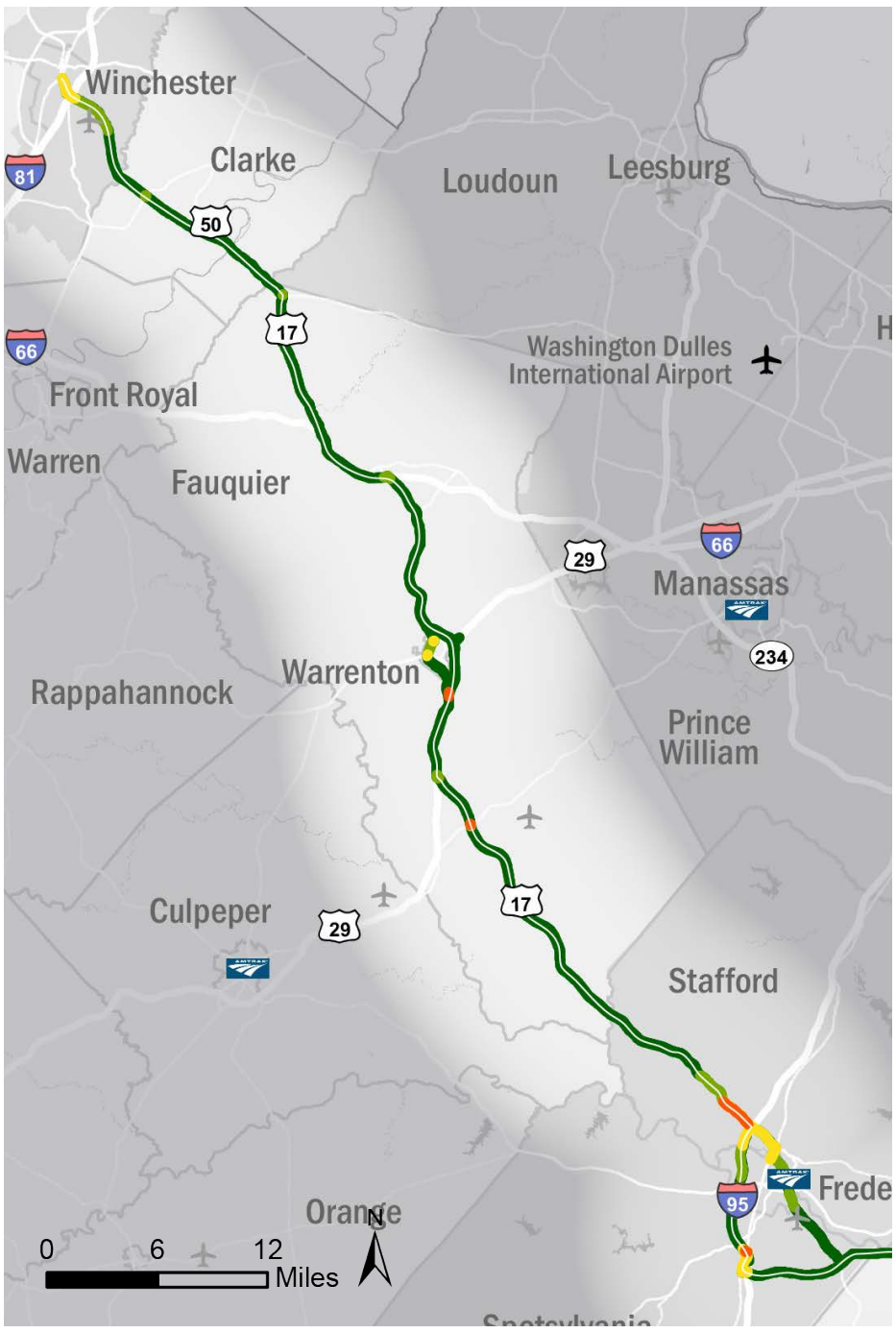
Passenger Delays

Because Segment A3 passes through Fredericksburg and includes a portion where US 17 runs concurrently with I-95, delays along this segment are greater than along Segment A2, for a total of almost 4,500 person-hours of delay. Overall congestion is not as severe as along Segment A1, although parts of Segment A3 through Fredericksburg are as congested as Segment A1. Areas with significant person-hours of delay include US 17 in Winchester, US 17 Business near Warrenton, US 17 south of I-95 in Spotsylvania County, and I-95 north of Fredericksburg, US 1, US 17, and US 17 Business in Stafford County. Peak-period passenger delays account for slightly more than half of daily congestion, similar to Segment A1.

Freight Delays

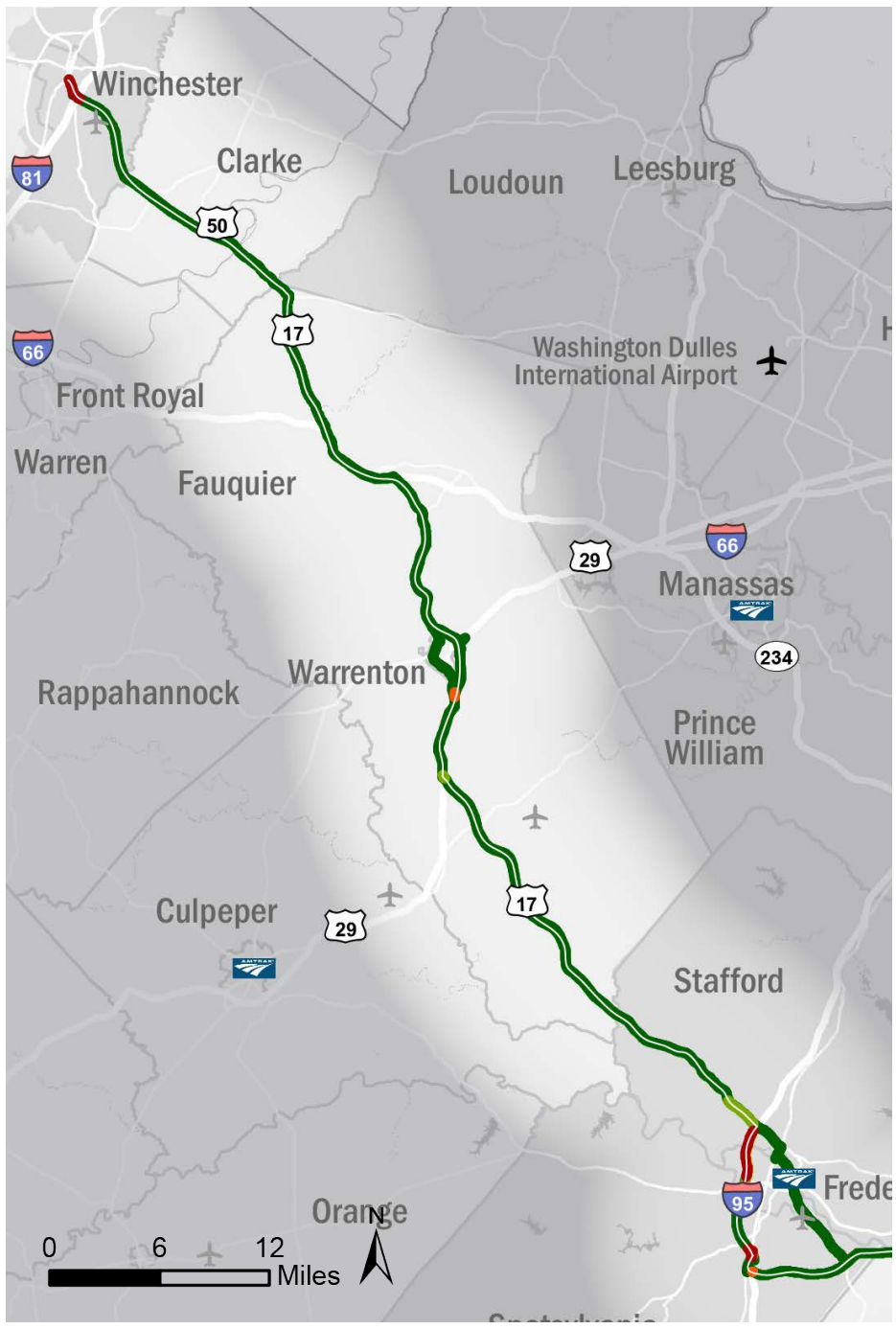
Freight congestion along Segment A3 is among the most severe freight congestion in Virginia, with over 11 million ton-hours of delay, although it is not as significant in terms of ton-hours of delay per mile. The areas of Segment A3 with the highest levels of freight delay include the area where US 17 runs concurrently with I-95 in and near Fredericksburg, US 17 in Winchester, US 17/US 29 at US 17 Business near Warrenton, and the ramps at the interchange between I-95 and US 1/17 in Spotsylvania County. Peak-period freight delays along Segment A3 account for about 51 percent of daily congestion, more than along Segments A1 and A2, and are fairly high for CoSS segments.

Daily Person Hours of Delay Per Mile

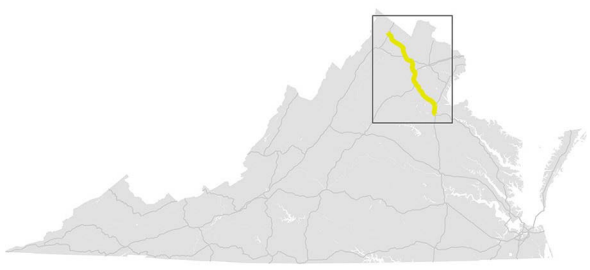


< 50
51 - 100
101 - 250
251 - 500
> 500

Daily Freight Ton Hours of Delay Per Mile



< 100,000
100,001 - 250,000
250,001 - 500,000
500,001 - 1,000,000
> 1,000,000



A3 SEGMENT NEEDS

Reliability

Weekday Peak Period

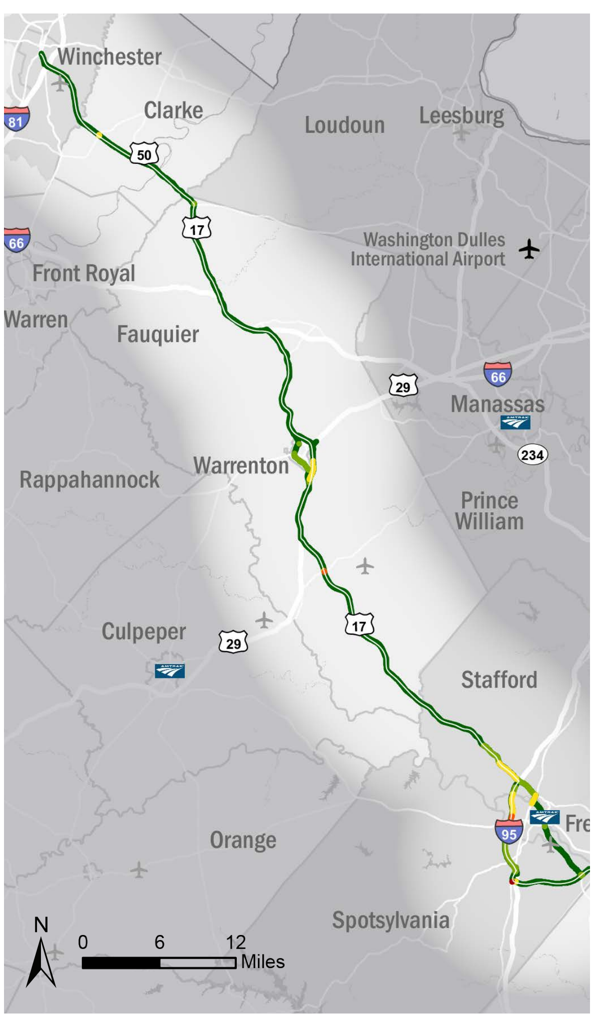
Reliability of travel during the peak period on a typical weekday on Segment A3 ranges from 0.0 to 0.77 in terms of reliability index, with an average value of 0.13. While this segment does have a peak period reliability index higher than average for the CoSS segments statewide, none of the locations along Segment A3 have reliability index values exceeding the statewide threshold.

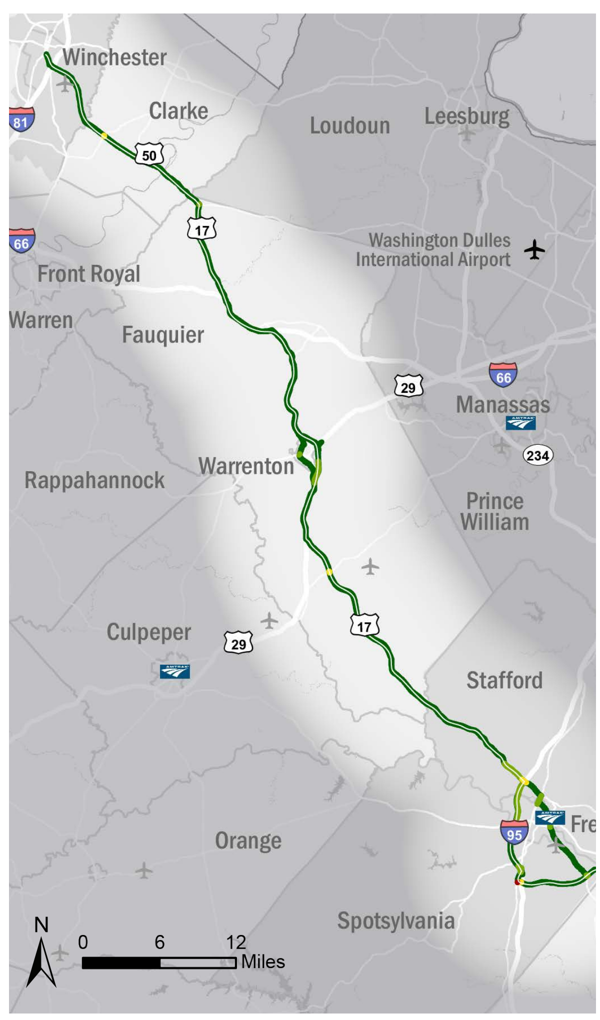
Weekday

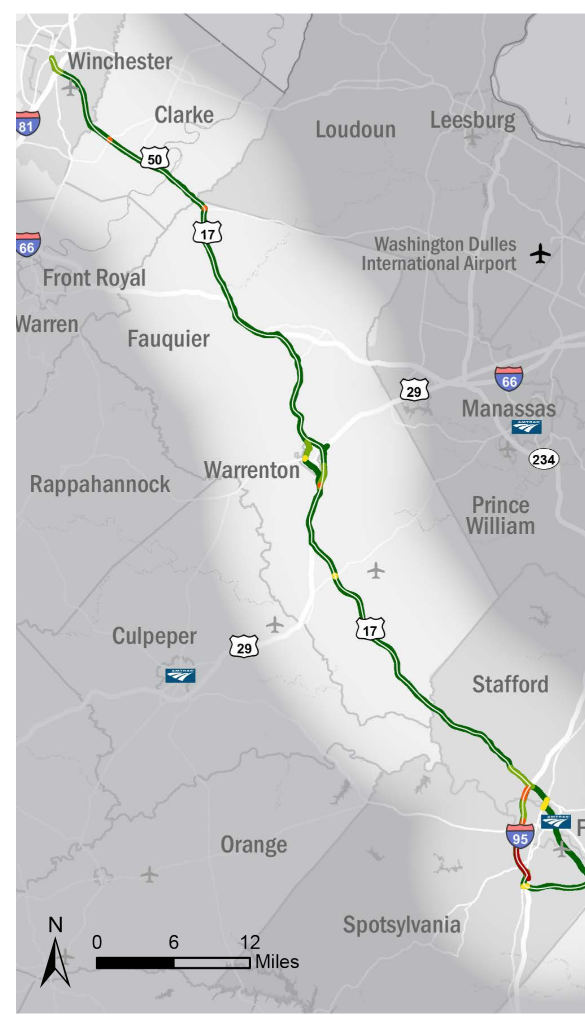
Reliability of travel during a typical weekday ranges from 0.00 to 0.49 in terms of reliability index, with an average value of 0.11. Locations where the weekday reliability index exceeds the statewide threshold include US 17 at Route 28 in Bealton, US 17/US 50 at US 340 in Clarke County, and US 17 at I-95 north of Fredericksburg.

Weekend

Reliability of travel during a typical weekend ranges from 0.0 to 1.07 in terms of reliability index, with an average value of 0.15. The maximum and average weekend reliability indices along Segment A3 are in the top five among the CoSS segments. Areas in which the weekend reliability index exceeds the statewide threshold include the portion of US 17 that runs concurrently with I-95, US 17/US 50 at US 340 in Clarke County, US 17/US 29 at US 17 Business south of Warrenton, and US 17 near US 50 in Fauquier County.





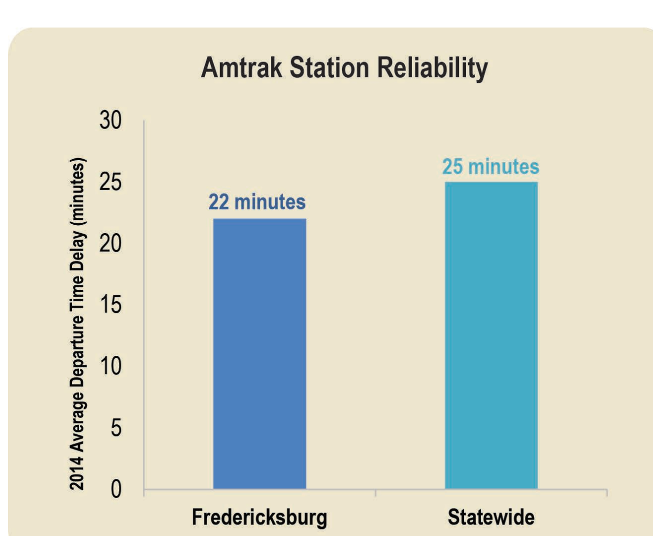


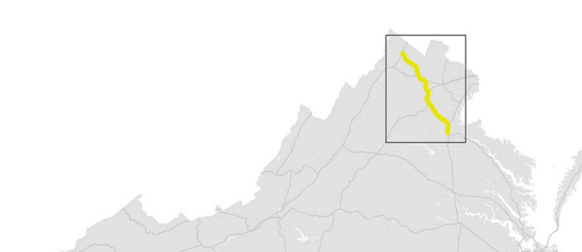
Reliability Index

- < 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- > 0.8
- Primary facility (in white)

Statewide reliability index thresholds have been set for weekday peak, weekday and weekend travel to assess the reliability of travel on each segment on all corridors of statewide significance. A higher reliability index indicates that travel times are more unreliable. The following are the reliability index thresholds:

- Weekday Peak - 0.80
- Weekday - 0.40
- Weekend - 0.60

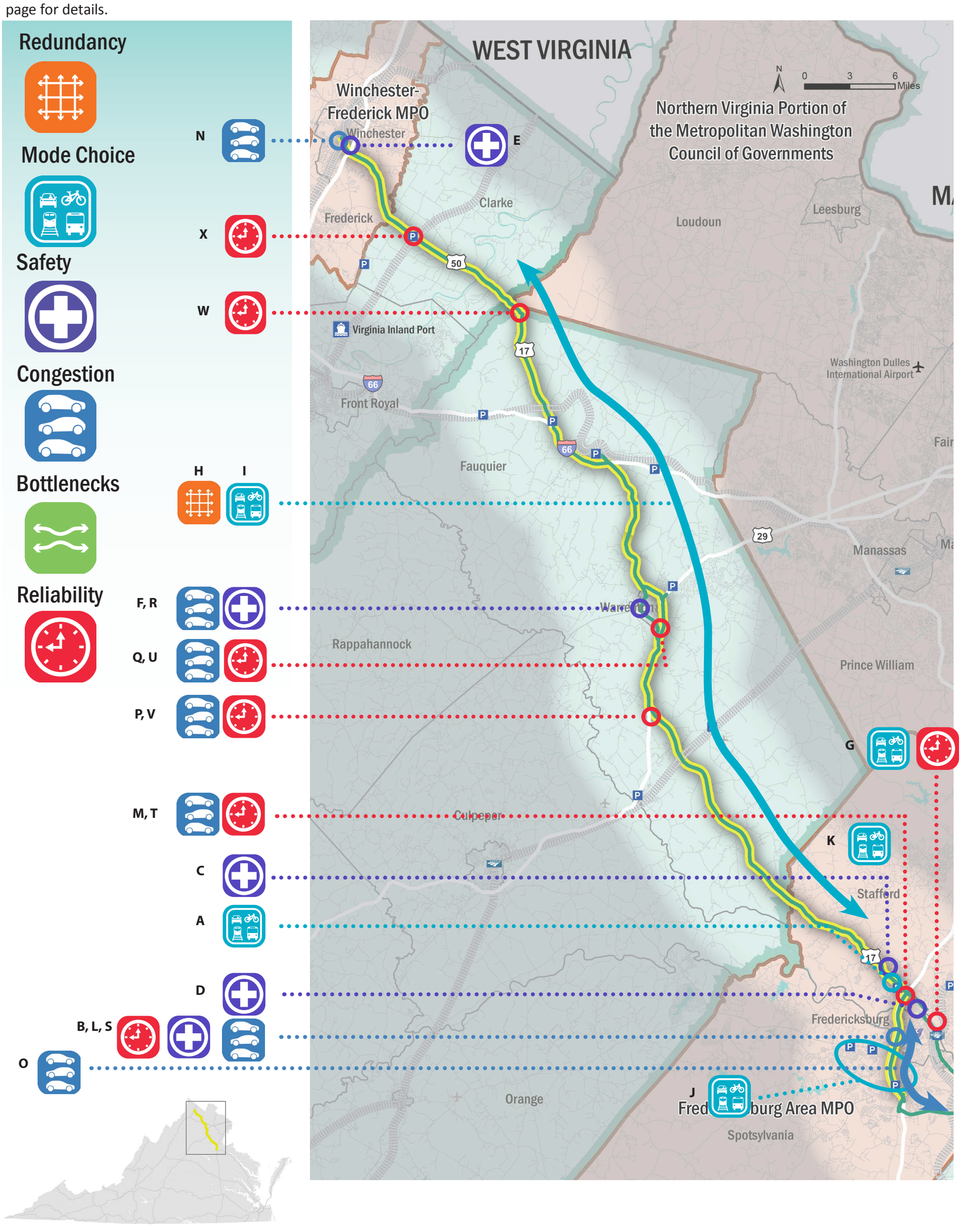




A3 SEGMENT NEEDS

Summary of Needs

Identified locations are approximate. See "Summary of Needs" table on the following page for details.



A3 SEGMENT NEEDS

Summary of Needs - A3 Segment

A.	Limited availability/connections to transit modes at park-and-ride lots
B.	Slow speeds and safety concerns at interchange of I-95/US 17 and US 3.
C.	US 17 north of Fredericksburg: 58 severe crashes between Sanford Dr and International Parkway
D.	US 17-Business in Falmouth: 41 severe crashes between I-95 and US 1
E.	US 17 near interchange with I-81 in Winchester: 19 severe crashes
F.	US 17-Business in Warrenton: 21 severe crashes between Broadview Avenue and Keith Street
G.	Unreliable Amtrak service from Fredericksburg station. Average departure delay is 22 minutes totaling over 20,700 person-hours of delay from this segment.
H.	No parallel highway facilities for US 17
I.	Limited availability of transit options from Hampton Roads to Metropolitan Washington region (5 buses, 1 rail trips daily) and Fredericksburg (2 buses, 1 rail trip daily). No transit options from Hampton Roads or Fredericksburg to Winchester.
J.	Park and Ride lots in Fredericksburg Over Capacity (124% Daily Utilization)
K.	Utilization of Park and Ride lots in Stafford County above state average (84% Daily Utilization)
L.	Congestion issue on US 17/I-95 between VA Route 3 and US 17/US 17 Business west of Fredericksburg

A3 SEGMENT NEEDS

Summary of Needs - A3 Segment

M.		Congestion issue on US 17/US 17 Business between Celebrate Virginia Parkway and Rappahannock River north of Fredericksburg
N.		Congestion issue on US 17 west of I-81 in Winchester
O.		Congestion issue on US 17/US 1 between US 17 and I-95 south of Fredericksburg
P.		Congestion issue at US 17 and VA Route 28 in Bealton
Q.		Congestion issue at US 17/US 29 and US 17-Business south of Warrenton
R.		Congestion issue at US 17 Business and US 211 in Warrenton
S.		Reliability issue on I-95 from US 17 south of Fredericksburg to VA Route 3
T.		Reliability issue on I-95 from the Rappahannock River to US 17 north of Fredericksburg
U.		Reliability issue at US 17/US 29 and US 17-Business south of Warrenton
V.		Reliability issue at US 17 and VA Route 28
W.		Reliability issue at US 17 and US 50 east of Paris
X.		Reliability issue at US 17/US 50 and US 340 in Waterloo