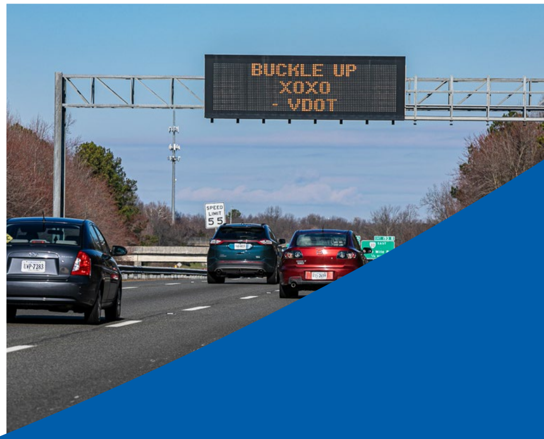

Final Report

Interstate 64/664

Corridor Improvement Plan

September 2021

VDOT

Office of INTERMODAL Planning and Investment

DRPT
Virginia Department of Rail and Public Transportation

INTERSTATE 64/664

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Introduction

I-64 is the primary east-west interstate corridor in Virginia stretching more than 300 miles from the West Virginia border to Hampton Roads, where I-664 connects to I-64. The corridor serves as a critical commuter route for residents in Covington, Lexington, Staunton, Waynesboro, Charlottesville, and the metropolitan regions of Richmond and Hampton Roads. In the summertime, the I-64/664 corridor sees a marked increase in traffic as travelers make their way to Virginia's beaches. The I-64/664 corridor provides for the east-west movement of people, goods, and freight through various modes of transportation while supporting daily commuters as shown in **Figure 1**. More than 7 million trucks and approximately $135 billion in goods are moved through the corridor per year, according to Transearch Global Insights data. Additionally, the corridor serves as a key route for goods and freight entering and leaving the Port of Virginia.

FIGURE 1 SIGNIFICANCE OF THE I-64/664 CORRIDOR

7.2 Million
Trucks Per Year

Critical East-West Corridor

$135 Billion
in Goods Moved Per Year

~21,000
Crashes Over 5 Years

> 925 Incidents
{With Average Clearance Times Almost 1.5 Hours)

Multimodal Corridor
- Highway
- Light Rail
- Vanpool
- Carpooling
- Commuter/express Bus
- Park and Ride Lots
- Amtrak
- Freight Rail

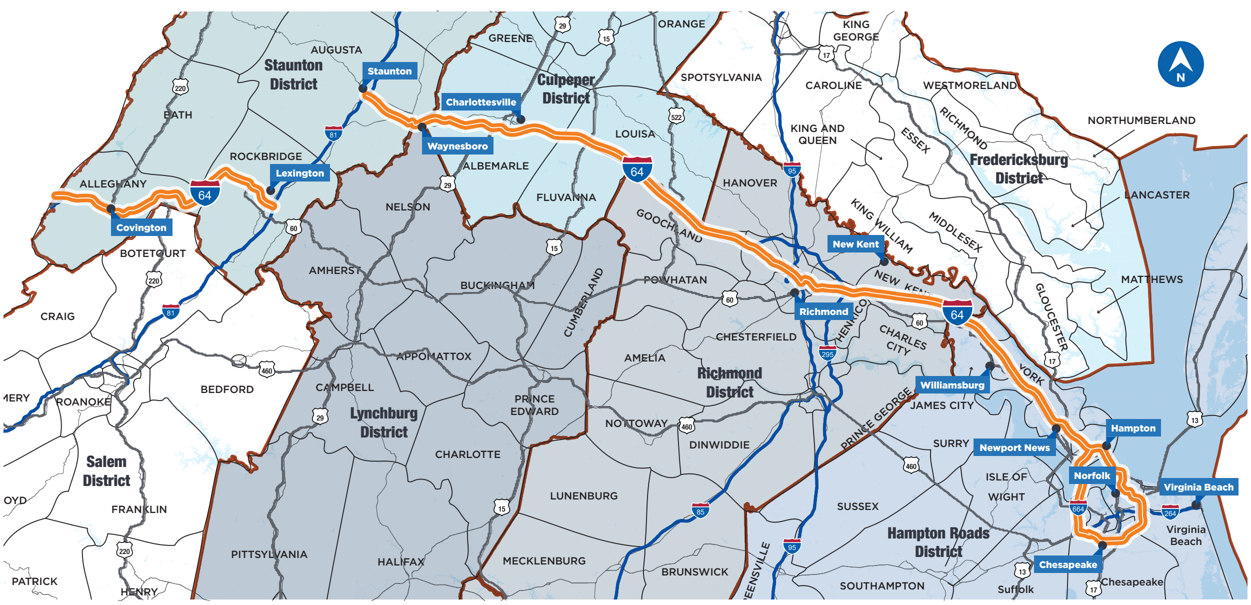
Study Request

In similar fashion to the I-81 and I-95 corridor improvement plans, the Secretary of Transportation and the Commonwealth Transportation Board (CTB) requested a study of the I-64 corridor to identify potential options for improvements to the corridor. The Office of Intermodal Planning and Investment (OIPI), the Virginia Department of Transportation (VDOT), and the Department of Rail and Public Transportation (DRPT) jointly conducted this study resulting in the I-64/664 Corridor Improvement Plan (Plan).

The Secretary of Transportation and study team determined that since the I-664 corridor is inextricably linked to the I-64 corridor in the Hampton Roads region, both corridors would be evaluated. In addition, the approximate 2.5-mile section of the I-95/I-64 overlap in Richmond was also included in the study area. However, the 25.3-mile section of the I-81/I-64 overlap in Augusta County was not included in the study area, as the needs on this portion of the corridor were addressed in the I-81 Corridor Improvement Plan and subsequent program of projects adopted by the CTB. The resulting length of the corridor is approximately 300 miles and is shown in **Figure 2**. The I-64/664 corridor traverses 12 counties, 13 cities, and four VDOT construction districts: Staunton, Culpeper, Richmond, and Hampton Roads. Also, this study includes the development of a corridor-wide operations improvement plan and evaluation of key parallel arterial routes along the I-64/664 corridor to identify strategies and improvements to more efficiently accommodate diversions of traffic, especially during major incidents on I-64 and I-664.

The results of the I-64/664 Corridor Improvement Plan will be folded into the Interstate Operations and Enhancement Program (IOEP), which is intended to improve the safety, reliability, and travel flow along interstate highway corridors in the Commonwealth. The IOEP was developed in accordance with Chapters 1230 and 1275 of the *2020 Virginia Acts of Assembly,* as codified in §33.2-372 and through amendments to § 33.2-232 and §33.2-358 of the *Code of Virginia,* in which the General Assembly of Virginia directed the CTB to prepare interstate corridor improvement plans for those interstate corridors with more than 10 percent of their vehicle miles traveled comprised of Federal Highway Administration (FHWA) Class 6 vehicles and above. These corridors (I-81, I-95, and I-64) receive dedicated funding from the IOEP. The IOEP policy text is provided in **Appendix A**.

FIGURE 2 STUDY AREA FOR I-64/664 CORRIDOR IMPROVEMENT PLAN



Study Purpose

The purpose of this plan is to identify a package of targeted operational, multimodal, and capital improvements that are expected to deliver safer and more reliable travel throughout the I-64 and I-664 corridors in Virginia.

Challenges in the Corridor

As the I-64 corridor spans the Commonwealth, from rural and mountainous western Virginia to the major metropolitan centers of Richmond and Hampton Roads, it faces varied challenges, differing and dependent on context.

On sections of I-64 in western Virginia, road users face the greatest risk of being involved in a serious crash, especially crashes impacted by steep terrain, winding roadway, or inclement weather. Although there is a lower number of overall crashes, there is a higher crash rate on many sections of I-64 west of the I-81 overlap compared to the busier sections of the corridor in the Richmond and Hampton Roads regions, as shown in **Figure 4** on page 6.

In Richmond, I-64 converges with I-95 through the center of the city. Significant congestion and safety issues are prevalent approaching the I-95/I-64 overlap and intensify at both the Bryan Park and I-95/I-64 East interchanges.

In the Richmond and Hampton Roads regions, more than $300 million has been invested in widening I-64 to three lanes in each direction, with another $244 million expected to complete Segment 3 of the project in the Williamsburg area.

- Segment A: Exit 200 to Exit 205
- Segment 1: Exit 247 to Exit 255
- Segment 2: Exit 242 to Exit 247
- Segment 3: Exit 234 to Exit 242

The projects address previous capacity deficiencies of I-64 by adding an additional travel lane in each direction. However, following project completion, a "gap" will remain between I-64 Exit 205 - Bottoms Bridge and Exit 234 - Lightfoot.

There are severe reliability and congestion issues along the I-64/664 corridor in the Hampton Roads region, where the interstate system connects the Peninsula to the Southside through the Hampton Roads Bridge-Tunnel (I-64) and the Monitor-Merrimac Memorial Bridge-Tunnel (I-664). Multibillion-dollar investments through the Hampton Roads Bridge-Tunnel Expansion, I-64 Southside/High Rise Bridge, and Hampton Roads Express Lanes projects aim to mitigate congestion and eliminate existing bottlenecks throughout the corridor. The Plan assumes that these projects are fully implemented. Finally, the Hampton Roads region faces significant challenges in creating a multimodal culture, where only approximately 1–1.5 percent of travelers use transit. Although the COVID-19 pandemic has substantially reduced transit ridership throughout the nation, existing investments in managed lanes facilities in the Hampton Roads region are anticipated to improve the reliability of the I-64/664 corridor, and aid in fostering a commuter culture less dependent on single-occupancy vehicles (SOV).

Approach to Solutions

Realizing that solutions to the challenges in the I-64/664 corridor involve various modes of travel and different types of expenditures, the study team used a stepped approach to identify improvements. As specified in section 33.2-372 of the Code of Virginia, this meant first identifying operational improvements to maximize efficiency of existing infrastructure and then multimodal options, which represent the next lowest cost solution that builds upon the overall goal of moving people. Finally, the team identified highway capital projects where performance issues could not be adequately addressed by either operational or multimodal improvements.

Existing Conditions

To understand the current travel conditions in the corridor, the study team gathered data from a variety of sources. This data included travel speeds; numbers and types of crashes; numbers, types, and durations of incidents; origins and destinations of passenger cars and trucks; numbers and types of traffic; multimodal service; and location, number of spaces and utilization rates at park-and-ride lots.

Depending on the time of day, the day of week, and the month of the year, travel in the corridor varies greatly. These differences were important to understand as the study team developed potential improvements.

Performance Measures

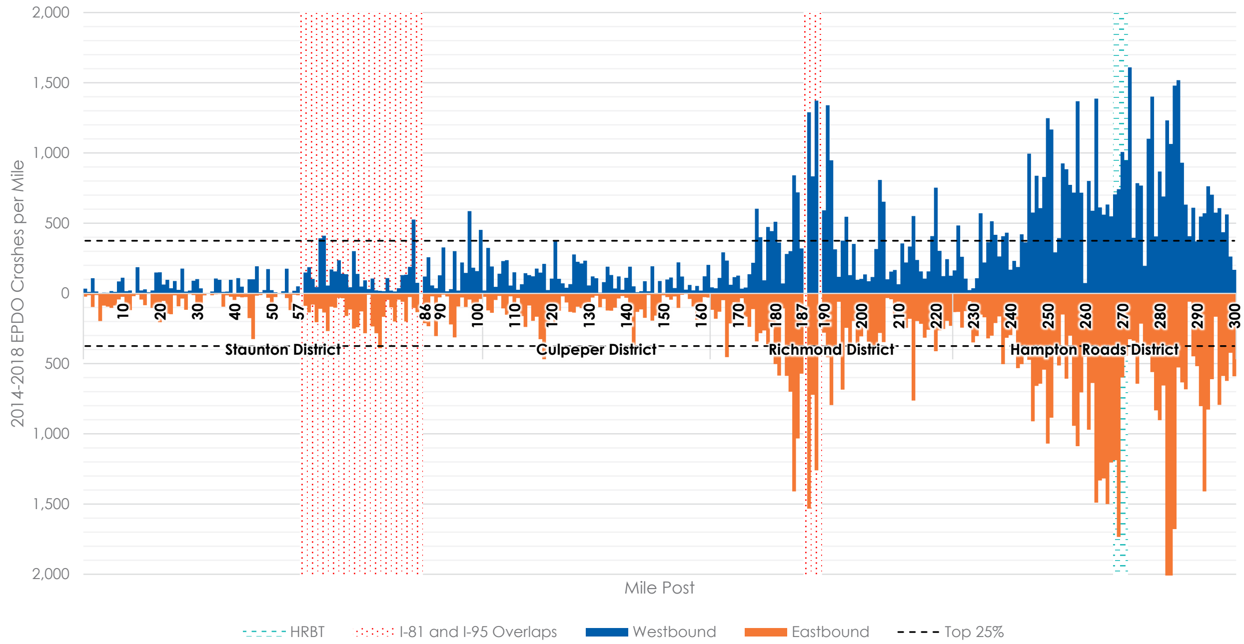
Based on a review of the available data in the corridor, the study team developed four performance measures to evaluate the existing operational and safety issues throughout the corridor. The team collected and summarized crash, delay, and Annual Average Daily Traffic (AADT) data for 5 years, from 2014 through 2018, in 1-mile segments by direction. For segments along I-64 that intersected with I-81, I-95, or I-664/264 (Bower's Hill Interchange), the team measured the segment to the nearest I-64 milepost and normalized the data on a per-mile basis. The study team then ranked the 1-mile segments and highlighted the top 25 percent of segment performance issues, regardless of direction, to be reviewed for potential improvements. The team employed the same process to determine the top 25 percent of segments along I-664. The four performance measures include:

- ***Crash frequency and severity:*** The total number of crashes, weighted by severity using the equivalent property damage only (EPDO) scale. *Source: VDOT Roadway Network System*
- ***Crash severity rate:*** The total rate of crashes, weighted by severity, per 100-million-vehicle-miles traveled. *Source: VDOT Roadway Network System and VDOT Traffic Monitoring System*
- ***Total delay:*** The total person hours of delay caused by the impacts of congestion, incidents, and weather events. *Source: INRIX*
- ***Incident delay:*** The total person hours of delay caused by incidents (crashes and disabled vehicles) that lead to at least one lane of the interstate to be closed for an hour or more. *Source: Regional Integrated Transportation Information System*

The team included performance measures data along the I-81 and I-95 overlaps for visual comparison only—the I-81 and I-95 overlap data did not impact the top 25 percent of performance measures along I-64. **Appendix B** includes histograms detailing each performance measure for I-64 and I-664.

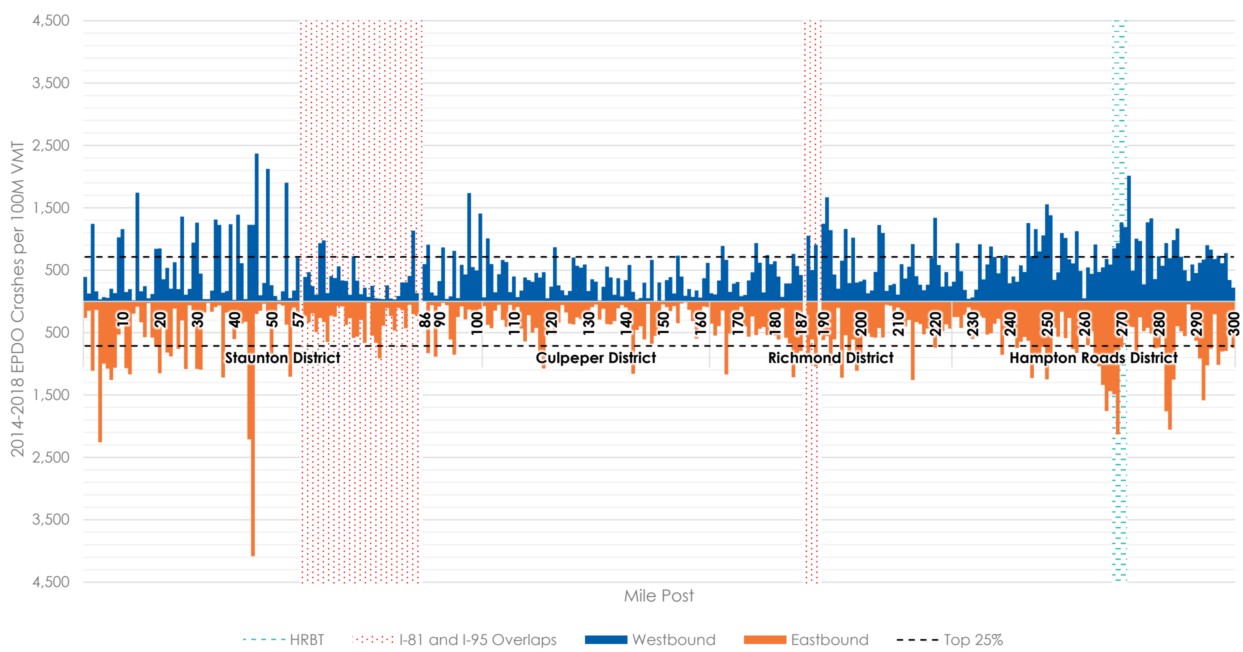
A histogram detailing the EPDO crashes per mile is shown in **Figure 3**.

FIGURE 3 I-64 EQUIVALENT PROPERTY DAMAGE ONLY (EPDO) CRASHES PER MILE



Whereas the EPDO crashes per mile data highlights crash trends predominantly in the metropolitan regions along the I-64 corridor, the following histogram detailing the EPDO crash severity rate, **Figure 4**, highlights significant crash trends along the mountainous western portion of the corridor. The study team used this information to focus on improvements that would provide the greatest safety benefit to road users.

FIGURE 4 I-64 EQUIVALENT PROPERTY DAMAGE ONLY (EPDO) CRASHES PER 100M VMT



In addition to the crash data, person hours of delay data revealed highly congested stretches of I-64 east and west of the I-95/64 overlap in Richmond and throughout Hampton Roads. The most prominent delay and incident delay hot spots occur along westbound I-64 between the I-64/264 interchange and the Hampton Roads Bridge-Tunnel and along eastbound I-64 approaching the Hampton Roads Bridge-Tunnel, as shown in **Figure 5** and **Figure 6**. The Plan assumes the programmed improvements between the Hampton Roads Bridge-Tunnel and I-64/664 Interchange at Bowers Hill will improve traffic along the most highly congested stretches, but congestion hot spots will likely remain, especially near the I-64/464 interchange.

FIGURE 5 I-64 ANNUAL PERSON HOURS OF DELAY

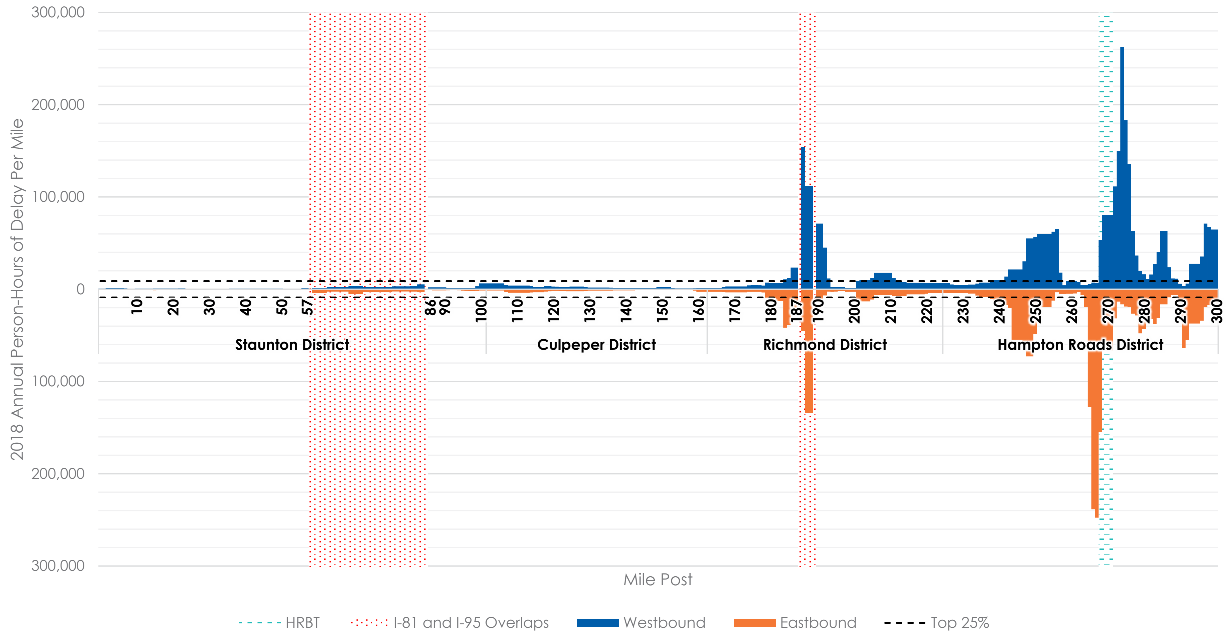
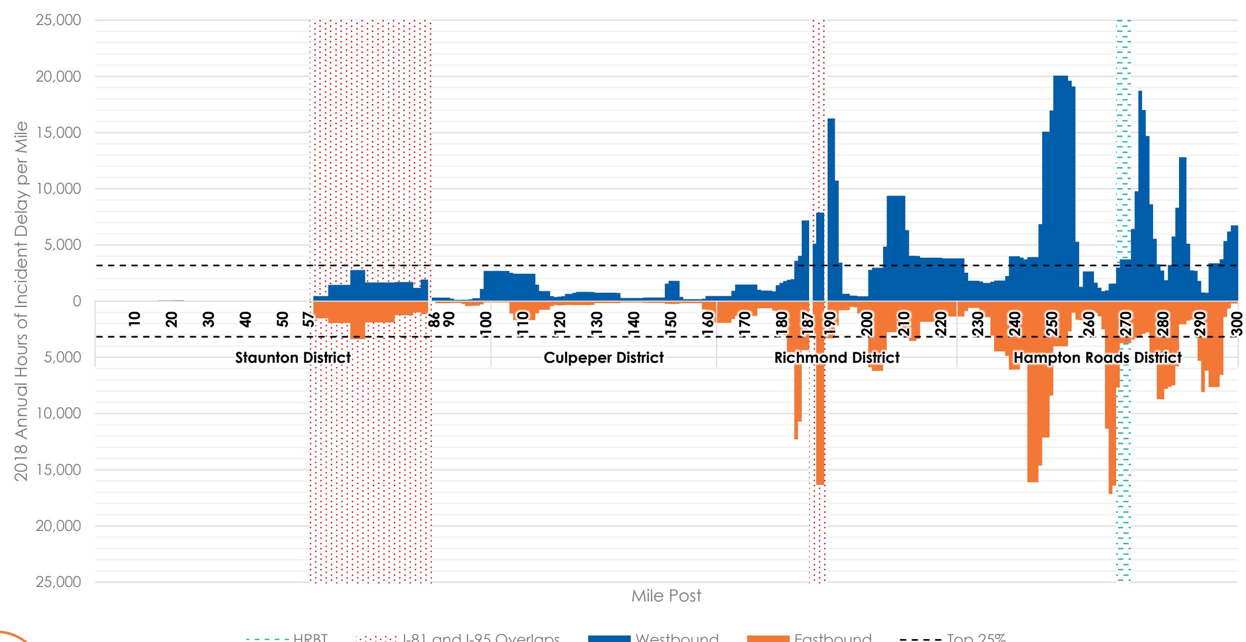


FIGURE 6 I-64 ANNUAL PERSON HOURS OF INCIDENT DELAY



Person hours of delay data along I-664, pictured below in **Figure 7**, showed heavy congestion approaching the Monitor-Merrimac Memorial Bridge-Tunnel, further highlighting the dependence on and volatility of the I-64/664 corridor bridge-tunnel network and the need for the planned investments in this area. Finally, the highest crash hot spots along I-664 occurred along the Monitor-Merrimac Memorial Bridge-Tunnel, as shown in **Figure 8**.

FIGURE 7 I-664 ANNUAL PERSON HOURS OF DELAY

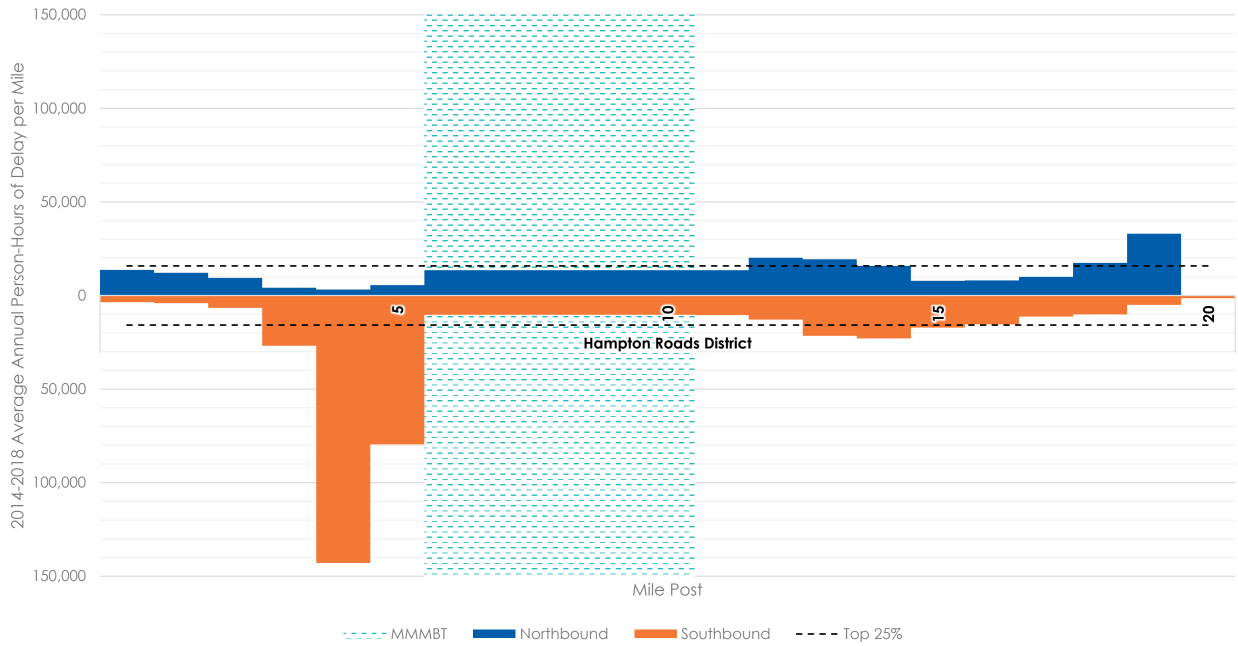
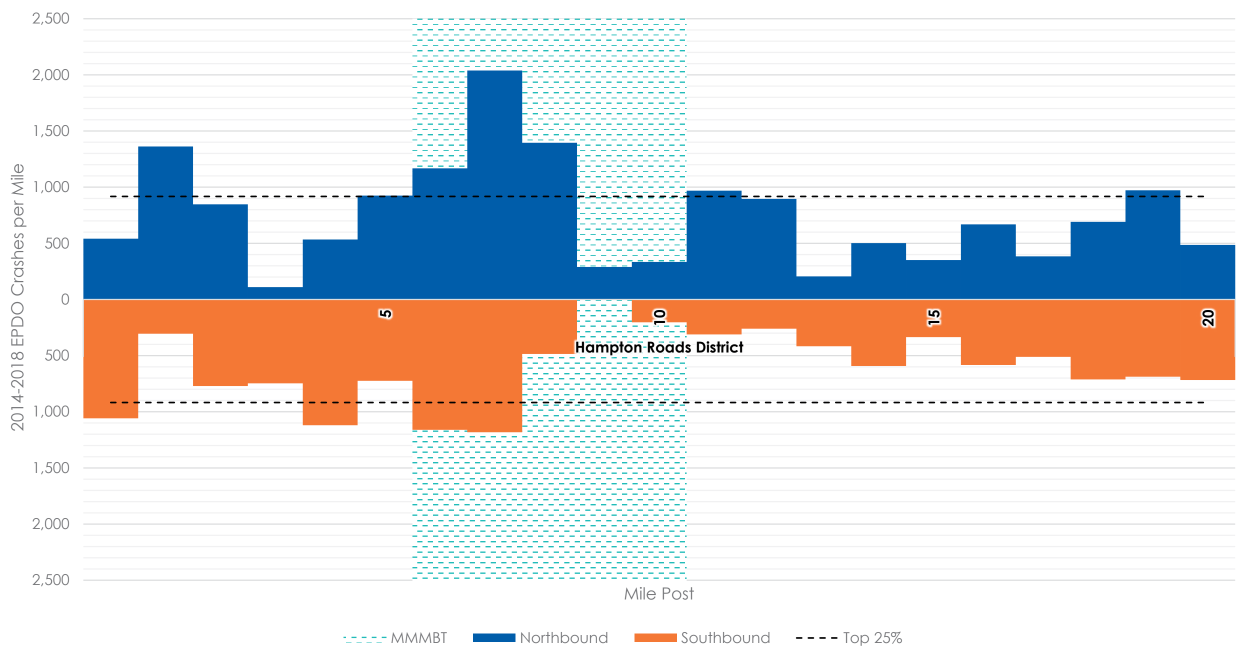


FIGURE 8 I-664 EQUIVALENT PROPERTY DAMAGE ONLY (EPDO) CRASHES PER MILE



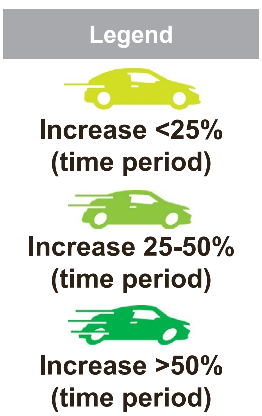
Projects Completed by 2026

The study team reviewed projects already funded in the VDOT Six-Year Improvement Program (SYIP) to determine how those projects may resolve issues in the corridor relating to two performance measures: crash frequency and severity and total delay. Additional SYIP project details are presented in **Appendix C**. The study team did not review 1-mile segments for additional improvements if the safety and delay benefits from the funded projects were projected to remove the segment from the top 25 percent of segments for all performance measures. The study team evaluated the potential benefits of the following seven projects.

- Hampton Roads Bridge-Tunnel Expansion
- Hampton Roads Express Lanes Network
- Peninsula Widening Segment A: from I-295 to Bottoms Bridge
- Peninsula Widening Segment I: from Route 238/Yorktown Road to Jefferson Avenue
- Peninsula Widening Segment II: from Humelsine Parkway/Marquis Center Parkway to Route 238
- Peninsula Widening Segment III: from Route 199 (Lightfoot) to Humelsine Parkway/ Marquis Center Parkway
- I-64 Southside / High Rise Bridge

Projected changes in PM peak period speed for three of these programmed improvements are shown in **Figure 9**.

FIGURE 9 PEAK PERIOD SPEED BENEFITS FROM PROGRAMMED IMPROVEMENTS



Project Description	Projected Change in Travel Speed (PM Peak)	
	Eastbound	Westbound
Hampton Roads Bridge Tunnel		
Hampton Roads Express Lanes		
High-Rise Bridge		

The study team used Hampton Roads Express Lanes analysis data to project traffic conditions in 2026. Based on Hampton Roads Express Lanes assumptions, existing bottlenecks at the Hampton Roads Bridge-Tunnel were effectively mitigated. However, the team identified significant congestion during future conditions along other sections of the I-64 Hampton Roads corridor, namely on I-64 eastbound (Hampton Roads Beltway inner loop) approaching the I-64/464 Interchange in Chesapeake.

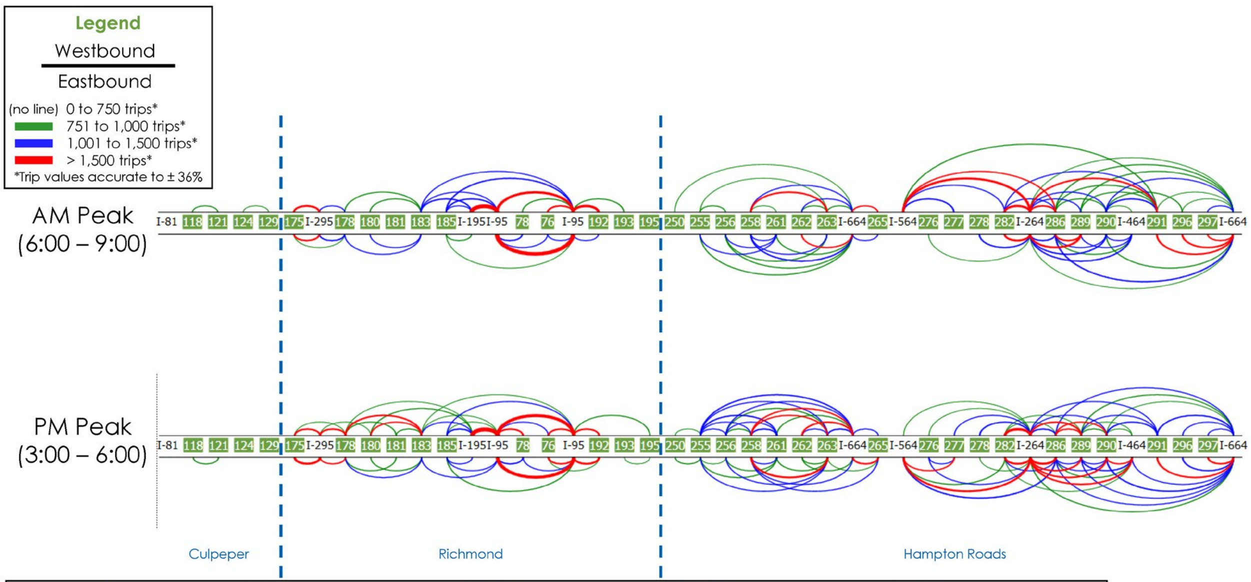
Supplementary Data

The study team collected and summarized additional data to supplement the four performance measures for the identification of problem areas and project identification. The supplementary data includes the following information:

- **Speed data:** The study team collected INRIX data in 15-minute intervals to summarize average speed patterns and variability in speeds throughout the corridor per time of day, day of week, and time of year for 2018.
- **Origin-destination data:** The study team collected StreetLight data and summarized origin-destination patterns on I-64 and I-664 in 2018. The study team summarized the following by time of day and day of week:
  - Statewide interchange-to-interchange travel patterns as shown in **Figure 10**
  - Route choice between the Hampton Roads Bridge-Tunnel and Monitor-Merrimac Memorial Bridge-Tunnel for passenger cars and trucks traveling between the Peninsula and the Southside in Hampton Roads during the a.m. and p.m. peak periods.
- **Incident data:** The study team collected and summarized additional incident data from VA Traffic, including the number of total or lane-impacting incidents and the average time to clear a lane or scene.

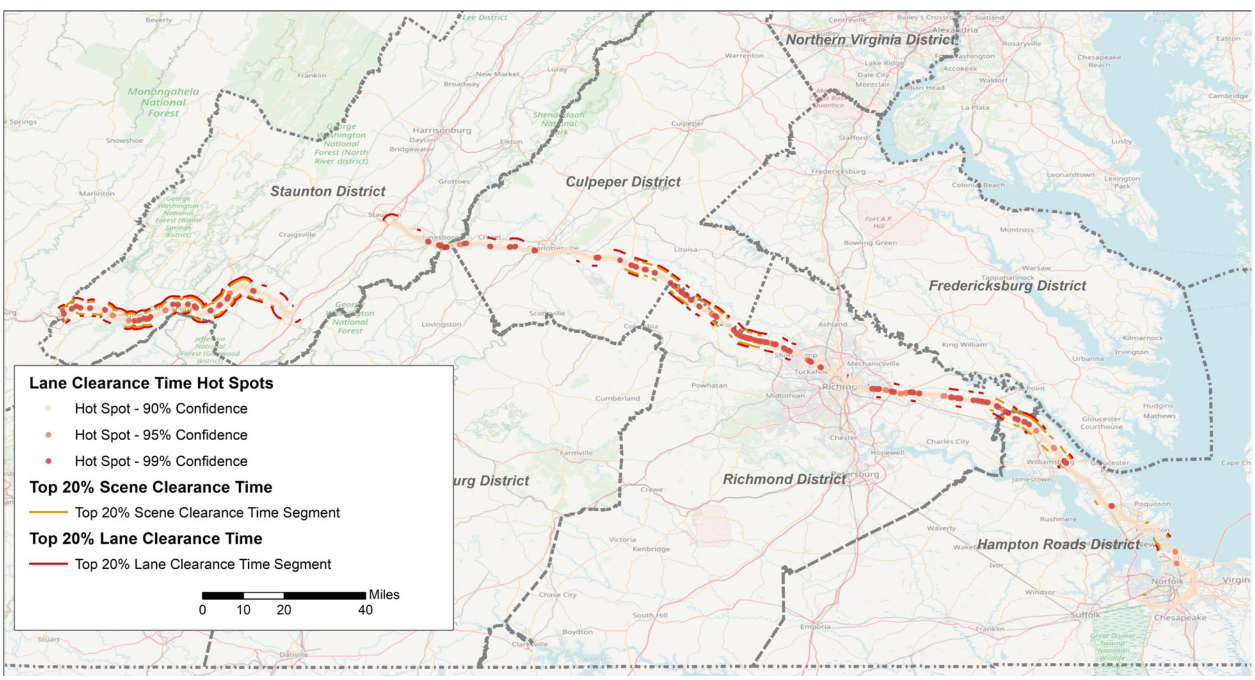
The incident data was used to help identify specific countermeasures at various locations along the corridor. For example, the incident clearance time hot spot graphic highlighted that the western regions of the Richmond and Staunton maintenance districts have experienced the longest incident clearance times, as shown in **Figure 11**. The study team has proposed to expand safety service patrol programs to better serve these locations.

FIGURE 10 I-64 ORIGIN-DESTINATION PATTERNS BY INTERCHANGE



EXIT 118 – US 29
EXIT 121 – Scottsville Road
EXIT 124 – US 250
EXIT 129 – Black Cat Road
EXIT 175 – Route 288
EXIT 178 – US 250 (Short Pump)
EXIT 183 – US 250 / Glenside
EXIT 185 – Staples Mill Road
EXIT 186 – W Laburnum Avenue
EXIT 192 – US 360
EXIT 193 – Nine Mile Road
EXIT 195 – Laburnum Avenue
EXIT 255 – Jefferson Avenue
EXIT 256 – Victory Boulevard
EXIT 258 – US 17
EXIT 261 – HR Center Parkway
EXIT 262 – Magruder Boulevard
EXIT 263 – Mercury Boulevard
EXIT 265 – La Salle Avenue
EXIT 276 – US 460
EXIT 277 – Tidewater Drive
EXIT 278 – Chesapeake Boulevard
EXIT 282 – US 13
EXIT 286 – Indian River Road
EXIT 289 – Greenbrier Parkway
EXIT 290 – Battlefield Boulevard
EXIT 291 – US 17, Route 168
EXIT 296 – US 17
EXIT 297 – US 460

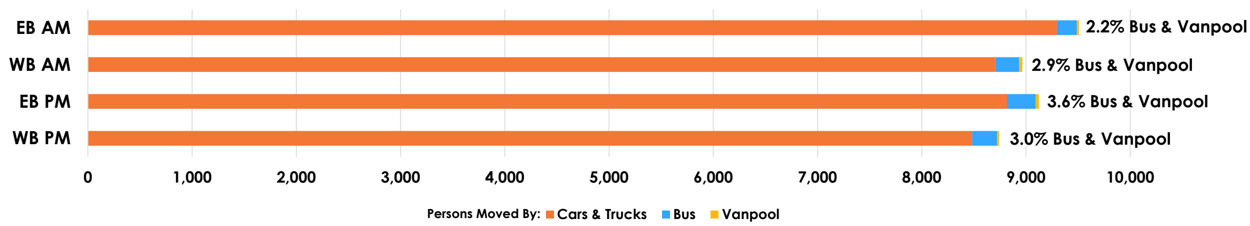
FIGURE 11 I-64 INCIDENT CLEARANCE TIME HOT SPOTS



Multimodal Corridor Characteristics

The I-64/664 corridor has a wide range of multimodal travel options—such as bus, rail, carpool, and vanpool—which have an opportunity to contribute greatly to moving people in the I-64/664 corridor, offering an array of alternatives to SOV travel. However, the usage of these alternatives is limited. Rail service along the corridor is provided by Amtrak, which serves a number of cities along the corridor, including Clifton Forge, Charlottesville, Richmond and Newport News. Commuter bus service is available in Richmond and Hampton Roads and supports the usage of park-and-ride lots. **Figure 12** provides a sample of how people are using multimodal options in the Hampton Roads region at a major bottleneck for travel in the corridor, the Hampton Roads Bridge Tunnel.

FIGURE 12 SINGLE AND HIGH OCCUPANCY VEHICLE ON I-64 AT THE HAMPTON ROADS BRIDGE TUNNEL



Park-and-ride lots contribute positively to multimodal travel along the corridor. The availability of commuter parking not only enables more people to make use of bus and vanpool systems when co-located with transit hubs, but also helps enable a robust culture of carpooling. Commuter assistance programs, such as Traffix, Ridefinders, RideShare, and RIDE Solutions, provide residents, employers, and workers along the I-64/664 corridor with travel options information, trip planning, guaranteed rides home, and multimodal ride matching services.

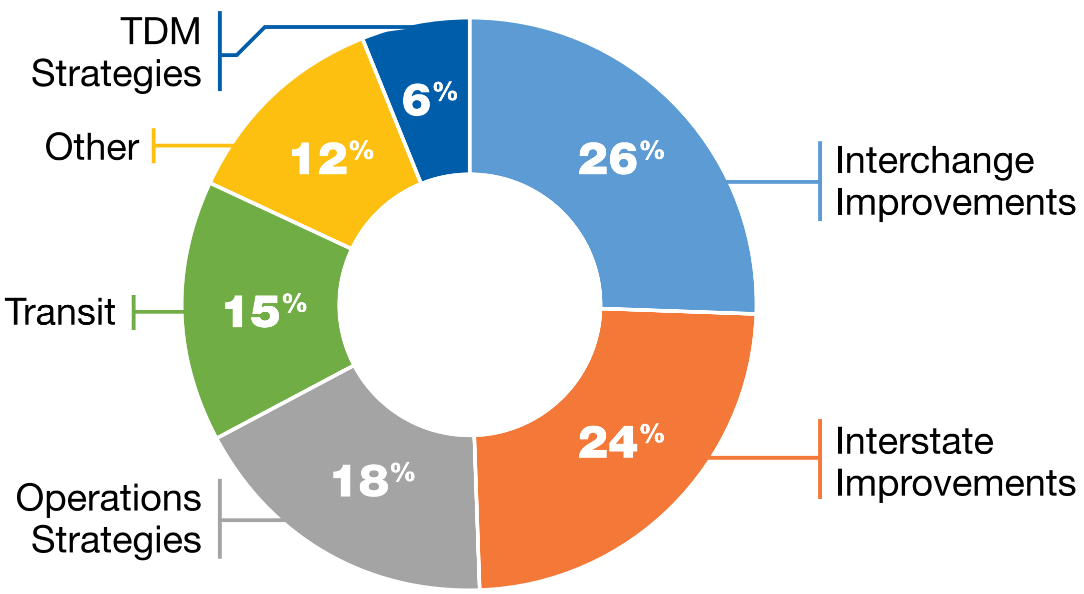
Additionally, the presence of the I-64 Express Lanes in Norfolk and future Hampton Roads Express Lanes network make bus transit travel along the corridor more reliable and incentivizes carpooling and vanpooling, as vehicles with two or more people do not pay a toll. Traffic occupancy counts and modeling indicate that during peak periods, on a per-lane basis, the express lanes on I-64 could carry more persons than the general purpose lanes.

Public Outreach

The COVID-19 pandemic began at the beginning of the I-64/664 Corridor Improvement Plan study and required the study team to facilitate public outreach through digital formats. The study team hosted an online public engagement website (www.i-64-664publicinfo.com/), which included informative videos on the study process and allowed participants to comment on existing conditions and potential improvements on the I-64/664 corridor. VDOT shared social media blasts to targeted audiences based on their proximity to the I-64/664 corridor to encourage participation in MetroQuest surveys in July and October. Virtual public meeting display boards are included in **Appendix D**.

The first MetroQuest survey was available from July 13, 2020 -August 15, 2020 and focused on existing conditions along the corridor. More than 4,500 participants provided feedback and placed nearly 7,500 map markers at various locations within the study area. The second MetroQuest survey was available from October 20, 2020 – November 22, 2020 and focused on potential solutions along the corridor. Nearly 1,400 participants ranked their preference of the potential solutions while also providing feedback about their preferred funding allocation. The number of comments received by category are shown in **Figure 13**.

FIGURE 13 PUBLIC COMMENTS BY CATEGORY



Public engagement meeting summaries and public survey results are included in **Appendix E**.

Operations Improvement Plan

Mainline Operations Strategies Identification and Summary

Mainline operations strategies are used to address the impacts of non-recurring congestion such as vehicle crashes and weather events and respond to those incidents as quickly as possible. These strategies are integral to the function of the freeway and are currently being used on I-64, I-664, and other roadways in Virginia. Mainline operations strategies include the following types of improvements:

- Closed-circuit television (CCTV) cameras
- Changeable message signs (CMS)
- Safety service patrol (SSP)
- Freeway incident management program tools

These infrastructure improvements and incident response tools require proper integration and coordination with VDOT Traffic Operations Centers to be used most effectively. The study team used a combination of input from the VDOT Regional Operations Directors (RODs); corridor characteristics; corridor performance measures; return on investment analysis; and coordination with other parallel facilities and roadway improvements to determine proposed locations for the strategies.

CCTV Cameras

CCTV cameras are in use along the corridor to help identify incidents and monitor the corridor. They are useful in verification of traffic and weather conditions as well. There are approximately 313 cameras in operation along I-64 and I-664. Camera expansions are based on two goals:

1. Have a camera at key interchanges to support detour management after incidents occur
2. Have cameras at rural locations with crashes and incidents as demonstrated by the corridor performance measures

There are five recommended camera expansion locations for the I-64 corridor as shown in Table 1.

TABLE 1 RECOMMENDED CAMERA EXPANSION

Sites	Camera Expansion Locations
Interchanges	Exits: 211, 220, 227, 231
High Incident Locations	Relocate camera from mile marker 102.1 to 102.4 to improve viewshed

Changeable Message Signs

Message signs are in use along the corridor to inform drivers of travel conditions ahead and to help manage detours. There are approximately 196 message signs in operation along I-64 and I-664. Message signs are often installed at key decision points on the mainline highway, and the recommended message signs are for this same purpose. Two additional signs are recommended to alert motorists prior to the interchanges of I-64 with US 29 and US 250 in Charlottesville, which provide alternative routes to I-64 and I-81. These are summarized in **Table 2**.

TABLE 2 RECOMMENDED MESSAGE SIGN EXPANSION

Changeable Message Sign Expansion Locations	
Install New	➡ I-64 eastbound approaching Exit 118 ➡ I-64 westbound approaching Exit 124

Safety Service Patrols (SSP)

SSP is a system of support vehicles that are used to assist disabled vehicles, identify incidents, and assist with the clearance of debris and incidents from the roadway. Varying levels of coverage exist along much of the corridor including between I-64 Exit 87 (I-81) and Exit 136 (US 15), I-64 Exit 175 (VA-288) and Exit 299 (I-664), and all of I-664 as well as the I-64/I-81 overlap.

The study team identified potential locations for SSP expansion using incident history and hourly traffic volume data. The analysis also considered extenuating circumstances that impact typical traffic conditions, such as special events. The analysis revealed the need for expanded SSP coverage on the weekends in the Charlottesville area between Exit 114 and Exit 130.

Additional SSP strategies were identified to enhance the functionality of service in the I-64/I-664 corridor. This includes installing lift-and-tow devices on a portion of the fleet, which will allow these SSP trucks to relocate disabled vehicles (in non-injury situations) from travel lanes to the roadside to clear blocked lanes faster. Automated hazard alerts are recommended for the corridor fleet, which will provide real-time digital alerts to approaching drivers using the Waze navigation app when SSP are on-scene with amber lights activated. This will give additional time for drivers to slow down and move over. Recommended SSP strategies for the I-64/I-664 corridor are summarized in **Table 3**.

TABLE 3 RECOMMENDED SAFETY SERVICE PATROL EXPANSION

Safety Service Patrol Expansion	
Expand Charlottesville Route	• Add weekend (Saturday–Sunday) SSP coverage on I-64 from Exit 114 to Exit 130
Lift-and-Tow Devices	• Equip a portion of the I-64/I-664 corridor SSP fleet (approximately 25 trucks) with lift-and-tow devices
Automated Hazard Alerts	• Equip I-64/I-664 corridor SSP fleet (approximately 100 trucks) with automated hazard alert capabilities

Freeway Incident Management Program Tools

This program area includes strategies with a combined purpose to provide better data tools and resources to access and respond to incident events properly. These tools enable the right resources to be brought to the scene which minimizes rework and delay.

While the Virginia State Police are often the first responder to incidents directly on I-64/I-664, localities can respond to and support interstate incidents as well. Localities also respond to incidents along the parallel facilities. Information about the location and status of both interstate and parallel facilities incidents is essential for effective incident management.

VDOT has developed a program to share information from local authorities responding to freeway incidents directly to VDOT's Traffic Operations Centers by way of Public Safety Answering Point (PSAP) integration. Counties or localities requiring PSAP integration in the I-64/I-664 corridor are shown in **Table 4**.

TABLE 4 COUNTIES/LOCALITIES REQUIRING PSAP INTEGRATION

Corridor	# Entities	Locations	
I-64	9	• Alleghany County • Rockbridge County • Augusta County • City of Staunton • Albemarle County	• Louisa County • Goochland County • New Kent County • City of Virginia Beach

Parallel Facilities Improvements Identification and Summary

During traffic incidents or periods of congestion on the I-64/664 corridor, motorists choose to use roadway facilities parallel to the corridor to avoid or minimize delays. A major incident on the interstate can result in a road closure of the impacted interstate segments and result in temporary routing of traffic onto these parallel facilities. The ***Virginia Freeway Traffic Management Incident Detour Plan*** specifies parallel facilities to be used during road closures between each segment of the I-64/664 corridor. The study team evaluated parallel facilities to identify improvements that could enhance safety and improve operations during significant traffic incidents or periods of congestion. Highest priority was given to improvements that support the capabilities to directly influence or mitigate traffic during an incident at locations where safety and congestion performance measures rank in the top 25 percent. The study team identified intersection improvements totaling more than $100 million, which were prioritized and organized into funding tiers.

The study team compiled available information such as the crash data, asset data for traffic signal infrastructure, and the status of planned or programmed projects on the detour routes. The study team then identified systemic improvements, such as traffic signal timing optimization, traffic signal equipment upgrades, communications upgrades, and deployment of automated traffic signal performance measures (ATSPM) to address operational limitations of the parallel facilities. In addition, locations were identified for the installation of CCTV cameras to provide improved monitoring and detection capabilities for incidents and response times and to be able to provide additional notification to drivers. Nearly 2,500 individual improvements at 670 locations were identified along parallel facilities. Planning-level cost estimates were developed for each of the identified potential improvements. **Table 5** summarizes the number of potential parallel facility improvement locations in each district.

TABLE 5 NUMBER OF IDENTIFIED PARALLEL FACILITY IMPROVEMENTS BY DISTRICT

Jurisdiction	Staunton	Culpeper	Lynchburg	Richmond	Hampton Roads	Total
VDOT	42	27	1	109	32	211
Locality	24	2	0	43	390	459
Total	**66**	**29**	**1**	**144**	**422**	**670**

*Consists of improvements to enhance operations along incident detour routes, including ATSPM, communications, ATC controllers, and CCTV cameras

To pare down the 670 intersection improvements that totaled more than $100 million, to targeted priorities, the study team established four tiers among the incident detour route signalized intersections. Tier 1 intersections were highest priority and are on detour routes serving sections of mainline I-64/664 with the highest prevalence of performance measures. The study team recommended two corridors consisting of Tier 1 intersections—along US 33 (Staples Mill Road) between I-64 and I-295 in the Richmond District and along Route 199 in the Hampton Roads District—for funding. These corridors were prioritized due to their logical termini for funding and their use as detour routes by the Districts. Based on follow-up conversations with the Districts, two fiber communications installation projects were selected to be delivered with I-64 Corridor Improvement Plan arterial operations funds to support improved operations along the recommended corridors. These improvements are presented in **Table 6**.

TABLE 6 PARALLEL FACILITIES PRIORITIZED IMPROVEMENTS

District	Route	Extents	Project Description	Cost Estimate
Hampton Roads	Humelsine Parkway (Route 199)	I-64 Exit 242 to I-64 Exit 234	Installation of fiber optic communications along Route 199.	$1.3M
Richmond	I-64	I-64 Exit 177 to I-64 Exit 187	Installation of fiber optic communications. Enables future connectivity along the Staples Mill Rd corridor.	$3.1M

Return on Investment (ROI) Analysis

An ROI analysis was conducted for each of the operational improvement needs identified. Capital costs as well as the 10-year operations and maintenance (O&M) costs were calculated for each improvement and weighed against anticipated benefits. The results of the analysis can be seen in the recommendations in **Table 7** and **Table 8**.

TABLE 7 MAINLINE OPERATIONS IMPROVEMENTS RETURN ON INVESTMENT

Proposed Operational Improvement	Implementation Cost	O&M Cost (10 Years)	Benefit (10 Years)	ROI (10 Years)
CCTV Cameras (5)	$915K	$258K	$4.3M	**3.5**
Changeable Message Signs (2)	$1.0M	$486K	$10.5M	**7.0**
Safety Service Patrols	$875K	$2.2M	$11.1M	**3.6**
PSAP Integration	$800k	-	$8.6M	**10.7**

TABLE 8 PARALLEL FACILITIES OPERATIONS IMPROVEMENTS RETURN ON INVESTMENT

Proposed Operational Improvement	Implementation Cost	O&M Cost (10 Years)	Benefit (10 Years)	ROI (10 Years)
Signal Upgrades*	**$4.1M - $4.6M**	**$725,000**	**$140.0M**	**27.2**
ATSPM	$1.2M - $1.3M	$150,000		
Communications	$0.8M - $0.9M	$500,000		
ATC Controller Upgrade	$1.9M - $2.1M	$50,000		
Signal Timing	$0.2M - $0.3M	$25,000		
CCTV Cameras - Arterials	**$0.3M - $0.4M**	**$75,000**	**$4.0M**	**9.6**

* Includes upgrades to ATSPM, Communications, ATC Controller, and Signal Timing

Multimodal Improvements Plan

Development of Multimodal Improvements

A cooperative process involving VDOT, DRPT, regional transit providers and OIPI, rooted in existing planning efforts and public feedback, was conducted to define and fully develop the specific multimodal improvements that will be included in the plan. The following steps were conducted to develop the final list of potential improvements:

1. Review existing plans, studies, and planned activities in coordination with local transit providers.
2. Screen projects using subjective and objective evaluation factors
3. Conduct secondary screening based on project focus areas
4. Conduct modified SMART SCALE project scoring
5. Allocate funding based on IOEP policy

Existing Plans and Studies

Based on the existing wealth of recent multimodal planning and the expedited time constraints of this study, the Secretary of Transportation directed the study to focus on identifying improvements that have been previously documented in lieu of conducting new modeling or analysis. To identify multimodal and commuter assistance improvements in the corridor, the study team looked to recently-completed plans and studies that have targeted the I-64/664 corridor. Additionally, rail-related improvements included in this study are informed by ongoing, long-term efforts throughout the Commonwealth, including the Virginia Statewide Rail Plan and Transforming Rail in Virginia Program.

Project Screening

The improvements that were compiled underwent several rounds of screening by the study team to evaluate their performance compared against the overall goal of the I-64/664 Corridor Improvement Plan, to provide faster, safer, and more reliable travel along the I-64/664 corridor.

Preliminary Screening

Following a review of existing plans, 378 potential recommendations were identified. The first preliminary round of screening occurred in February 2020 through which the project team recommended to the Commonwealth a list of 49 projects that had the potential to be carried forward based on the potential impact to performance of I-64 and I-664, as well as the objective and subjective evaluation factors listed below. The objective screening factors were assessed by data from existing studies and did not incorporate new analysis. Any projects that were duplicates or included in the baseline scenario (funded to be complete by 2026) were not included.

Secondary Screening and Refinement

During Spring 2020, to further narrow down the list of potential multimodal recommendations, projects were compared using the criteria described above and the following direction from the Secretary of Transportation:

- Support options for intercity non-SOV travel
- Focus on solutions for the top origin-destination pairs
- Support mode shift from SOVs in Richmond and Hampton Roads

This resulted in a list of 16 projects that could be advanced for the SMART SCALE-like evaluation described in the following section. Before the evaluation, the project list was refined based on the following:

- Coordination with and input from transit providers
- Availability of defined alignments, ridership projections, and costs
- Consideration of park-and-ride needs that had developed following the completion of the previous studies
- Decision that commuter assistance programs would be considered but not as individual projects

Multimodal Improvements

After the project screening process described above, a total of 16 multimodal projects have been proposed to be prioritized for funding, for a total of $57.94 million. These 16 projects represent the priorities out of the 378 total multimodal projects initially identified for consideration in the four VDOT districts. The plan includes potential multimodal improvements as laid out in **Table 9**—commuter bus service, local bus service, park-and-ride lots, and commuter assistance programs. The multimodal improvements are part of a suite of proposed improvements along I-64/664 including operational improvements on I-64/664, improvements on parallel facilities (such as VA 199), and capital projects on I-64/664.

TABLE 9 TYPE OF MULTIMODAL IMPROVEMENT

Type of Multimodal Improvement
Commuter/Local Bus: Improvements such as new express bus routes from the western suburbs of Richmond to Downtown Richmond or increased frequencies for routes serving Newport News Shipbuilding.
Park-and-Ride: Improvements such as expansion of existing lots and construction of new lots.
Commuter Assistance Programs: Improvements such as enhanced multimodal ridematching, rewards for non-SOV travel, and strategic marketing and promotion of multimodal travel options and services, with emphasis on the most congested segments of I-64/664.

Commuter and Local Bus

The provision of commuter and local bus service is an important part of the congestion solution along the I-64/664 corridor, and especially in the Hampton Roads region. Today, commuter buses move a limited number of passengers across the James River in the peak period because they have to experience the same congestion as SOV do. However, there is an opportunity for increased use of bus service in Hampton Roads with the construction of the Hampton Roads Express Lanes. The express lanes will allow for more reliable and frequent service to major employment destinations, such as the Newport News Shipbuilding, Naval Station Norfolk, and the Port of Virginia.

Previous studies conducted by Hampton Roads Transit (HRT) and Greater Richmond Transit Company (GRTC) have shown demand for and recommended commuter bus service originating at suburban park-and-ride lot locations in each of these major metropolitan areas along the I-64/664 corridor, serving key destinations.

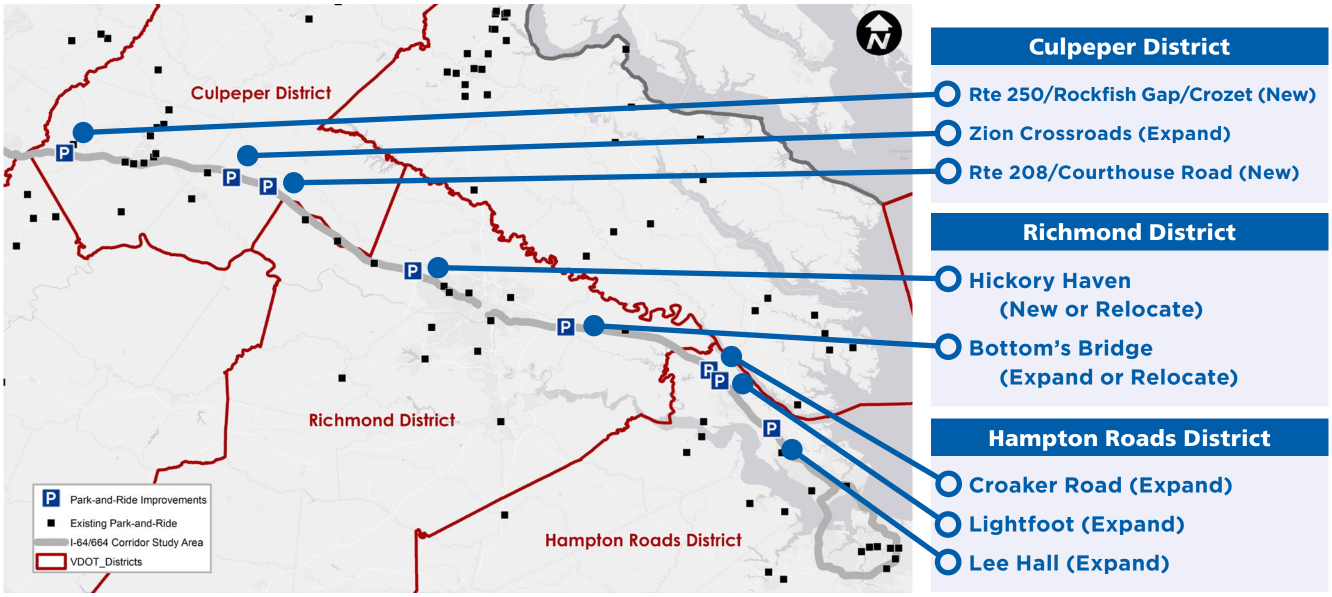
Potential service improvements identified in this study include commuter and local routes in Richmond connecting to Short Pump and enhanced frequencies from Downtown Richmond east to the Richmond airport. Improvements in Hampton Roads include enhanced frequencies for existing local routes in Newport News and MAX express routes serving the Peninsula and Southside.

Park-and-Ride Lots

Park-and-ride lots are a common transportation feature along the I-64/664 corridor and include state-owned, privately-owned, and informal lots. Under the oversight of VDOT, these facilities allow commuters—particularly long-distance commuters—to park their vehicles at a convenient location and then finish their commute using alternative transportation modes including carpool, vanpool, bus, train, bike, or walking.

This plan recommends enhancement, expansion, or new construction of eight park-and-ride lots at key points along the I-64/664 corridor as shown in **Figure 14**. When combined, these recommendations could contribute more than 1,000 new parking spaces to the existing 4,300 spaces in the corridor—a 23 percent increase. Many park-and-ride lots will provide connections to existing and future commuter bus service, and all newly-constructed lots will be designed to accommodate and optimize carpool and vanpool operations.

FIGURE 14 PROPOSED PARK-AND-RIDE IMPROVEMENTS



Commuter Assistance Programs

Building new and widening existing roads alone is not enough to meet Virginia's current and future transportation needs. Congestion was identified by the first public survey as the most important issue to address. To effectively improve mobility, provide more travel options, move more people, and promote and sustain economic growth, there is a necessity to move more people with fewer vehicles by sharing rides and using high-capacity modes such as bus or rail. Commuter assistance programs are part of the solution to ensure people know about and are supported in using non-SOV modes of travel.

Commuter assistance programs provide transportation choices, make Virginia's transportation more efficient, and help improve air quality. This is accomplished by moving more people in fewer vehicles, reducing vehicle miles traveled, reducing vehicle trips, and moving peak period trips to off-peak times. The focus of commuter assistance programs is to move more people in fewer vehicles. Examples of how this is achieved are programs and services that:

- Promote transit, vanpools, carpools, telework, and biking
- Provide free ride matching and trip planning
- Increase the use of vanpools, carpools, transit, telework, and biking
- Work with employers to establish worksite programs for telework, carpool and vanpool formation, transit and vanpool employee benefits, biking to work, and alternative work schedules
- Help commuters realize the true cost of driving alone and the benefits of transit, vanpooling, carpooling, telework, and biking

To advance and build upon the Commonwealth's commuter assistance efforts, DRPT will further target the I-64 corridor with strategic marketing and promotion of travel options, including:

- Marketing that is targeted to corridor travelers with an emphasis on the most congested segments of I-64/664
- Coordinated marketing messaging with local commuter assistance programs
- Targeting of employers with a high concentration of employees that commute on I-64/664
- Commute!VA website and mobile app multimodal travel options and ride matching
- Carpool, vanpool, transit, rail, and telework options
- Commute!VA rewards for carpool, vanpool, transit, and commuter rail
- Existing carpool and vanpool incentives and formation assistance
- Using the express lanes free with EZ-Pass Flex and a carpool/vanpool of 2+ (including driver)

Corridor Costs and Potential Benefits

Summary of Costs

The projects listed in the sections above are summarized in **Table 10**. In total, there are 16 multimodal projects that total approximately $57.94 million. Total costs from transit projects include 3 years of operating costs in addition to capital costs of vehicles and infrastructure investments.

TABLE 10 MULTIMODAL IMPROVEMENT COSTS

Type of Project	Number of Projects	Capital Costs	Annual Operating Cost	Total Cost
Commuter/Local Bus	8	$18,782,797	$8,255,963	$27,038,761
Park-and-Ride	8	$30,900,000		$30,900,000
TOTAL	**16**	**$49,682,797**	**$8,255,963**	**$57,938,761**

Benefits

Targeted improvements to transit and carpooling offer the greatest opportunities to not only improve performance on I-64/664 itself, but to provide fast and reliable trips along more parts of the corridor to more people. The recommended transit improvements are expected to serve over 400,000 trips along I-64 annually.

The suite of multimodal improvements included in this study offer unique opportunities to address peak-period traffic conditions that can be implemented at a lower cost, a much greater ability to safely move people, and more flexibility to adapt to changing travel patterns.

Mainline Roadway Improvements Plan

Mainline Roadway Improvements Identification and Summary

The study team considered performance measures, supplementary data, existing roadway geometry, recently completed studies, and public input to develop potential capital improvements. The team also reviewed recently-constructed projects and projects already funded in the SYIP to determine how those projects may resolve issues in the corridor relating to the performance measures.

The study team reviewed crash data for the 1-mile segments in the top 25 percent to determine the underlying causes of crashes and what solutions, if any, could mitigate the crashes. In several cases, capital improvements were not recommended to improve safety if there was no discernible crash pattern or if there were several crashes caused by miscellaneous factors that are not likely to be remedied by changes to the roadway. Miscellaneous factors include mechanical failure, medical issues, behavioral issues, such as alcohol or distracted driving, or crashes that involved animals or occurred in an active work zone.

Table 11 describes the types of mainline roadway improvements considered and their associated benefits. The study team only recommended an interchange improvement if it was recommended in a previously completed study. **Table 12** displays the number of mainline roadway improvements per type that were proposed in each district and scored using a SMART SCALE-like method. **Appendix F** includes performance measure detail information used to develop the mainline roadway improvements.

TABLE 11 TYPES OF I-64/664 CAPITAL IMPROVEMENTS

Type of Improvement	Locations to Consider	Benefit
Auxiliary Lane: An extra lane constructed to connect on- and off-ramps between closely spaced interchanges to reduce the impacts of traffic entering and exiting the interstate	• Where spacing between an on-ramp and the subsequent off-ramp is less than 2 miles • Where there are many crashes between exits • Where there are large volumes between interchanges	• Reduces the potential for crashes caused by traffic entering and exiting the interstate • Gives entering and exiting traffic more space to maneuver
Widening by One Lane: An extra lane constructed for multiple miles to increase the capacity of the interstate	• Where there are high person hours of delay and incidents/crashes with a lane closure • Where there are high traffic volumes • Where there are long distances that vehicles need to pass, merge, or travel through multiple interchanges	• Reduces the likelihood of congestion by providing additional roadway capacity • Reduces the potential for crashes by allowing more space for vehicles to maneuver

Type of Improvement	Locations to Consider	Benefit
Acceleration or Deceleration Lane Extension: Longer lengths to accelerate when entering the interstate and decelerate when exiting the interstate	• Where there are many crashes involving lane merges • Where acceleration or deceleration lane lengths are less than the VDOT standards	• Reduces the potential for crashes caused by slower moving traffic entering or exiting the interstate • Provides more time for entering vehicles to match the speed of the interstate traffic and exiting vehicles to slow down to safely exit the interstate
Shoulder Widening: Widening the paved inside or outside shoulder	• Where there is high-crash frequency or severity with roadway departure crashes • Where the shoulder width is deficient	• Reduces the potential for roadway departure crashes by giving drivers a wider shoulder for recovery • Provides shoulder space to clear crashes or other incidents
Truck Climbing Lane: An extra lane constructed for multiple miles to increase the capacity of the interstate	• Where there is an uphill grade • Where there are many truck crashes and rear-end crashes • Where there is a speed differential between trucks and cars	• Reduces the potential for crashes due to the impacts of slow-moving vehicles • Provides space for slow-moving vehicles to move to the right on uphill grades to improve speeds and safety for all vehicles
Curve Improvements: A variety of improvements that reduce the potential for crashes through horizontal curves, such as LED-lit chevron sign and high-friction surface treatments	• Where there is high crash frequency or severity in a horizontal curve • Where there are many roadway-departure crashes	• Reduces the potential for roadway-departure crashes in horizontal curves • Provides low-cost, high-benefit countermeasures that can be constructed quickly
Interchange Improvement: A variety of improvements that improve safety and reduce delay at interchanges by modifying the existing interchange configuration	• Where there are high person hours of delay or crashes caused by vehicles entering and exiting the interstate • Where short weaves exist on the interstate • Where congestion on the arterial affects the interstate	• Reduces the potential for crashes caused by traffic entering and exiting the interstate • Reduces person hours of delay on the arterial and interstate
Express Lanes: Separate lanes that allow drivers to pay a toll or rideshare to utilize the facility	• Where there are high traffic volumes • Where widening by one lane is not predicted to meet future demand	• Reduces congestion and accommodates travel demand more efficiently • Provides greater reliability of travel times

TABLE 12 MAINLINE ROADWAY IMPROVEMENTS BY TYPE BY DISTRICT

Improvement Type	Staunton	Culpeper	Richmond	Hampton Roads	Total
Auxiliary Lane			5	2	7
Widening by One Lane			3	1	4
Acceleration or Deceleration Lane Extension		2	7	11	20
Shoulder Widening					
Curve Improvements*	6		1		7
Truck Climbing Lane	2	1			3
Interchange Improvement			3	2	5
Total	**8**	**3**	**19**	**16**	**46**
Projected Cost (Millions)	$250.7	$396.4	$940.6	$654.1	**$2,241.8**

* Includes High-Friction Surface Pavement and Flashing Chevron improvements

The study team evaluated widening of the I-64 corridor between MM 205-234 by one lane in each direction to address capacity and safety issues. These issues typically occur during the summer months and are more frequent on weekends. The analysis showed that I-64 was forecast to be congested again within a 30-year time frame even with these additional lanes. As a result, this segment of the I-64 corridor is recommended for evaluation of managed lanes.

Improvements and Locations Requiring Further Study

The study team also identified several improvements with the potential to resolve issues in the corridor relating to the performance measures that had not been recommended in a previously completed study. These improvements were not advanced to project prioritization because there is insufficient information to evaluate the projects. **Table 13** displays the number of mainline roadway, park-and-ride, and transit improvements by type in each district that were recommended for further study. **Appendix G** contains a list of individual improvements and locations identified by the study team that were recommended for further study. The study team identified 18 improvements and locations that are recommended priorities for advancing through concept development and study.

TABLE 13 PROPOSED IMPROVEMENTS FOR FURTHER STUDY BY TYPE BY DISTRICT

Improvement Type	Staunton	Culpeper	Richmond	Hampton Roads	Total
Interchange	0	1	3	2	**6**
Park-and-Ride	0	4	3	1	**8**
Transit	0	2	0	2	**4**
Total	**0**	**7**	**6**	**5**	**18**

Available Funding

Upon development of planning level cost estimates for recommended projects, the study team determined that the needs identified far exceeded available revenues. In addition, the needs do not account for planning level cost estimates associated with "improvements and or locations identified for further study." **Table 14** outlines the estimated distribution of IOEP funding for I-64 in the coming years and the anticipated funds available for prioritization.

TABLE 14 DISTRIBUTION OF IOEP FUNDING FOR I-64 (IN MILLIONS)

		Previous	FY22	FY23	FY24	FY25	FY26	FY27	TOTAL
I-64 Dedicated IOEP Funding		$32.1	$9.9	$18.5	$18.5	$19.4	$20.3	$19.3	$137.9
Proposed Funding for I-64 Operations Improvements	Capital Projects in SYIP	$14.0							$14.0
	Operations and Maintenance			$0.16	$0.16	$0.17	$0.17	$0.18	$0.85
I-64 Remaining Funds for Prioritization		**$18.1**	**$9.9**	**$18.3**	**$18.3**	**$19.2**	**$20.2**	**$19.1**	**$123.1**

Prioritization of Improvements

The prioritization process for I-64 followed the process outlined in the IOEP. The I-64/664 Corridor Improvement Plan identified the top 25 percent problem areas for congestion, safety, and reliability and the identified operational strategies, transportation demand management (TDM) strategies, and roadway capital improvements to address those issues in the corridor. All of these strategies improve reliability and safety of travel. The operational strategies were evaluated using an ROI methodology. The TDM and roadway capital improvements were evaluated using a SMART SCALE-like methodology using the following scoring weights:

- 40% for person hours of delay reduction
- 40% for reduction of fatal and severe injury crashes
- 20% for accessibility to jobs

These measures are the same as those used in SMART SCALE and represent those measures that correlate with the IOEP goal defined in §33.2-372 of improving the safety, reliability, and travel flow along interstate corridors.

This scoring methodology resulted in the list of TDM and capital projects recommended for funding as part of the I-64/664 Corridor Improvement Plan shown in **Table 15**. According to the IOEP, available funding will be allocated to the projects based on the prioritization ranking, and scheduled according to constructability, risk, and the Board’s discretion. At this time, the first 19 projects are recommended for funding, as indicated. Additionally, projects labeled as tentative may be considered for funding at the Board's discretion should there be available remaining funding. Detailed improvement prioritization scoring results are included in **Appendix H**.

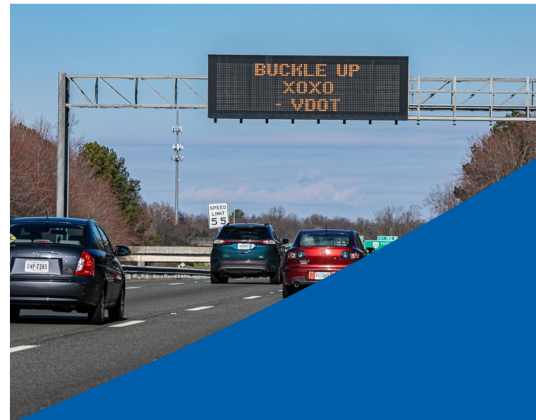
TABLE 15 I-64/664 CORRIDOR IMPROVEMENT PLAN SCORING AND PROGRAMMED COSTS

Project Description	Cost	SMART SCALE Score	Recommended for Funding
I-64 EB - NB I-81 Exit 221 to EB I-64 - Install high-friction surface pavement	$600,000	27.23	Yes
I-64 Both - Route 972 (Tidewater to NNSB via HRBT)	$898,598	13.35	Yes
I-64 EB - MM 23 - Install flashing chevrons	$120,000	11.75	Yes
I-64 WB - Exit 87 - I-64 WB to I-81 SB Ramp - Install high-friction surface pavement	$480,000	10.35	Yes
I-64 Both - Broad Street – Short Pump Bus Service	$3,744,635	3.83	Yes
I-64 WB - MM 19 to MM 21 - Install high-friction surface pavement	$2,300,000	3.69	Yes

Project Description	Cost	SMART SCALE Score	Recommended for Funding
I-64 Both - Create a new express route (22x) from Short Pump to downtown	$3,017,484	3.39	Yes
I-64 Both - Newport News Route 106 (Newport News / Warwick Boulevard / Denbigh Fort Eustis)	$4,033,729	3.19	Yes
I-64 Both - Newport News Route 107 (Newport News / Warwick Boulevard / Denbigh)	$3,511,492	2.96	Yes
I-64 WB - Exit 284 - Extend acceleration lane	$3,700,000	2.84	Yes
I-64 Both - Hickory Haven - New PnR or Relocate	$5,100,000	2.80	Yes
I-64 EB - Exit 256 - Extend acceleration lane	$2,600,000	2.27	Yes
I-64 Both - Increase bus frequency on Route 7 (Nine Mile) to 15 minutes	$7,816,397	2.23	Yes
I-64 WB - Exit 181 - Improve Interchange Configuration	$12,000,000	2.12	Yes
I-64 EB - Exit 284 - Extend acceleration lane	$4,300,000	1.96	Yes
I-64 Both - Bottom's Bridge - Expand PnR or Relocate	$3,100,000	1.87	Yes
I-64 WB - Exit 282 - Extend acceleration lane	$4,700,000	1.84	Yes
I-64 Both - Exit 291/ I-464 Interchange - Improve Interchange Configuration (Alternative 4A)	$140,000,000	1.48	Yes (IOEP)
I-64 EB - Exit 278 - Extend acceleration lane	$5,100,000	1.47	Yes (IOEP)
I-64 Both - Croaker Road - Expand PnR/Enhance	$2,500,000	1.41	Tentative (IOEP)
I-64 EB - Exit 265B to Exit 265C - Construct auxiliary lane	$8,500,000	1.40	Tentative (IOEP)
I-64 EB - Exit 185 - Extend deceleration lane - B	$3,500,000	1.35	Tentative (IOEP)
I-64 EB - Exit 279 - Extend acceleration lane	$4,700,000	1.30	Tentative (IOEP)
I-64 Both - Airport via Route 60 Bus Service	$2,833,600	1.21	Tentative (IOEP)
I-64 EB - WC to Exit 214 - Construct auxiliary lane	$6,500,000	1.10	Tentative (IOEP)
I-64 Both - Rte 208 /Courthouse Rd & Crew Rd - New PnR	$2,200,000	1.03	No
I-664 NB - Exit 13 - Extend acceleration lane	$5,300,000	0.90	No
I-64 Both - MM 224 to MM 233 - Median Widening (to six lanes)	$190,000,000	0.88	No
I-64 WB - Exit 185 - Extend acceleration lane	$4,200,000	0.86	No
I-64 EB - Exit 185 - Extend deceleration lane - A	$4,200,000	0.84	No
I-64 Both - Lightfoot - Expand PnR	$2,300,000	0.82	No
I-64 Both - MM 205 to MM 211 - Median Widening (to six lanes)	$120,000,000	0.74	No
I-64 EB - Exit 277 - Extend acceleration lane	$4,500,000	0.68	No
I-64 WB - Exit 261 - Extend acceleration lane	$7,300,000	0.67	No
I-64 EB - MM 23.8 to MM 24 - Install high-friction surface pavement	$240,000	0.67	No
I-664 NB - Exit 2 - Extend acceleration lane	$13,000,000	0.62	No
I-64 WB - Exit 192 - Extend acceleration lane	$7,000,000	0.60	No
I-64 WB - Exit 279 - Extend acceleration lane	$9,400,000	0.55	No

Project Description	Cost	SMART SCALE Score	Recommended for Funding
I-64 Both - MM 211 to MM 218 - Median Widening (to six lanes)	$190,000,000	0.50	No
I-64 Both - Lee Hall - Expand PnR	$3,800,000	0.43	No
I-64 EB - Exit 118 - Extend acceleration lane	$3,200,000	0.42	No
I-64 Both - MM 218 to MM 224 - Median Widening (to six lanes)	$230,000,000	0.37	No
I-64 WB - WC to Exit 214 - Construct auxiliary lane	$12,000,000	0.36	No
I-64 Both - Rte 250 /Rockfish Gap Tpk; Crozet - New PnR	$3,000,000	0.36	No
I-64 EB - Exit 118 - Extend deceleration lane	$3,200,000	0.35	No
I-64 EB - Exit 180 to Exit 181 - Construct auxiliary lane	$26,000,000	0.27	No
I-64 Both - Reimplement parkway shuttle to link Williamsburg, Jamestown, and Yorktown	$1,182,826	0.26	No
I-64 EB - Exit 195 - Extend deceleration lane	$4,700,000	0.26	No
I-64 WB - Exit 195 - Extend deceleration lane	$5,600,000	0.21	No
I-64 EB - Interchange Improvements at 64/264	$210,000,000	0.21	No
I-64 Both - Zion Crossroads - PnR Expansion	$7,500,000	0.19	No
I-664 NB - Exit 6 to Exit 7 - Construct auxiliary lane	$37,000,000	0.17	No
I-64 WB - MM 100 to MM 105 - Construct Truck Climbing Lane	$390,000,000	0.14	No
I-64 EB - MM 12 to MM 13 - Widen left shoulder	$12,000,000	0.10	No
I-64 EB - Exit 178 to Exit 180 - Construct auxiliary lane	$77,000,000	0.07	No
I-64 EB - Exit 167 - Extend acceleration lane	$3,400,000	0.07	No
I-64 WB - Exit 178 to Exit 180 - Construct auxiliary lane	$73,000,000	0.07	No
I-64 EB - Exit 178 - Improve Interchange Configuration	$89,000,000	0.07	No
I-64 WB - MM 44 to MM 48 - Construct Truck Climbing Lane	$170,000,000	0.05	No
I-64 WB - Exit 180 - Improve Interchange Configuration	$65,000,000	0.04	No
I-64 WB - MM 26 to MM 28 - Construct Truck Climbing Lane	$65,000,000	0.03	No
Grand Total	**$2,293,078,761**		

Above bold lines, costs have been inflated to year of expenditure and have undergone a preliminary refinement based on a process similar to SMART SCALE. Costs below the lines are planning level costs used for initial project prioritization.



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