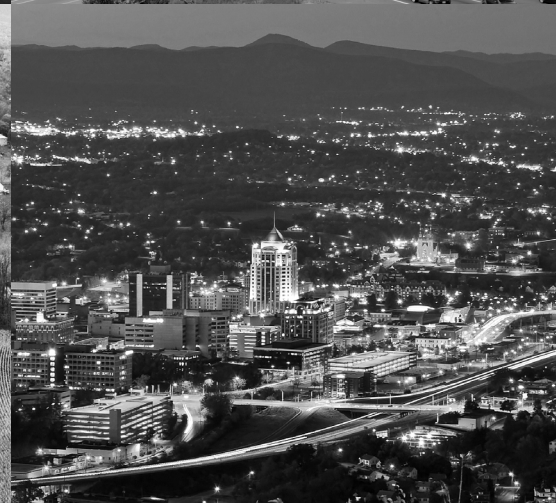




VTRANS — VIRGINIA'S TRANSPORTATION PLAN

Pursuant to § 33.2-353, submitted by the
Commonwealth Transportation Board to the
Governor and the Virginia General Assembly



For More Information

Visit vtrans.org for additional details, updates, and documentation about the VTrans development process. Please contact the Statewide Transportation Planning (STP) Team at the Office of Intermodal Planning and Investment to request an alternative format.

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PREPARED BY THE OFFICE OF INTERMODAL
PLANNING AND INVESTMENT FOR THE
COMMONWEALTH TRANSPORTATION BOARD



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1. Introduction to VTrans – Virginia’s Transportation Plan

1.1. PURPOSE OF THE DOCUMENT

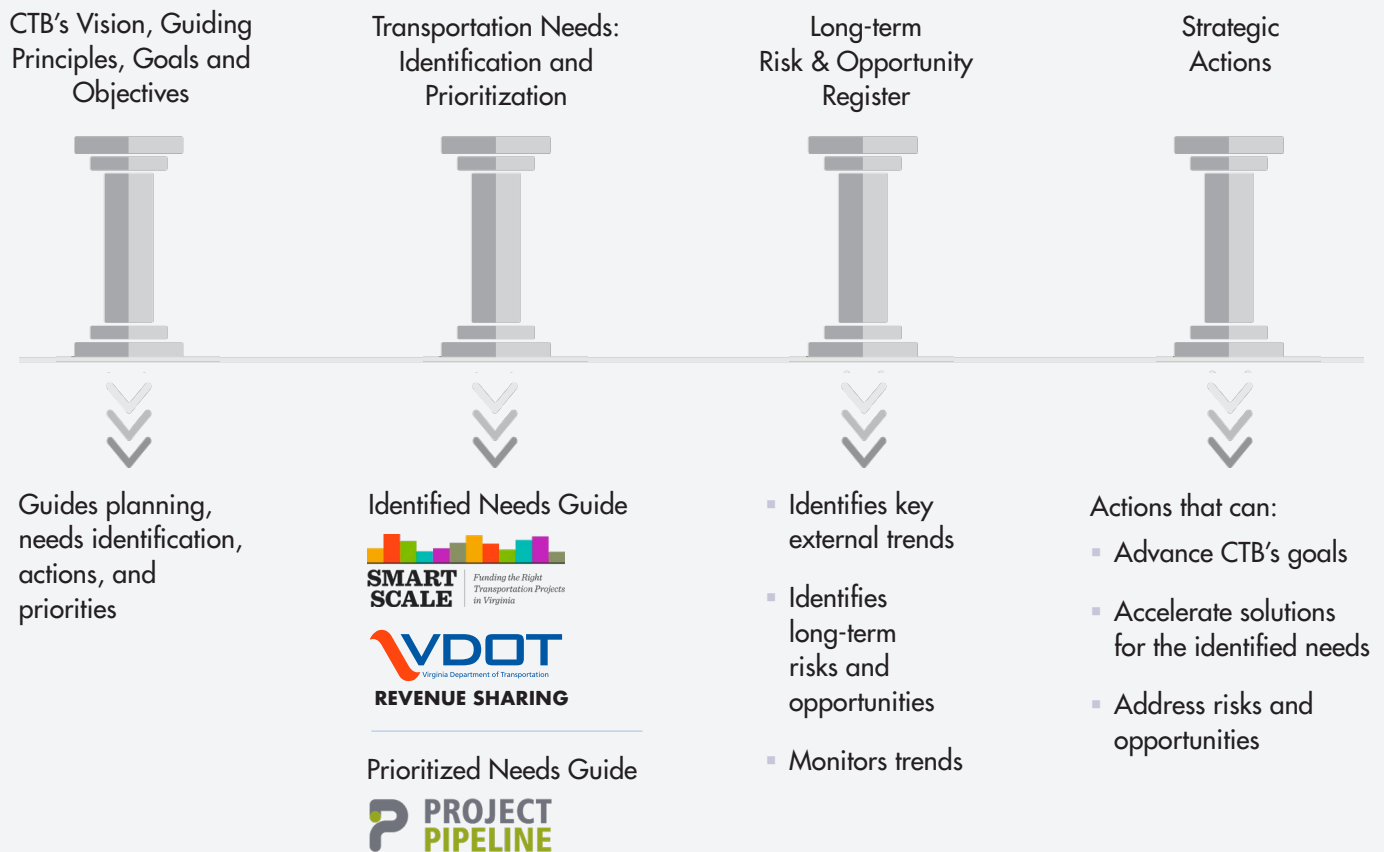
VTrans is Virginia’s Transportation Plan that considers all modes of surface transportation. Pursuant to § 33.2-353, the Commonwealth Transportation Board (CTB) has developed the plan and, as required, submits this document to the Office of the Governor and the General Assembly.

1.2. SIGNIFICANCE

As part of VTrans, the CTB has established transparent, replicable, and data-driven decision frameworks to guide the Commonwealth’s transportation investments. Figure 1 below summarizes how VTrans is guiding the transportation future.

- Prioritizes transportation needs and guides nearly **\$500 million** in annual construction investments
- Monitors long-term risks and opportunities
- Informs VDOT and DRPT decision-making

Figure 1: Major Components of VTrans - Virginia’s Transportation Plan



2. VTrans Vision, Goals, and Objectives

2.1. VTRANS VISION, GUIDING PRINCIPLES, GOALS, AND OBJECTIVES

The Commonwealth Transportation Board (CTB) has established a vision and adopted Guiding Principles, Goals, and Objectives for Virginia’s transportation system.

2.1.1. VISION

Virginia’s multimodal transportation system will be **Good for Business, Good for Communities, and Good to Go**. Virginians will benefit from a sustainable, reliable transportation system that advances Virginia businesses, attracts a 21st century workforce, and promotes healthy communities where Virginians of all ages and abilities can thrive.

2.1.2 GUIDING PRINCIPLES

OPTIMIZE RETURN ON INVESTMENTS

Implement the right solution at the right price, striving to meet current needs while advancing long-term prosperity and livability.

ENSURE SAFETY, SECURITY, AND RESILIENCY

Provide a transportation system that is safe for all users, responds immediately to short-term shocks such as weather events or security emergencies, and adapts effectively to long-term stressors such as sea level rise.

EFFICIENTLY DELIVER PROGRAMS

Deliver high-quality projects and programs in a cost-effective and timely manner.

CONSIDER OPERATIONAL IMPROVEMENTS AND DEMAND MANAGEMENT FIRST

Maximize capacity of the transportation network through increased use of technology and operational improvements as well as managing demand for the system before investing in major capacity expansions.

ENSURE TRANSPARENCY AND ACCOUNTABILITY, AND PROMOTE PERFORMANCE MANAGEMENT

Work openly with partners and engage stakeholders in project development and implementation. Establish performance targets that consider the needs of all communities, and measure progress towards targets. Adjust programs and policies as necessary to achieve the established targets.

IMPROVE COORDINATION BETWEEN TRANSPORTATION AND LAND USE

Encourage local governments to plan and manage transportation-efficient land development by providing incentives, technical support, and collaborative initiatives.

ENSURE EFFICIENT INTERMODAL CONNECTIONS

Provide seamless connections between modes of transportation to harness synergies.

2.1.3. GOALS AND OBJECTIVES

GOAL A: ECONOMIC COMPETITIVENESS AND PROSPERITY

Invest in a transportation system that supports a robust, diverse, and competitive economy

Objectives:

- Reduce the amount of travel that takes place in severe congestion
- Reduce the number and severity of freight bottlenecks
- Improve reliability on key corridors for all modes

GOAL B: ACCESSIBLE AND CONNECTED PLACES

Increase opportunities for people and businesses to efficiently access jobs, services, activity centers, and distribution hubs

Objectives:

- Reduce average peak-period travel times in metropolitan areas
- Reduce average daily trip lengths in metropolitan areas
- Increase the accessibility to jobs via transit, walking, and driving in metropolitan areas

GOAL C: SAFETY FOR ALL USERS

Provide a safe and secure transportation system for passengers and goods on all travel modes

Objectives:

- Reduce the number and rate of motorized fatalities and serious injuries
- Reduce the number of non-motorized fatalities and serious injuries

GOAL D: PROACTIVE SYSTEM MANAGEMENT

Maintain the transportation system in good condition and leverage technology to optimize existing and new infrastructure

Objectives:

- Improve the condition of all bridges based on deck area
- Increase the lane miles of pavement in good or fair condition
- Increase the percentage of transit vehicles and facilities in good or fair condition

GOAL E: HEALTHY COMMUNITIES AND SUSTAINABLE TRANSPORTATION COMMUNITIES

Support a variety of community types promoting local economies and healthy lifestyles that provide travel options, while preserving agricultural, natural, historic, and cultural resources

Objectives:

- Reduce per-capita vehicle miles traveled
- Reduce transportation related NO_x, VOC, PM, and CO emissions
- Increase the number of trips traveled by active transportation (bicycling and walking)



3. Transportation Needs and Priorities

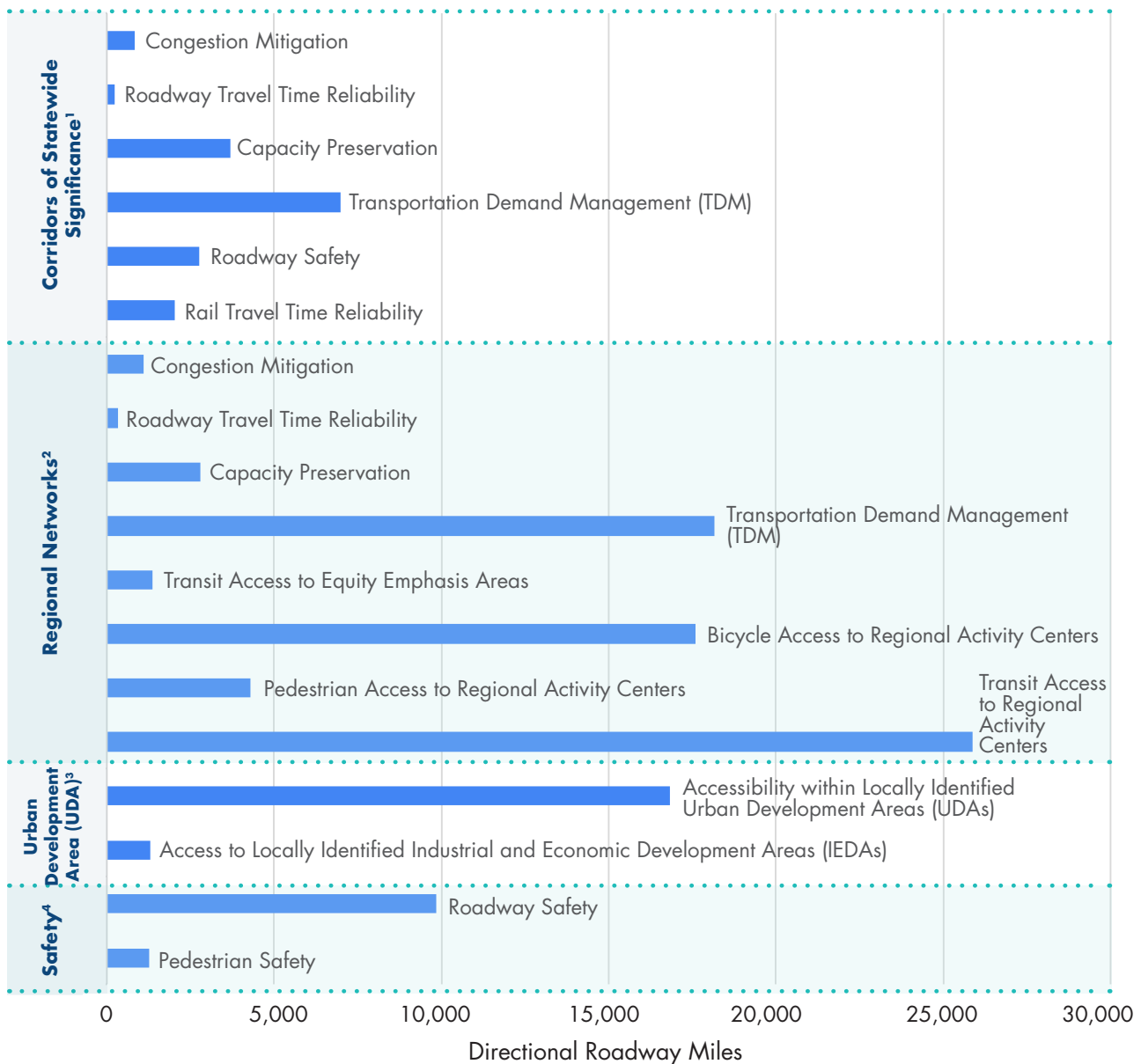
The Commonwealth Transportation Board (CTB) has established policies to identify and prioritize locations around the Commonwealth with transportation (highway, transit, rail, bicycle, pedestrian) needs in a transparent and data-driven manner utilizing stakeholder feedback. The identified transportation needs may be addressed by projects, policies, or programs over the next ten years and are referred to as the VTrans Mid-term Needs.

Pursuant to §33.2-214.1, Virginia is investing over \$500 million annually to address the identified transportation needs.

3.1. VTRANS TRANSPORTATION NEEDS

The Commonwealth has over 47,000 directional roadway miles with one or more multimodal transportation needs. A summary of the identified transportation needs is included in Figure 2.

Figure 2: VTrans Transportation Needs



¹ CoSS is a network of 12 transportation corridors. Each corridor is an integrated set of multimodal (highway, rail, transit, waterway, etc.) transportation facilities to support interregional travel of people and goods within and outside the state.

² CTB has established 15 Regions in the Commonwealth with substantial intra-regional (travel within the region) travel needs.

³ Locally designated growth areas pursuant to VA Code § 15.2- 2223 or economic development sites submitted to Virginia Economic Development Partnership (VEDP)’s Business-Ready Site Program

⁴ All publicly accessible roadways in the Commonwealth are analyzed for safety needs.

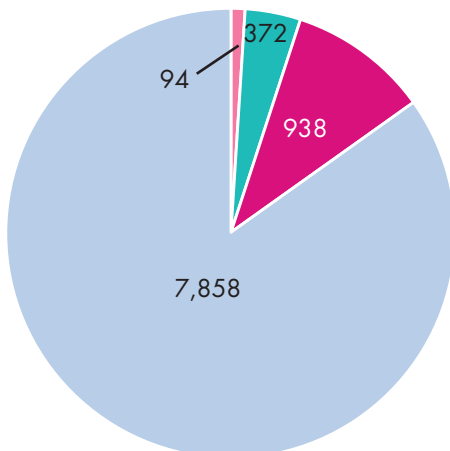
3.2. PRIORITIZATION OF VTRANS TRANSPORTATION NEEDS

There are simply too many transportation needs to address with today’s funding, so while all transportation needs become eligible for funding in SMART SCALE, the purpose of the prioritization is to establish an order in which they will be studied by the Commonwealth. The identified transportation needs help establish two types of priority locations: (1) Statewide Transportation Priority Locations (Figure 3); and (2) VDOT Construction District Priority Locations (Figure 4).



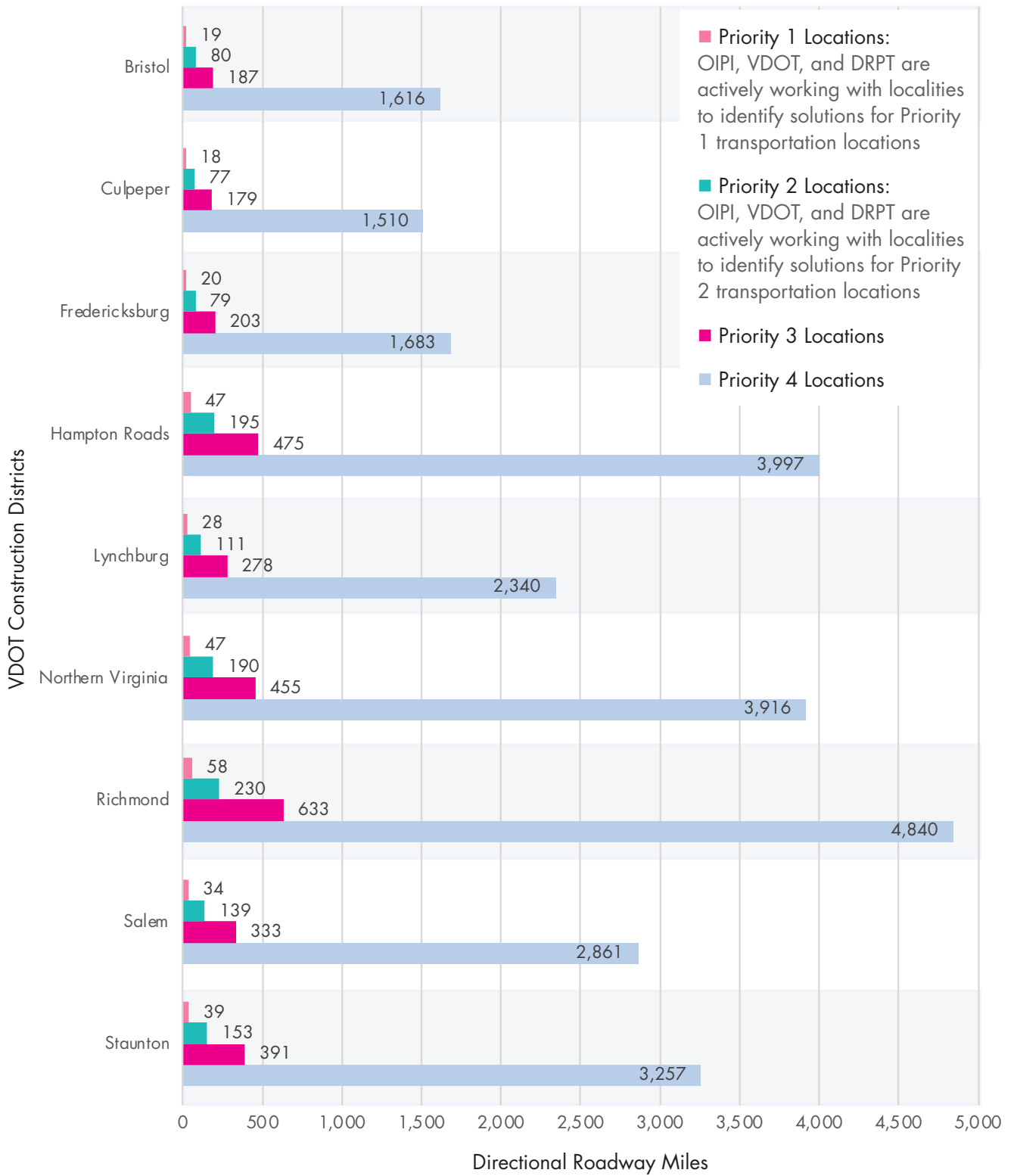
Figure 3: Statewide Transportation Priority Locations (Directional Roadway Miles)

These locations directly or indirectly advance economic prosperity and vitality for the entire state. Priority Locations are assigned levels 1–4 based on their relative statewide rank by roadway segment mileage in the following manner:



- Priority 1 Locations: Top 0%–1% of the total mileage
OPI, VDOT, and DRPT are actively working with localities to identify solutions for Priority 1 transportation locations
- Priority 2 Locations: 1.001%–5% of the total mileage
OPI, VDOT, and DRPT are actively working with localities to identify solutions for Priority 2 transportation locations
- Priority 3 Locations: 5.001%–15% of the total mileage
- Priority 4 Locations: Bottom 15.001%–100% of the total mileage

Figure 4: VDOT Construction District Priority Locations



4. VTrans Long-term Transportation Risks & Opportunities

The purpose of identifying long-term risks and opportunities is to allow Virginia to be better prepared to minimize risks and make the most of potential opportunities in a methodical manner.

As part of VTrans, the CTB developed a Policy for the Development and Monitoring of the VTrans Long-term Risk & Opportunity Register. This policy identifies four megatrends and ten macrotrends that are likely to impact Virginia’s transportation system in the coming decades.

The Commonwealth Transportation Board (CTB) is actively monitoring transportation impacts of 10 key external factors (VTrans Macrotrends).

Figure 5: VTrans Mega and Macrotrends

MEGATREND 1: CLIMATE



Macrotrend 1: Increase in Flooding Risk

MEGATREND 2: TECHNOLOGY



Macrotrend 2: Adoption of Highly Autonomous Vehicles



Macrotrend 3: Adoption of Electric Vehicles



Macrotrend 4: Growth in Shared Mobility¹

MEGATREND 3: CONSUMPTION



Macrotrend 5: Growth in E-commerce



Macrotrend 6: Greater Automation of Production and Services

MEGATREND 4: SOCIO-DEMOGRAPHICS



Macrotrend 7: Growth of Professional Services Industry



Macrotrend 8: Increase in Workplace Flexibility



Macrotrend 9: Growth of the 65+ Cohort










Macrotrend 10: Population and Employment Shift

¹ Shared Mobility refers to micromobility services such as bikesharing and scooter sharing, and ridesourcing services such as transportation network companies like Uber and Lyft.

4.1 IMPACTS OF MACROTRENDS ON CTB GOALS

A data-driven method, informed by published academic and reputed research, is used to identify the impacts of external factors (mega- and macro-trends) on the CTB’s transportation goals. These impacts are shown in Figure 6.

Figure 6: Impact of Macrotrends

	IMPACTS OF VTRANS MACROTRENDS Over and above impacts due to economic growth			WHAT IT MEANS ¹
	Low	Medium	High	
VEHICLE MILES TRAVELED (VMT) INDEX Estimated change in VMT	+4%	+8%	+17%	
SHARED MOBILITY INDEX Estimated switchable urban auto Single-Occupancy Vehicle VMT to micromobility + ridesourcing	+9%	+18%	+27%	
SAFETY INDEX Estimated change in number of crashes involving fatalities + serious injuries	-26%	-38%	-67%	
TAILPIPE EMISSIONS INDEX Estimated change in tailpipe emissions	-3%	-17%	-69%	
NUMBER OF MILES AT RISK FROM FLOODING Sea Level Rise	900	1,100	1,400	
NUMBER OF MILES AT RISK FROM FLOODING Storm Surge	7,700	13,100	17,100	
NUMBER OF MILES AT RISK FROM FLOODING Inland/Riverine Flooding	17,500	17,900	18,200	

¹ Up logo: Desirable impact. Down logo: Undesirable impact.

4.2: VTRANS LONG-TERM RISK & OPPORTUNITY REGISTER

Based on the identified impacts, this register documents impacts of external factors, mega- and macro trends, in a systematic manner. A total of nineteen risks and opportunities for the Commonwealth’s transportation system have been found.

The Commonwealth Transportation Board (CTB) has adopted Strategic Actions to address the identified risks and opportunities.*









Table 1: VTrans Long-term Risk & Opportunity Register


Macrotrend	Characterization	Description
		<ol style="list-style-type: none"> 1. A large number of the state’s roadways are at risk of flooding 2. Several unknown and unquantified flooding risks are present 3. Impacts of increased flooding risk are disproportionately higher for certain geographic areas and populations
		<ol style="list-style-type: none"> 4. Proactively eliminate or mitigate identified flooding risks 5. Increase the state’s preparedness to address <u>other</u> macro trends associated with climate change megatrend
		<ol style="list-style-type: none"> 6. Greater wear-and-tear of the transportation system due to increased vehicle miles traveled (VMT) and increase in average vehicle weight
		<ol style="list-style-type: none"> 7. Improve the state’s ability to manage a transportation system with a high number of highly autonomous vehicles 8. Maximize safety benefits offered by highly autonomous vehicles, especially those with Automated Driving System
		<ol style="list-style-type: none"> 9. Higher vehicle miles traveled (VMT) for each unit of economic activity compared to the present fleet
		<ol style="list-style-type: none"> 10. Minimize environmental impacts of the transportation system development
		<ol style="list-style-type: none"> 11. Increased curb access conflicts in urbanized areas
		<ol style="list-style-type: none"> 12. Projected growth in shared mobility (micromobility and TNC/ridesourcing) does not provide measurable transportation system benefits 13. Benefits of growth in shared mobility are not equally accessible by all areas and population segments
		<ol style="list-style-type: none"> 14. Utilize shared mobility services to improve accessibility 15. Improve the state’s ability to manage a transportation system with a high number of shared mobility vehicles


Opportunity (Uncertainty with a positive impact on CTB Goals)

Risk (Uncertainty with a negative impact on CTB Goals)

*See page 15.

Macrotrend	Characterization	Description
		16. Proactively eliminate or mitigate transportation impacts associated with e-commerce including those related to large warehouse and distribution centers
		17. Improve state’s ability to proactively manage transportation impacts associated with greater automation of production and services
		18. Maximize utilization of workplace flexibility for telework capable jobs
		19. Transportation system and services are unable to meet mobility needs of Virginians age 65 and older

 Opportunity (Uncertainty with a positive impact on CTB Goals)

 Risk (Uncertainty with a negative impact on CTB Goals)

4.3 VTRANS TREND TRACKERS

The Commonwealth Transportation Board (CTB) has adopted metrics, also referred to as VTrans Trend Trackers, to allow the Commonwealth to systematically monitor change in risks and opportunities. The CTB receives annual updates on these trend trackers.

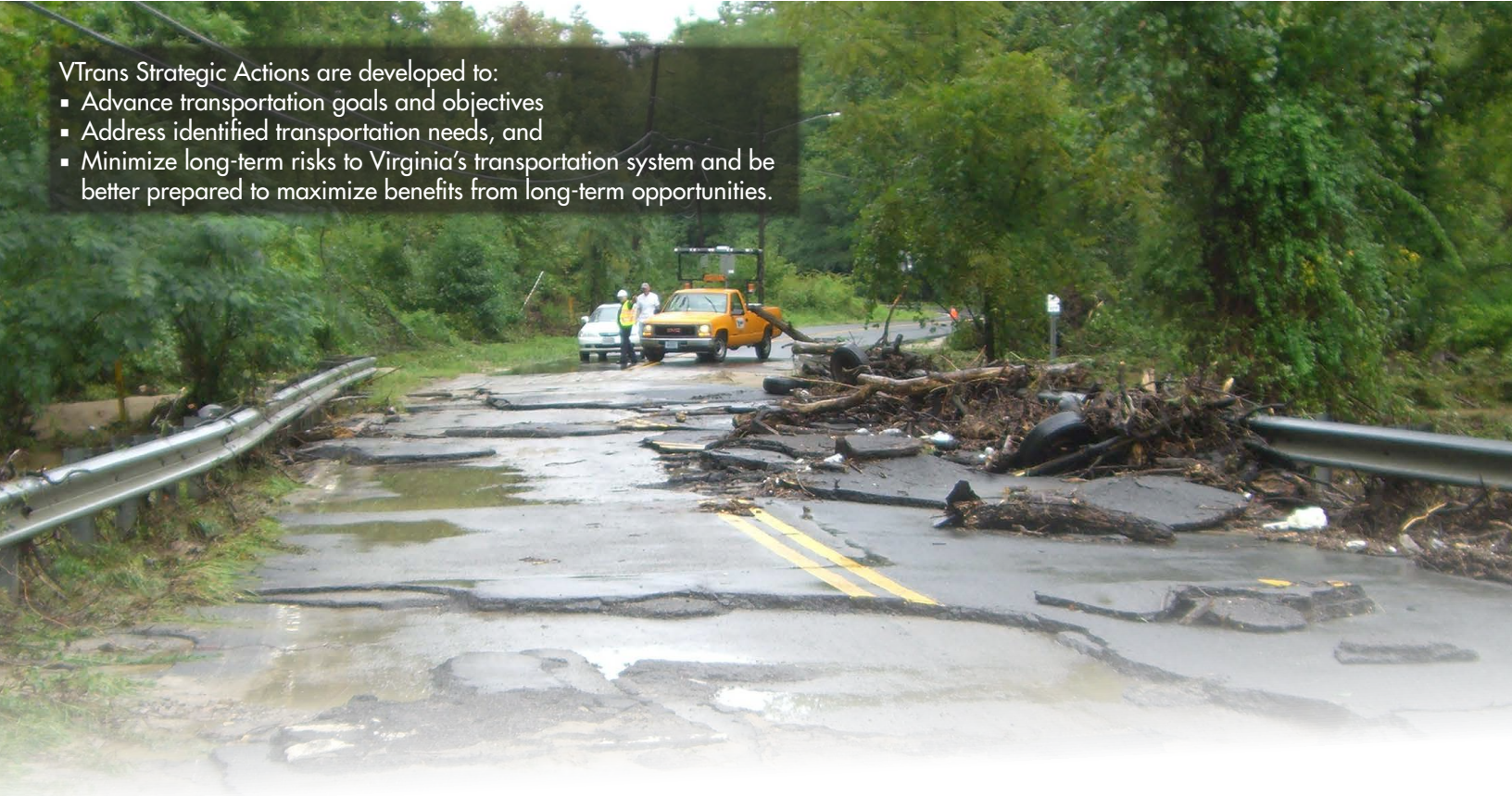
Table 2: VTrans Trend Trackers

Macrotrend	VTrans Trend Trackers
 <p>1. Increase in Flooding Risk</p>	<ul style="list-style-type: none"> ▪ Number of directional miles at risk from sea level rise ▪ Number of directional miles at risk from storm surge ▪ Number of directional miles at risk from inland/riverine flooding ▪ Annual cost of transportation repair due to flooding events
 <p>2. Adoption of Highly Autonomous Vehicles</p>	<ul style="list-style-type: none"> ▪ Market Penetration of Semi-Autonomous (Levels 1 and 2) Vehicles ▪ Attitude and Preferences for Adoption of Semi-Autonomous (Levels 1 and 2) Vehicles ▪ Market Penetration of Highly Autonomous (Levels 3 and 4) Vehicles ▪ Attitude and Preferences for Adoption of Highly Autonomous (Levels 3 and 4) Vehicles
 <p>3. Adoption of Electric Vehicles</p>	<ul style="list-style-type: none"> ▪ Number of Electric Vehicles ▪ Market Penetration of Electric Vehicles ▪ Attitude and Preferences for Adoption of Electric Vehicles ▪ Transportation Funding by Funding Source
 <p>4. Growth in Shared Mobility</p>	<ul style="list-style-type: none"> ▪ Access to Shared Mobility Services ▪ Utilization of Shared Mobility Services by Type
 <p>5. Growth in E-Commerce</p>	<ul style="list-style-type: none"> ▪ Number of Warehouse and Distribution Centers ▪ Square Footage of Warehouse and Distribution Centers ▪ Share of E-commerce Sales (Business-to-business, business-to-customers) ▪ Number of Jobs in Goods Movement Dependent Industries
 <p>6. Greater Automation of Production and Services</p>	<ul style="list-style-type: none"> ▪ Number of short-range drone deliveries ▪ Number of long-range drone deliveries
 <p>7. Growth of Professional Services Industry</p>	<ul style="list-style-type: none"> ▪ Share of Professional Services Industry Jobs ▪ Number of Science, Technology, Engineering, and Mathematics (STEM) Jobs
 <p>8. Increase in Workplace Flexibility</p>	<ul style="list-style-type: none"> ▪ Number of Workers with Workplace Flexibility ▪ Utilization of Workplace Flexibility
 <p>9. Growth of the Age 65+ Cohort</p>	<ul style="list-style-type: none"> ▪ Number of Virginians Age 65 or higher ▪ Share of Age 65+ Cohort
 <p>10. Population and Employment Shift</p>	<ul style="list-style-type: none"> ▪ VTrans Land Use Vitality (LUV) Index ▪ Population ▪ Employment ▪ Income

5. Strategic Actions¹

VTrans Strategic Actions are developed to:

- Advance transportation goals and objectives
- Address identified transportation needs, and
- Minimize long-term risks to Virginia’s transportation system and be better prepared to maximize benefits from long-term opportunities.



1. Collect data (e.g., right-of-way mapping, precipitation, roadway elevation, etc.) to accurately assess flooding risks for state- and locally-maintained roadways that can be used to identify funding needs and prioritize investment.

- Responsible entity(s): VDOT
- Intent: This action addresses VTrans Risk & Opportunity Register Item #2: Presence of unknown and unquantified flooding risk.

2. Develop policies, based on robust data collection and analysis, to ensure flooding risks are reflected in transportation asset life cycle and/or transportation project planning processes.

- Responsible entity(s): VDOT, DRPT
- Intent: This action addresses VTrans Risk & Opportunity Register Item #4: Proactively eliminate or mitigate identified flooding risks.

3. Collaborate with state/regional agencies to systematically identify solutions that facilitate consistent and systematic prioritization and support the allocation of state resources to address flooding risks.

- Responsible entity(s): VDOT, DRPT
- Intent: This action addresses VTrans Risk & Opportunity Register Item #4: Proactively eliminate or mitigate identified flooding risks.

¹ VTrans Strategic Actions are not listed in any particular order as many of them are interrelated. Some strategies may require adjustment or sequential implementation depending on the status of other strategies.

4. Evaluate options to gather vehicle automation/capability data for the state’s registered vehicle fleet to develop a more complete and accurate assessment of risks and opportunities associated with automated vehicles.

- Responsible entity(s): VDOT
- Intent: This action addresses VTrans Risk & Opportunity Register Item # 7: Improve the state’s ability to manage a transportation system with a high number of highly autonomous vehicles.

5. Develop a roadmap for implementing foundational digital practices such as digital- as-builts (DABs) and information management processes, etc., for capturing asset information from projects.

- Responsible entity(s): VDOT, DRPT
- Intent: This action addresses VTrans Risk & Opportunity Register Item # 8: Maximize safety benefits offered by highly autonomous vehicles, especially those with Automated Driving Systems, and VTrans Guiding Principle # 3: Efficient delivery of programs.

6. Evaluate and facilitate vehicle-to-infrastructure communications along limited-access highways by the private sector.

- Responsible entity(s): VDOT
- Intent: This action addresses VTrans Risk & Opportunity Register Item # 8: Maximize safety benefits offered by highly autonomous vehicles, especially those with Automated Driving Systems.

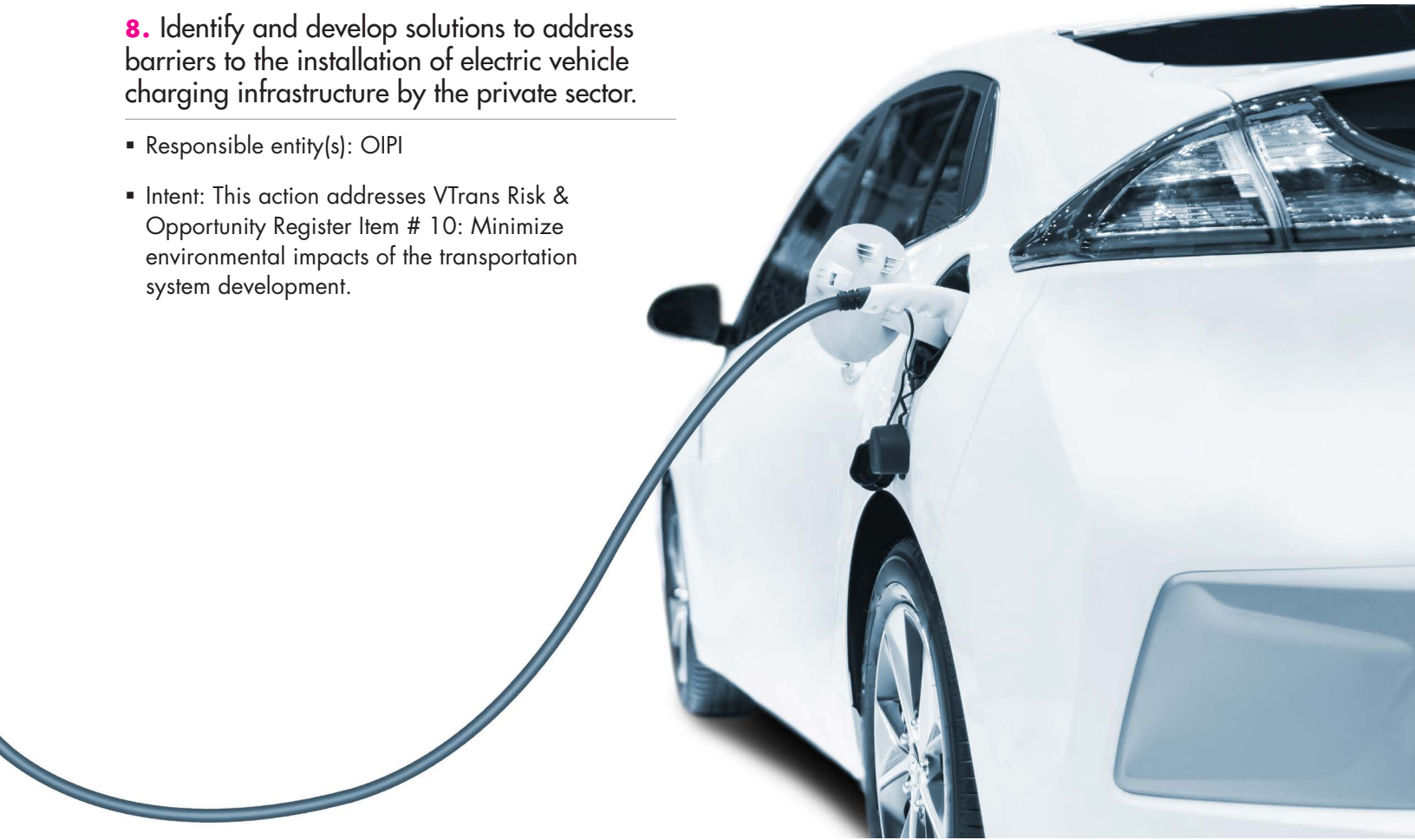
7. Identify and provide access to the available real-time or up-to-date state transportation asset and operations data in digital formats for use by the public and industry partners as needed to support autonomous vehicle deployment.

- Responsible entity(s): VDOT, DRPT
- Intent: This action addresses VTrans Risk & Opportunity Register Item # 8: Maximize safety benefits offered by highly autonomous vehicles, especially those with Automated Driving Systems.



8. Identify and develop solutions to address barriers to the installation of electric vehicle charging infrastructure by the private sector.

- Responsible entity(s): OIPI
- Intent: This action addresses VTrans Risk & Opportunity Register Item # 10: Minimize environmental impacts of the transportation system development.



9. Evaluate and establish sidewalk and curb management best practices for state-owned roadways and promote them for locality-owned roadways.

- Responsible entity(s): OIPI
- Intent: This action addresses VTrans Risk & Opportunity Register Items: # 11: Increased curb access conflicts in urbanized areas due to shared mobility and e-commerce vehicles in urbanized areas; #14: Utilize shared mobility services to improve accessibility; and, # 15: Improve state’s ability to manage a transportation system with high number of shared mobility vehicles.



10. Formalize a process for needs identification and prioritization for the § 33.2-372: Interstate Operations and Enhancement Program utilizing the transportation planning policies established by the CTB in VTrans.

- Responsible entity(s): OIPI
- Intent: This action addresses CTB Guiding Principle #1: Optimize return on investment and Guiding Principle #3: Efficiently deliver programs.

12. Establish a regular study cycle for Project Pipeline studies, as defined in the CTB Policy for the Prioritization of VTrans Mid-term Needs adopted in March 2021, to include solutions for the most up-to-date Priority 1 and 2 locations.

- Responsible entity(s): OIPI
- Intent: This action addresses: VTrans Mid-term Needs and Priority Locations; CTB Guiding Principle # 3: Efficiently deliver programs and Guiding; and CTB Guiding Principle # 5: Ensure Transparency and Accountability, and Promote Performance Management.

11. Evaluate the performance of selected construction projects from the SMART SCALE, Interstate Operations and Enhancement Program, Virginia Highway Safety Improvement Program, and DRPT’s MERIT program to determine if the selected projects are providing the anticipated benefits to support efforts to continue to improve project evaluation criteria and methods.

- Responsible entity(s): OIPI
- Intent: This action addresses CTB Guiding Principle #1: Optimize return on investment and Guiding Principle #3: Efficiently deliver programs.





13. Evaluate the feasibility of and alternatives to a combined dashboard to monitor performance and delivery of projects and programs included in the Six-Year Improvement Program (SYIP).

- Responsible entity(s): VDOT, DRPT
- Intent: This action addresses CTB Guiding Principle # 3: Efficiently deliver programs and Guiding Principle # 5: Ensure Transparency and Accountability, and Promote Performance Management.

14. Evaluate and, if feasible, integrate the remaining application-based highway and transit capital funding programs and transit operating funding programs administered by OIPI, VDOT, and DRPT into SMART PORTAL to provide one-stop access to state’s funding programs.

- Responsible entity(s): VDOT, DRPT, OIPI
- Intent: This action addresses CTB Guiding Principle # 1: Optimize return on investment and Guiding Principle # 3: Efficiently deliver programs.



15. Identify and clarify roles and responsibilities of the state transportation agencies for emerging areas such as curb management, micromobility, shared mobility, etc., to ensure greater focus.

- Responsible entity(s): OIPI
- Intent: This overarching action addresses all items identified in the VTrans Risk & Opportunity Register.

16. To methodically address items in the 2021 VTrans Risk & Opportunity Register, formalize OIPI’s role in supporting and advising the CTB in the conduct of CTB business and the development of a comprehensive transportation policy.

- Responsible entity(s): OIPI
- Intent: This overarching action addresses all items identified in the VTrans Risk & Opportunity Register.



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