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8

CHAPTER

Planning for Performance

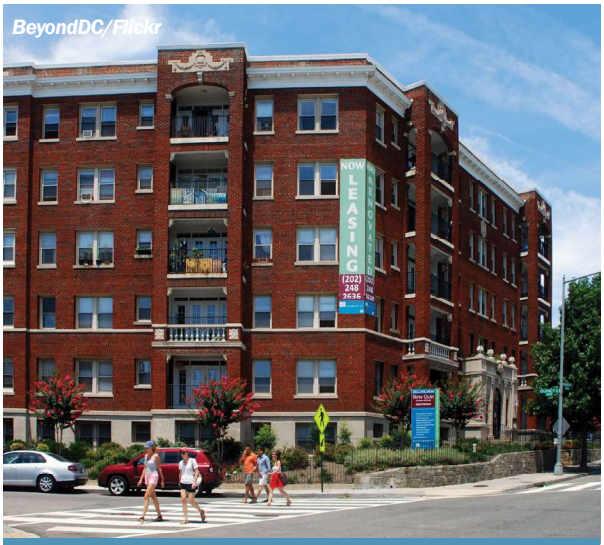
Planning, Evaluating and Forecasting Performance

Sports fans know that metrics are used by athletes and teams in the pursuit of improved performance. Transportation planning also uses analysis of performance measures to strive for better outcomes. Through performance planning, the TPB informs decision-making on how the region's transportation system will be managed, operated and invested in. The TPB works with partners to compile regional transportation data and evaluates the performance of how all the elements of the regional transportation system work together.

This chapter reports the TPB's planning for performance and demonstrates how that is documented through and meets the requirements of federal **Performance-Based Planning and Programming (PBPP)** and the **Congestion Management Process (CMP)**.

WHY MEASURE PERFORMANCE?

The TPB uses performance measures to monitor transportation trends and the impacts of investments on transportation performance. Implementing agencies respond to trends to improve performance of the transportation system. This provides a better return on investment of every taxpayer dollar and means better experiences for the people and businesses that rely on the transportation system.



PERFORMANCE-BASED PLANNING AND PROGRAMMING

A federally mandated process calling for states and MPOs to "transition to a performance-driven, outcome-based program that provides for a greater level of transparency and accountability, improved project decision-making, and more efficient investment of federal transportation funds."

This chapter reports three sets of measures:

1. The federally required regional performance measures established and reported as part of the PBPP process.
2. The Air Quality Conformity analysis measures, with forecasts based on the projects included in the constrained element.
3. The measures that TPB uses to report on performance of the regional transportation system, for current and forecasted performance, based on the projects included in the constrained element.

A Performance-Based Approach: PBPP and the CMP

The TPB and its partner agencies have a long tradition of using performance measures to inform planning and investments, and to evaluate the regional transportation system. Building upon that tradition, federal PBPP requirements originating in the federal surface transportation Moving Ahead for Progress in the 21st Century Act (MAP-21), and Fixing America's Surface Transportation (FAST) Acts, formalized that approach. They call for state departments of transportation (DOTs), providers of public transportation, and metropolitan planning organizations (MPOs, such as the TPB), to document how they link investment priorities to the achievement of performance targets. This includes the projects in Visualize 2045 and the TIP.

The TPB has a longstanding commitment to safety, managing congestion, providing transportation demand management through a comprehensive transportation system, and prioritizing the preservation of that system. This is enhanced by and documented through the PBPP and the CMP. These approaches provide a framework that links investments in programs, policies, and projects with desired outcomes for transportation system performance.

PBPP is comprised of a range of activities and products that TPB and partners must undertake, including:

- Reporting on PBPP in the development of long-range transportation plans.
- Reflecting PBPP in programming documents, including State and metropolitan Transportation Improvement Programs (STIPs and TIPs).
- Producing federally required plans and processes such as the CMP, Strategic Highway Safety Plans (SHSPs), Asset Management Plans, and Transit Agency Asset Management and Safety Plans.

Learn more about the TPB's PBPP performance measures and progress in this chapter, and in the Systems Performance Report, Appendix D of this plan.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Congestion Management Process (CMP)

Every day, millions of people travel on our region's roads to access jobs, schools, and medical care, as well as shopping, entertainment, and recreational opportunities. Roads also carry most goods deliveries to homes, schools, businesses, and stores in the region. When roads are congested, that means people spend more time in traffic and less time doing the activities and being with the people that are important to them.

Congestion means people must make costly tradeoffs, such as leaving home early to get to work or leaving work early to get to day care. It means higher costs for business to move goods and provide services. In the greater metropolitan Washington region,[36] in 2019, roadway users were estimated to spend more than 256 thousand hours stuck on the roads due to delay from congestion, averaging to 105 hours per commuter. The economic cost of this congestion was estimated at more than $5.4 billion, or about $2,200 per commuter per year. This leads to an excess of fuel consumed in the amount of more than 98 million gallons, leading to an additional 975,000 tons of carbon (greenhouse gases) emitted into the air.[37]

TPB's Role

Due to population and economic growth, congestion is forecasted to increase. The TPB must continuously plan to move more people and goods through multimodal strategies and efficient management and operation of the system. For decades, the TPB has conducted planning for the region's extensive highway and road network that provides connectivity for people and goods to destinations across the region.

The TPB serves in an important role addressing congestion and providing for safe and effective management and operation of the transportation system in the region. As depicted in Figure 8.1, it does this by conducting analyses and providing information for members' awareness of congestion trends and potential management strategies which are documented in the federally required CMP. The TPB's activities are documented as four major CMP components that are integral to the region's LRTP, as summarized in Table 8.1. The TPB's activities that are documented in the

Voices of the Region

A FEW KEY SURVEY RESULTS:

How big a concern is traffic congestion to you, personally?

The responses varied significantly based on where people lived, underscoring the impact that land use and the provision of multiple transportation options have on the consumer experience:

54% of people living in more suburban areas indicated that "*congestion is a significant concern and it impacts the quality of my life,*" compared to 46% in the inner suburbs, and only 27% of those in the core (more urban areas with more transportation options).

36 Note the estimates provided by TTI are for a geographical area slightly different from the TPB planning area.

37 Retrieved online from: Texas A&M Transportation Institute (TTI) 2019 Urban Mobility Report: mobility.tamu.edu/umr/congestion-data

CMP FEDERAL REQUIREMENTS

Federal law requires the TPB to provide for "safe and effective integrated management and operation of the multimodal transportation system…through the use of travel demand reduction and operational management strategies."

CMP include regional consensus building and participation in several forums for coordination and information sharing. The TPB Technical Committee, the Systems Performance, Operations, and Technology Subcommittee, and the Commuter Connections Subcommittee consult regularly on staff's work. The TPB's Commuter Connections program plays a critical role in implementing the most impactful strategies for demand management. Demand management seeks to reduce congestion by reducing the number of vehicles (especially single occupant vehicles) on the road during high-volume time periods while operational management focuses on incident management, technology advances, and, when necessary, capacity increases. **Further information on the CMP can be found online** and in Appendix E: Congestion Management Process Federal Compliance and Impact on Plan Development.

Figure 8.1: Visualize 2045 and the CMP

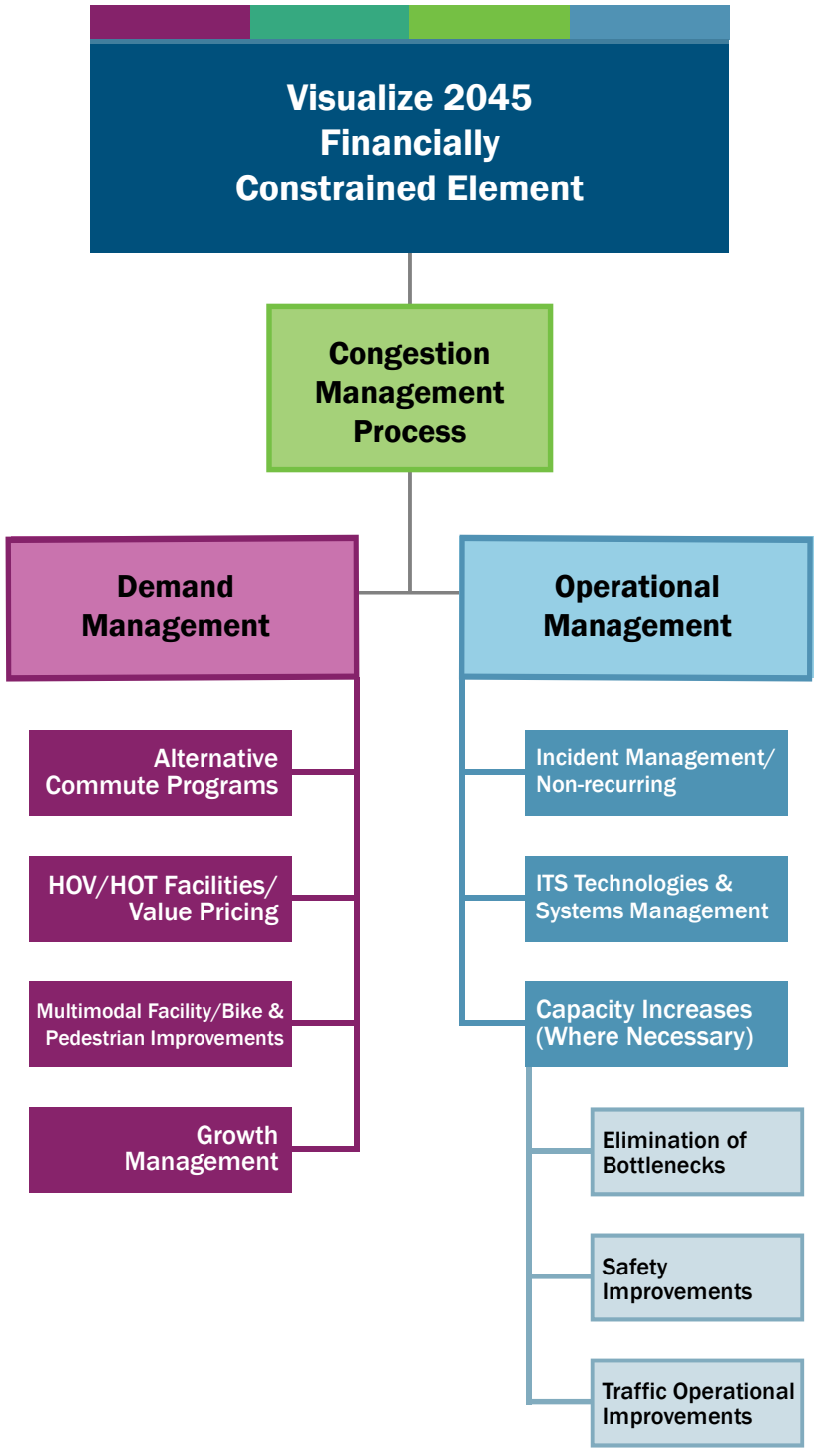

Table 8.1: Visualize 2045 and CMP Components

Component	TPB Role	CMP Documentation
1. Monitoring and evaluating transportation system performance	The TPB monitors the performance of the region's transportation system and identifies and evaluates the benefits that various congestion management strategies may have.	The TPB travel monitoring activities associated with the CMP are communicated to inform decision-makers on the region's congestion through numerous documents, graphics and text compiled on the TPB website including an ongoing series of **National Capital Region Congestion Reports.**
2. Defining and analyzing strategies	With accurate and reliable data, the TPB and regional partners work to establish potential strategies and initiatives to help alleviate congestion, such as the seven Aspirational Initiatives that the TPB endorsed in 2018. Strategies include both demand management and operational management strategies as described in the additional CMP documentation.	The TPB's Congestion Management Report provides technical details and updated congestion information and congestion management strategies on the region's transportation systems, as well as the process integrating the CMP into the update to Visualize 2045.
3. Compiling project-specific congestion management information	The TPB collects from project sponsors a CMP Documentation Form for projects that require them. The requirement is that SOV capacity-increasing projects are only supposed to be implemented if non-SOV-capacity strategies were also considered. The forms document that such consideration has occurred.	CMP Forms are provided by implementing agencies as part of TPB's Technical Inputs Solicitation for LRTP and TIP projects that have significant CMP impacts.
4. Implementing strategies	The TPB manages the Commuter Connections program to promote and implement regional demand management. TPB members implement the strategies and submit projects, programs and policies to the TPB for inclusion in the LRTP and TIP.	As TPB members implement regionally significant projects, programs and policies that reflect the CMP strategies, they are included in the LRTP and TIP. Notable strategies include the region's **incenTrip app** and overall **Commuter Connections** programs.

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WHAT IS A PERFORMANCE MEASURE?

A numeric measure that can be used to quantify the performance of one or more characteristics of the transportation system.

Implementing PBPP

To implement PBPP in coordination with partners, the TPB is tasked with setting and monitoring progress toward targets for 26 performance measures. As PBPP progresses over the years, performance compared to the targets will help inform funding decisions and help achieve targets. More information about the TPB's PBPP efforts can be found in Appendix D: PBPP System Performance Report and at **mwcog.org/PBPP**.

The TPB, states, and providers of public transportation use the PBPP process in the following areas:

- Highway Safety
- Highway Assets
- Highway System Performance
- Vehicular Emissions
- Transit Asset Management
- Transit Safety

TPB's Role

For each of the six performance areas, the TPB is responsible for determining how to calculate measures and set targets for the metropolitan planning area. See Table 8.2 for all the areas and measures. The TPB's efforts complement those of state DOTs and public providers of transportation who are also responsible for calculating measures and setting targets at the state level or for the transit system. Accordingly, the TPB coordinates with the states and transit agencies in establishing measures and targets for the region.

States measure performance and set targets on a statewide basis, and providers of public transportation measure performance and set targets for their transit system. Depending upon the area of performance, targets are set annually, biennially, or every four years. States and providers of public transportation must also develop supporting strategic plans for monitoring and improving performance in order to achieve their selected targets. In addition to setting quantitative targets, periodic narrative reports on measured performance compared to previous targets are required. The TPB is required to complete a system performance report (Appendix D to this plan) with every quadrennial LRTP and also provides inputs to the reports that states must submit biennially. Target-setting is intended to be based on an agency's strategic plan and science-based methodology for forecasting performance based on measured trends and the funding available and programmed for projects that will affect performance.

The MPO (TPB) is responsible for collecting this information to calculate measures and set targets for the metropolitan planning area, as appropriate. MPOs have up to 180 days to adopt targets following the targets being set by state DOTs or providers of public

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transportation. MPOs must coordinate with the state DOTs and providers of public transportation in setting the metropolitan area targets, which should be based on the strategic plans and funded projects of the cognizant agencies.

Highway safety and transit safety targets are set annually. Other targets are set biennially or for a four-year period. The current four-year targets were set for the period 2018 through 2021. While this period has concluded, the actual performance data for these targets are not yet available at the time of this plan. The next round of four-year targets for period 2022-2025 must be set by state DOTs by October 1, 2022, with MPOs having up to 180 days afterwards to set targets.

COVID-19 IMPACTS ON TRANSPORTATION SYSTEM PERFORMANCE

Many of the performance measures that TPB reports reflect how the system handles the transportation demand. The COVID-19 pandemic has had a significant impact on when, how, and to what extent the transportation system is used as well as transit service provision levels. Performance trends reported for 2020 reflect these changes.

Table 8.2: The Six PBPP Areas — Measures and Current Targets

Performance Area	Measure	Metric	Adopted Targets *as of 1.9.2022*
Highway Safety	Five-Year Rolling Average	# of Fatalities	253.0
	Five-Year Rolling Average	Rate of Fatalities (per 100 million VMT)	0.588
	Five-Year Rolling Average	# of Serious Injuries (SI)	1,889.7
	Five-Year Rolling Average	Rate of Serious Injuries (per 100 million VMT)	3.867
	Five-Year Rolling Average	# of Nonmotorized Fatalities & SI	492.4
Highway Asset Condition	Percent Pavement Lane Miles Interstate/NHS (excl. Interstate)	In Good Condition	52.7% / 31.1%
	Percent Pavement Lane Miles Interstate/NHS (excl. Interstate)	In Poor Condition	1.7% / 7.0%
	Percent Bridge Deck Area	In Good Condition	0.294
	Percent Bridge Deck Area	In Poor Condition	0.039
Highway Reliability	Percent Person Miles Traveled Interstate/NHS (excl. Interstate)	Level of Travel Time Reliability	58.5% / 72.7%
Freight	Index	Truck Travel Time Reliability	2.12
Congestion	Annual Hours per Capita	Peak Hour Excessive Delay	26.7
	Percentage	Non-SOV Travel	0.372
Vehicular Emissions	Total Emissions Reduction (kg/day)	VOCs / NOx	2.195 / 4.703
Transit Asset Management	Percentage	Service Vehicles exceeding Useful Life	6.9% (Bus)
	Percentage	Revenue Vehicles exceeding Useful Life	46.7% (Truck)
	Percentage	Track Segments with Performance Restrictions	3.5% (Heavy Rail)
	Percentage	Facilities rated Marginal or Poor	4.1% (Pass. Facilities)
Transit Safety	Number & Rate (per Revenue Vehicle Mile)	Fatalities by Mode (showing Bus)	0 / 0
	Number & Rate (per Revenue Vehicle Mile)	Reportable Injuries by Mode (showing Bus)	411 / 0.69
	Number & Rate (per Revenue Vehicle Mile)	Reportable Safety Events by Mode (showing Bus)	463 / 0.78
	Mean Distance	Between Major Mechanical Failures by Mode (showing Bus)	13,654

VDOT/Flickr

Performance Measures, Trends, and Targets

Highway Safety

Table 8.3 shows the five specific federally prescribed highway safety measures for which the TPB is required to establish targets, with annual trends over the past five years.

Target Setting Approach

The targets, which are 5-year averages, represent the performance outcomes anticipated for one year into the future. Once the targets are established they are reported to each of our state DOT partners.[38] The TPB also monitors the performance outcomes for each measure and reports the results to our state DOTs each year. This ongoing process of establishing safety targets and monitoring performance has been an important factor in the TPB's decision to adopt a regional roadway safety policy and also establish and fund the Regional Roadway Safety Program (see Chapter 6).

The TPB's planning area, for which performance targets are to be established, lies within three different jurisdictions: the District of Columbia, Maryland, and Virginia. As such, regional highway safety targets are determined by identifying sub-targets for the District

Table 8.3: National Capital Region Safety Trends (Sources: NHTSA, HPMS, and State DOTs)

	2015	2016	2017	2018	2019	2020	Change from 2019 – 2020
# of Fatalities	263	279	313	303	300	321	21 ↑
Fatality Rate (per 100 MVMT)	0.610	0.633	0.695	0.673	0.659	0.876	0.217 ↑
# of Serious Injuries	2,629	2,916	2,592	2,464	2,371	1,842	529 ↓
Serious Injury Rate (per 100 MVMT)	6.102	6.614	5.755	5.473	5.211	5.026	0.185 ↓
# Nonmotorist Fatalities and Serious Injuries	524	555	586	552	595	441	155 ↓

38 As required by federal rule, annual safety targets are expressed as five-year rolling averages. Additional detail: www.gpo.gov/fdsys/pkg/FR-2016-03-15/pdf/2016-05202.pdf.

of Columbia, Maryland, and Virginia portions of the region and applying each state's target setting approach to their respective portion of the region. Targets were developed by mathematically combining the three sub-targets into an overall target for the region.

Tracking Progress

Fatalities increased by 7 percent between 2019 and 2020 despite a significant decrease in VMT due to COVID-19 restrictions in 2020. The combination of these two factors resulted in a 33 percent increase in the fatality rate (per VMT). The increase in the number and rate of fatalities in the region reflected national trends and was driven in large part by increases in speeding, which was enabled by the reduction of congestion due to COVID-19 mitigation efforts, as well as increases in aggressive driving, and impaired driving. Both the number and rate of serious injuries fell significantly and the number of nonmotorist fatalities plus serious injuries decreased by 26 percent between 2019 and 2020.

Table 8.4 shows the region's performance on the five safety performance measures with respect to the 2016-2020 targets set in December of 2019. As shown, the region has met the 2016-2020 targets for the number of serious injuries and the serious injury rate performance measures. However, the region did not meet the targets set for the number of fatalities, the number of nonmotorist fatalities and serious injuries, and the fatality rate targets. The TPB Safety Study examined the numerous influences and behaviors that impact safety for users of the transportation system. **Learn more about the study in Chapter 6 or read the report online**.


Arlington DES/Flickr

Table 8.4: 2016 – 2020 Actuals vs. Targets (Sources: NHTSA, HPMS, and State DOTs)

	2016 – 2020 Actual	2016 – 2020 Target	Status
# of Fatalities	303.2	253.0	Not Met
Fatality Rate (per 100 MVMT)	0.701	0.588	Not met
# of Serious Injuries	2,437.0	2,692.1	Met
Serious Injury Rate (per 100 MVMT)	5.616	6.157	Met
# Nonmotorist Fatalities and Serious Injuries	557.3	508.6	Not met

Highway Asset Management

There are six federally prescribed highway asset management measures for which the TPB is required to establish targets. The current targets were established for the four-year period of 2018-2021 and are updated biennially to track the condition of highway pavement and bridges in the region.

Target Setting Approach

Regional highway asset targets were determined by identifying sub-targets for the District of Columbia, Maryland, and Virginia portions of the region and applying each state's target setting approach to their respective portion of the region. These sub-targets are informed by state-specific pavement and bridge condition results reported to federal databases. Targets for the region were developed by combining the sub-targets for each state-portion of the region to create the region-wide net result.

Tracking Progress

Hundreds of millions of dollars are spent every year in the region on keeping the highway system's pavement and bridges in a state of good repair. Projects ranging from periodic repaving to complete replacement of bridges after a 50-plus year lifetime determine asset performance. Funds for ongoing maintenance are often constrained, limiting what can be kept in good condition rather than fair condition. Major projects can address bridge condition, especially the replacement of poor condition bridges. While states measure and report asset condition for the pavement and bridges of the NHS in their state, some sections of the NHS are outside of their control; for example, the NPS owns several parkways and important bridges in the region. Asset performance is forecast based on both funding for regular maintenance and the completion of major projects. Shortfalls or delays in funding, therefore, have an impact on the actual performance data that states report. Highway owners in the region aim to keep infrastructure as good or fair as it is now, with periodic efforts to improve poor bridges, most recently on the Capital Beltway in Maryland and for the replacement of major bridges in DC, including the 11th Street Bridge, Frederick Douglass Bridge, and Arlington Memorial Bridge, owned by the NPS.

Figure 8.2: Pavement and Bridge Condition for the TPB Planning Area [1670.8 Interstate Lane Miles] (Source: Transportation Planning Board, 2017; includes IRI data only, data excludes sections with bridges, ramps, non-mainline, non-inventory direction, planned/unbuilt, unpaved and other types.)

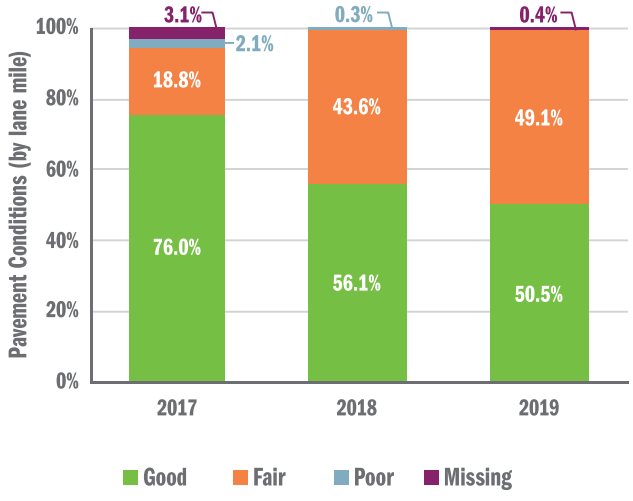


Figure 8.3: Non-Interstate NHS Pavement Conditions, 2017 – 2019 [4654.3 Non-Interstate NHS Lane Miles] (Source: Transportation Planning Board, 2017; includes IRI data only, data excludes sections with bridges, ramps, non-mainline, non-inventory direction, planned/unbuilt, unpaved and other types.)

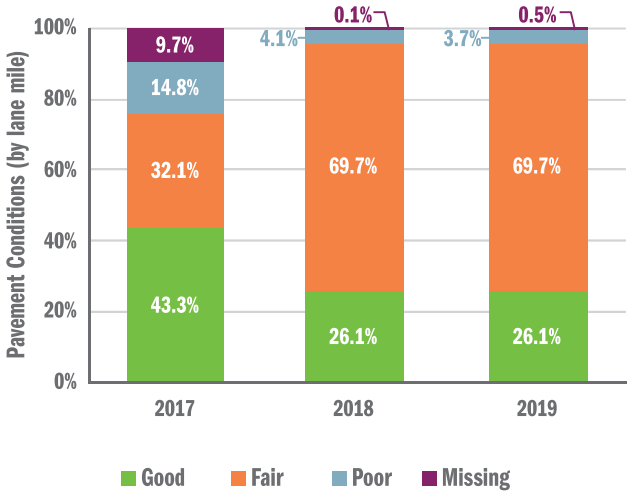


Figure 8.4: NHS Bridge Conditions, 2018 – 2020 (Source: Transportation Planning Board, includes 1,216 bridges and 223 culverts; 26 structurally deficient.)

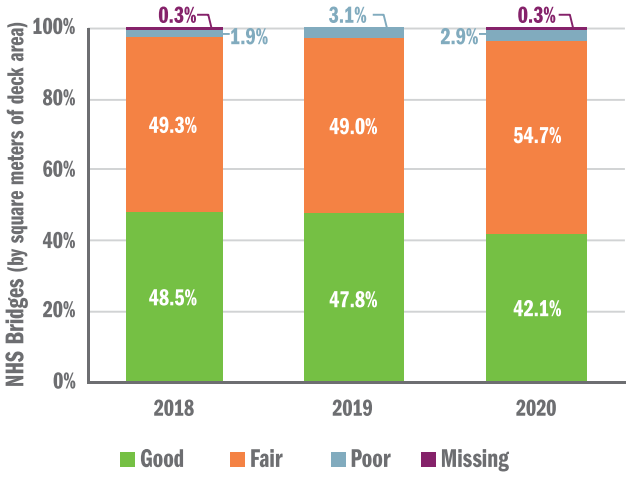
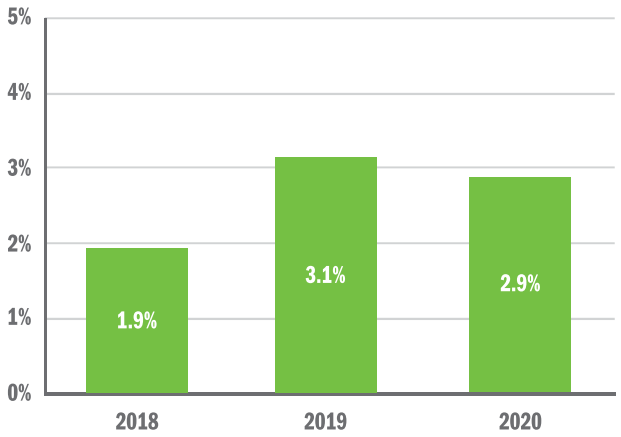
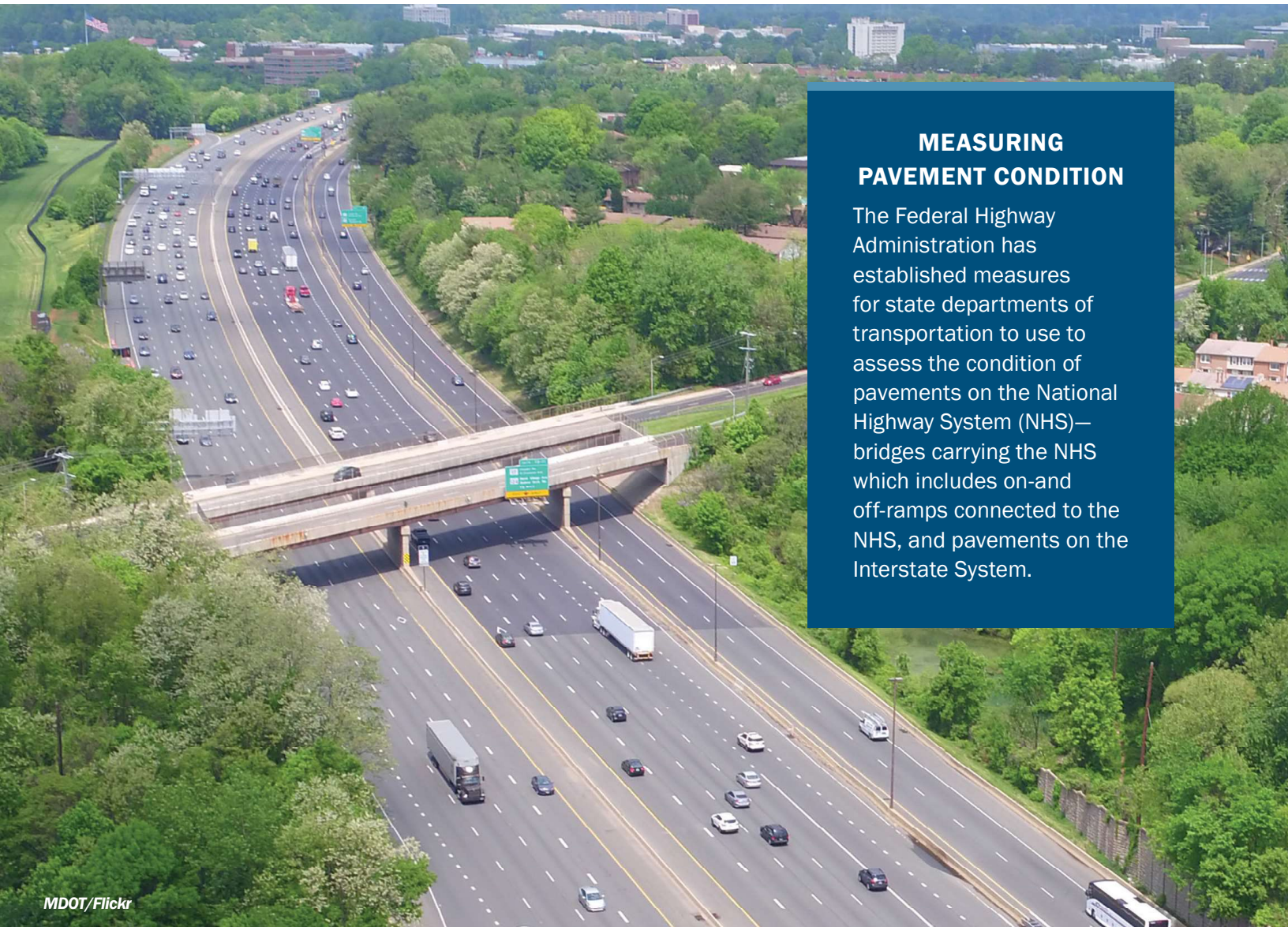


Figure 8.5: Structurally Deficient NHS Bridges, 2018 – 2020 (Source: Transportation Planning Board; includes 1,216 bridges and 223 culverts; 26 structurally deficient.)





MDOT/Flickr

MEASURING PAVEMENT CONDITION

The Federal Highway Administration has established measures for state departments of transportation to use to assess the condition of pavements on the National Highway System (NHS)—bridges carrying the NHS which includes on-and off-ramps connected to the NHS, and pavements on the Interstate System.

VDOT/ Flickr

Highway System Performance

There are five federally prescribed highway system performance measures considered through the lenses of congestion and freight, for which the TPB is required to establish targets. These include: Interstate Travel Time Reliability (TTR), Non-Interstate National Highway System TTR, Truck TTR Index, Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita, and Percent of Non-SOV Travel on the NHS. The current targets were established for a two- and four-year period (2018-2019 and 2018-2021) and are updated biennially to track the condition of highway pavement and bridges in the region.[39] Forecasts and targets are established like those for asset management. Due to the complexity of the methodologies for calculating these measures, please refer to the Visualize 2045 Appendix D, Systems Performance Report, for more detail on these measures.

Tracking Progress

Figure 8.6 shows the trends in travel time reliability on the interstate. In 2018 and 2019 actual data was slightly higher than predicted, with travel times more reliable. The impact of the COVID-19 pandemic is obvious in 2020, with travel times much improved in reliability. The same general findings apply to the non-interstate travel time reliability and truck travel time index and to the hours of peak hour excessive delay measure. Travel time reliability is mostly affected by demand on the highway system and the decisions millions of drivers make every day than by changes to the highway system itself. Roadwork and construction delays from major projects can also impact travel time reliability on major corridors, and there have also been changes in data collection that can impact results. However, targeted spot improvements and the slow expansion of the highway system over time have recently been able to match travel demand with the result that reliability has been fairly constant. In the long term, however, it is expected that population and economic growth will lead to significantly worse congestion and reduced travel time reliability unless different decisions are made by commuters, residents, and commercial transportation services.

39 Under this rule, DOTs must establish two-year and four-year targets related to highway system performance on a biennial cycle. Additional detail: gpo.gov/fdsys/pkg/FR-2017-01-18/pdf/2017-00681.pdf.

Figure 8.6: Interstate Travel Time Reliability [Target], 2015 – 2021 (Source: Transportation Planning Board)

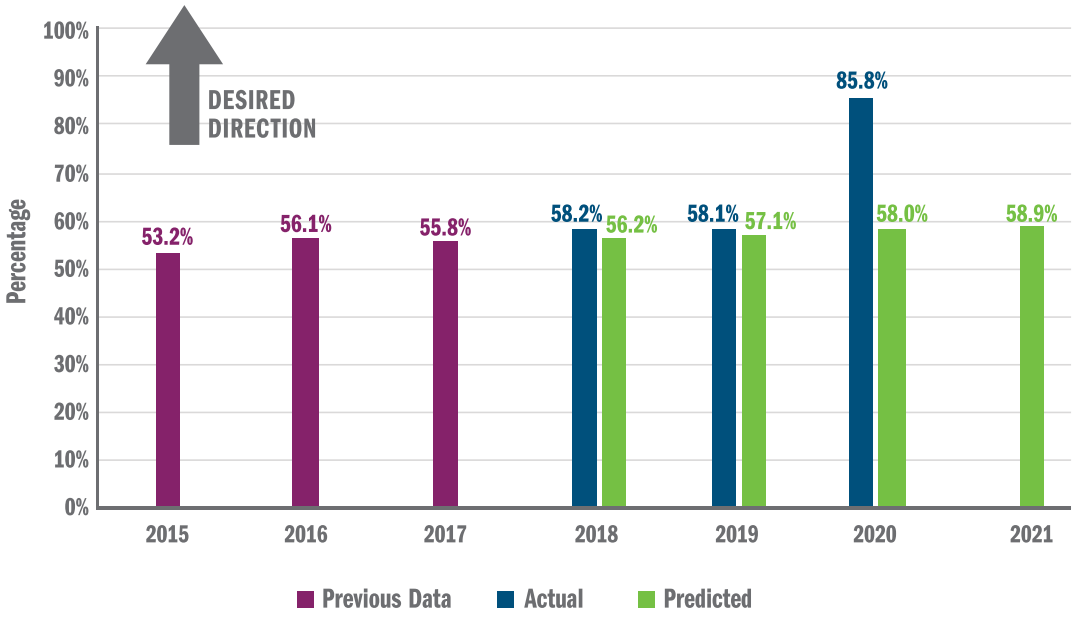
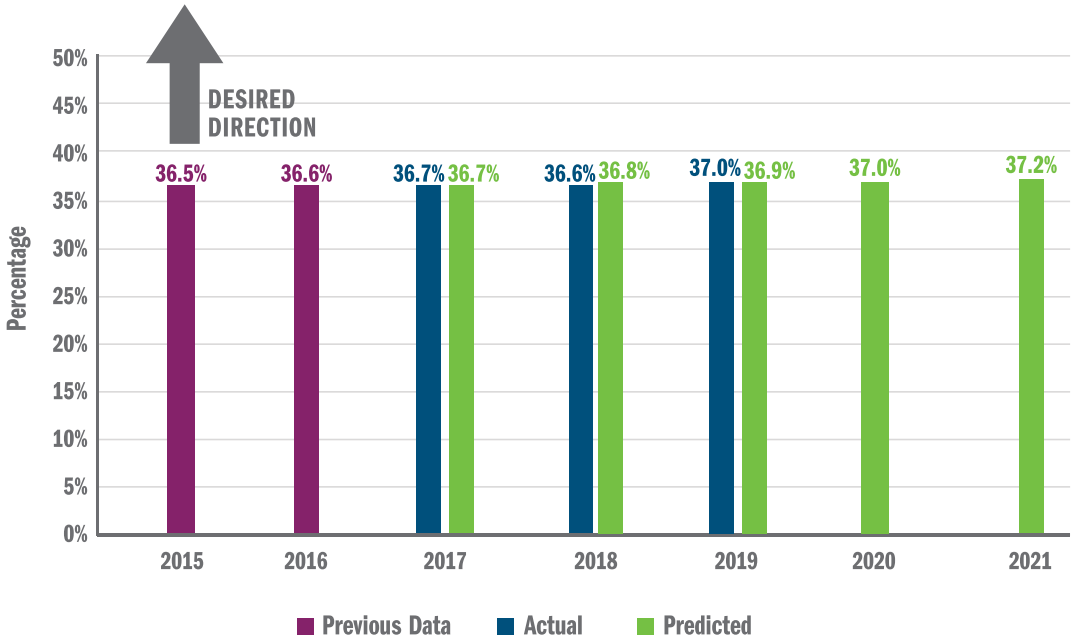
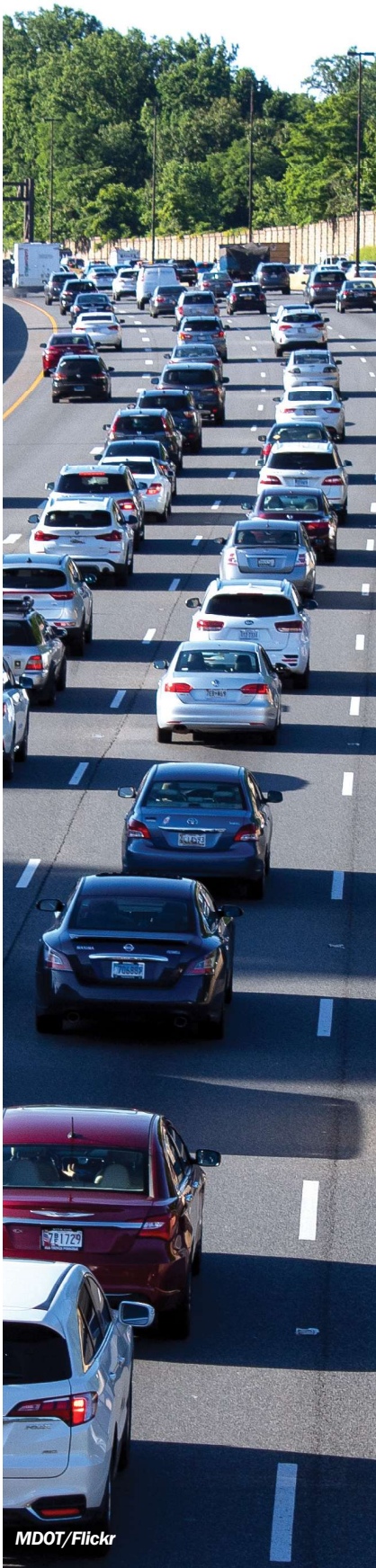


Figure 8.7: Traffic Congestion — Mode Share [non-SOV, Target] (Source: Transportation Planning Board)





MDOT/Flickr

Vehicular Emissions

There are two pollutants under the federally prescribed vehicular emissions measure for which the states and the TPB are required to establish targets. The targets are established for a two- and four-year period (2018-2019 and 2018-2021) and are updated biennially to track the vehicular emission reduction in the region. The states and the TPB must coordinate on and collectively establish a single, unified two- and four-year target for the estimated reductions in emissions of each applicable pollutant due to CMAQ funded projects.

The metropolitan Washington region is monitored for air quality affected by Volatile Organic Compounds (VOCs) and Nitrogen Oxides (NOx) pollutants. Accordingly, the TPB works with the three states to collect data on past emissions reductions calculations and on those anticipated in the next four years to set targets. Unlike other performance measures, the Emissions Reductions measures are based on model calculations and not on data of actual performance or observed conditions. See Figures 8.8 and 8.9 for forecast emissions data.

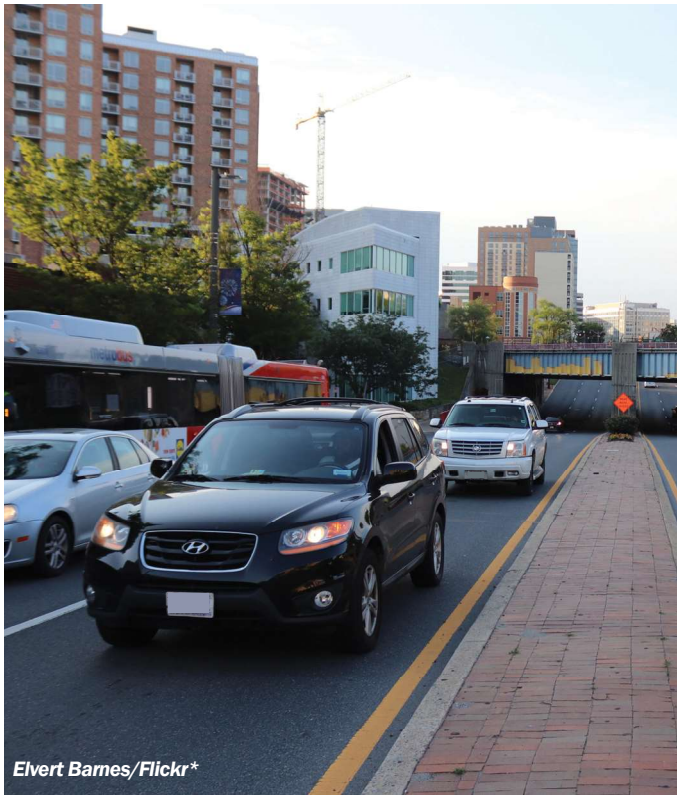

Elvert Barnes/Flickr*

Figure 8.8: Reductions in Volatile Organic Compounds [VOCs], 2015 to 2018 – 2021 Predicted (Source: TPB)

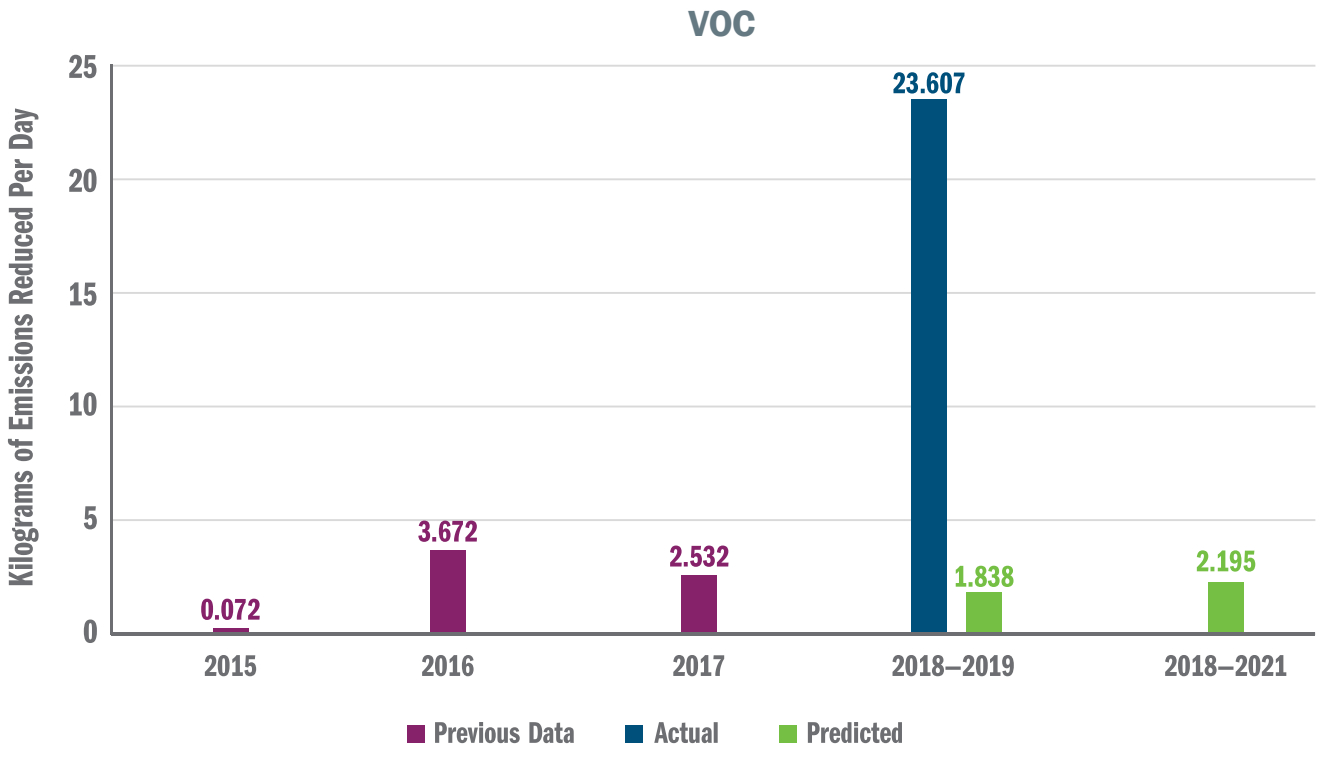
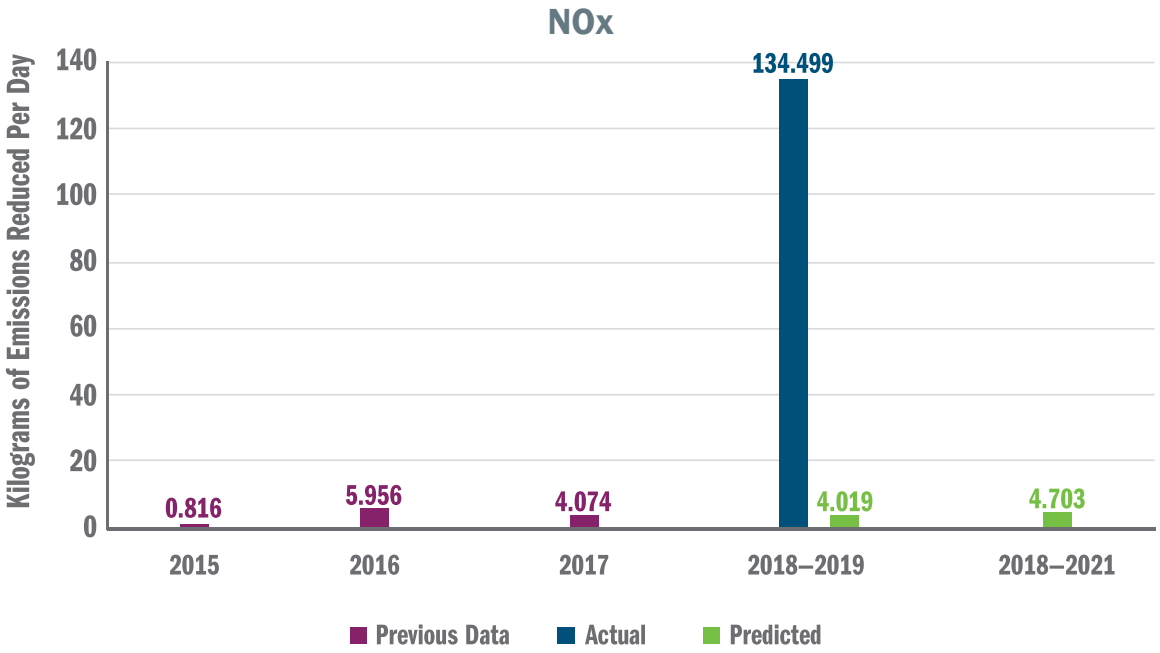


Figure 8.9: Reductions in Nitrogen Oxides [NOx], 2015 to 2018 – 2021 Predicted (Source: TPB)



Tracking Progress

The targets set for the reduction of vehicular emissions for the two pollutants were met and exceeded for the two-year and four-year targets (2018-2019 and 2018-2021 respectively). The implementation of transit improvement projects and ride sharing initiatives with CMAQ program funding, among other projects, led to significant reductions in calculated emissions.

VDOT/Flickr

Elvert Barnes/Flickr

Transit Asset Management

There are four specific federally prescribed transit asset management measures for which providers of public transportation and the TPB must collect and report on for the TPB planning area. These measure the performance of transit asset management to ensure effective operation, maintenance, and improvements of capital assets through their useful life.[40] The targets are established annually by providers of public transportation who must also develop a four-year plan for managing these capital assets.

The TPB's planning area for which transit asset management performance targets are to be established includes seven Tier 1 agencies (public transportation operators of rail or more than 100 vehicles) and twelve Tier 2 agencies (operate less than 100 vehicles). Tier 1 agencies report their information to the Federal Transit Administration (FTA) directly and to the TPB. Tier 2 agencies submit information to their respective state transit agencies, the MDOT-MTA or the Virginia DRPT, which then group the information for reporting to the FTA and to the TPB.

The four transit asset performance measures are split between two age-based (Rolling Stock and Equipment) and two condition-based measures (Condition of Infrastructure and Condition of Station/Facilities). For each type of asset, a threshold is established for permissible age or condition (e.g., a bus should be no more than 15 years old, or a facility should not have any failing components). Targets are set by the providers of public transportation on the maximum percentage of assets that are allowed to exceed the threshold (e.g., no more than 8 percent of buses can exceed 15 years old).

The regional TAM targets are developed in accordance with the FTA guidance, which suggests that the MPOs adopt a single target for each asset class in the region. As shown in Table 8.5, the regional targets calculate the total number of each asset class and the associated target based on the targets of each provider of public transportation. The table also shows the regional targets established for revenue vehicles.

Table 8.5: Regional Transit Asset Management Targets for Revenue Vehicles, 2022 (Source: Transportation Planning Board)

Percentage of Revenue Vehicles that Have Met or Exceeded Useful Life Benchmark	Regional Assets Total	Regional Target
Articulated Bus	95	2.5%
Auto	253	0.0%
Over-the-Road Bus	214	12.4%
Bus	2,616	6.9%
Cutaway Bus	112	0.7%
Heavy Rail Passenger Car	866	0.0%
Light Rail Vehicle	6	0.0%
Commuter Rail Locomotive	20	0.0%
Commuter Rail Passenger Coach	100	0.0%
Van	693	0.0%
Revenue Vehicle Totals	***4,975***	

40 Additional detail: gpo.gov/fdsys/pkg/FR-2016-07-26/pdf/2016-16883.pdf

Transit Safety

The federal transit safety rules require providers of public transportation and the TPB to collect and report data for four performance measures that track the condition of transit safety in the TPB planning area.[41] These measures include the number and rate of fatalities, injuries, safety events (derailments, collisions, fires, and evacuations), and also system reliability (mean distance between major and other mechanical system failures).

David Wilson/Flickr

Target Setting Approach

Targets for the region are based on those adopted by each applicable provider of public transportation, with the total number of events added up, and when a rate measure is called for it is calculated by dividing the total number of events by the total number of the vehicle revenue miles traveled by each mode.

Tracking Progress

Initial reporting on transit safety performance and establishment of targets began in 2020. The requirement only applies to providers of public transportation that are federal Section 5307 funding recipients and sub-recipients under FTA regulation, primarily WMATA and transit systems in DC and suburban Maryland. The rule is not applicable for local transit systems in Northern Virginia.

Table 8.6: Transit Safety Targets, 2021; rates are per 100,000 Vehicle Revenue Miles (Source: Transportation Planning Board)

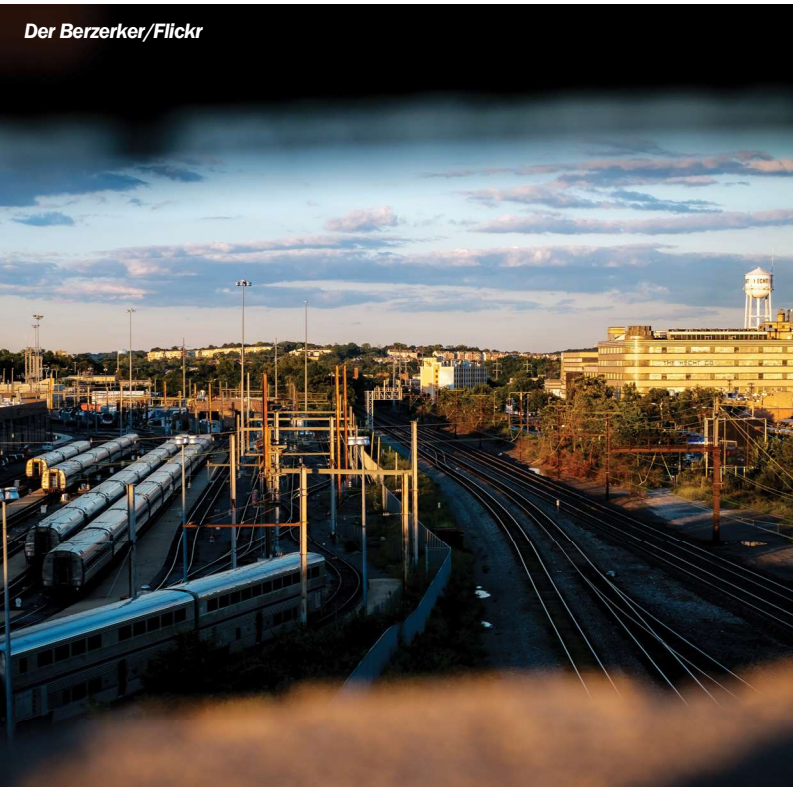
	Fatalities		Serious Injuries		Safety Events		Reliability
	Number	Rate	Number	Rate	Number	Rate	Mean Distance Between Failures
Heavy Rail	0	0	244	0.31	84	0.11	254,000
Streetcar Rail	0	0	0	0.00	4	0.27	672
Urban Bus	0	0	411	0.69	463	0.78	13,654
Commuter Bus	0	0	6	0.07	20	0.23	13,265
Demand Response	0	0	40	0.19	18	0.08	0
Vanpools	0	0	6	0.05	118	1.05	9,500

41 Additional detail: gpo.gov/fdsys/pkg/FR-2017-01-18/pdf/2017-00678.pdf and gpo.gov/fdsys/pkg/FR-2018-07-19/pdf/2018-15167.pdf

PBPP, CMP, and the Projects in the Constrained Element

As overarching strategies PBPP and the CMP are implemented not only through numerous travel demand activities and transportation options provided by transportation agencies but also by actions of planning agencies that work with their citizens to plan for how communities grow and change. Land use patterns impact when, where, and how people and goods travel. Learn more about many of these activities in Chapter 6 of this plan. The ongoing analysis and performance evaluation through the PBPP and CMP, as well as the TPB's regional evaluation of current and future performance of the transportation system inform the strategies implemented in the region that become the projects that are planned and programmed in the LRTP.

The projects incorporated into the financially constrained element of the update to Visualize 2045 and the projects and programs that are programmed for funding in the FY 2023-2026 TIP reflect the ongoing commitment of the TPB to achieving its goals, preserving the region's massive transportation system, providing demand management strategies for a livable region and to manage congestion, continuously working toward a safer transportation system, and more. These goals align with the National Goals (as shown in Chapter 3). The TPB and its members document the linkage from planning, to investment, and implementation through the PBPP process. Please see the FY 2023-2026 TIP for more detail on how the projects to be implemented in the next four years will support progress toward regional PBPP performance measure targets.



Der Berzerker/Flickr

As described by FHWA, "transportation performance management is a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals. The application of the performance management approach ensures that investments are performance-driven, and outcome based." Accordingly, states, MPOs, and providers of public transportation are required "to apply performance management principles in making decisions about where to invest resources. Those processes and investment strategies are documented in management plans the agencies develop for the various program areas. All management plans are then used in the performance-based planning and programming process to make investment trade-off decisions."

As the TPB does not implement projects, its coordination with the three state DOTs and other transportation agencies in the region is essential to demonstrate how the PBPP is implemented at the regional level. Figure 8.10 illustrates the cycle of how DOTs plan for, invest in, and evaluate the performance of the region's transportation system. These are key activities to implement PBPP. Measured performance compared to targets aids agencies in determining how to develop, prioritize, and inform transportation plans and projects.

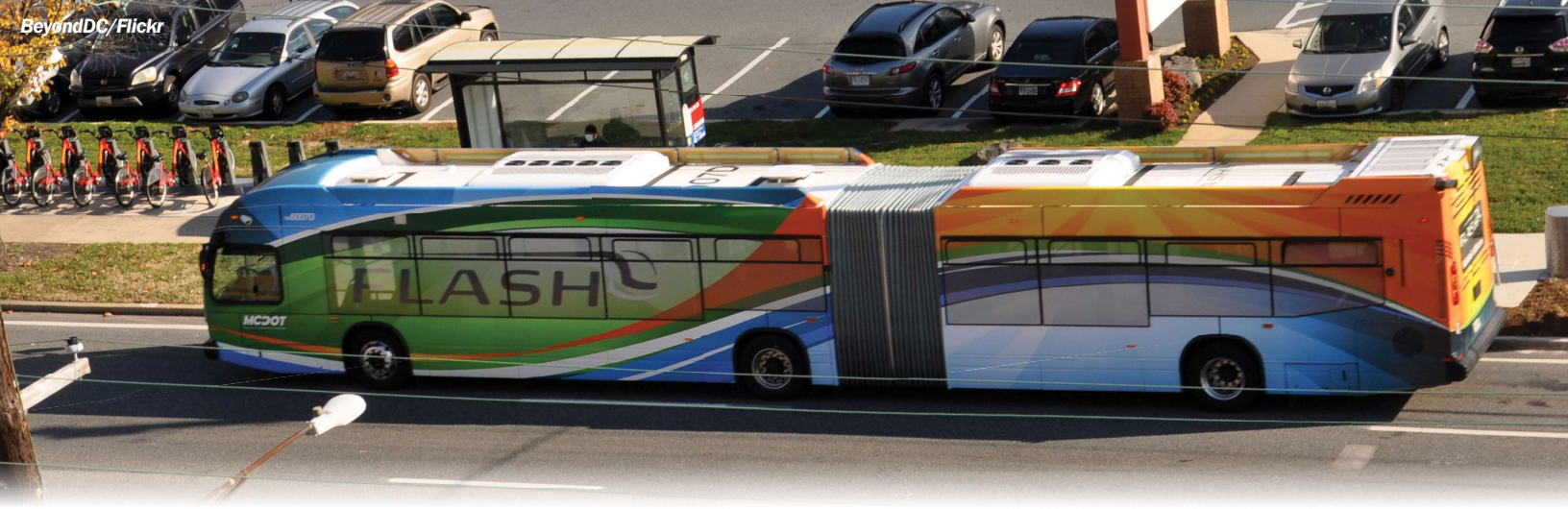


Figure 8.10: Plan, Invest, Evaluate [PBPP activities]

TPB & DOTs

- Set vision, goals, objectives, targets
- Conduct analysis/develop strategies & plans
- TPB's Visualize 2045
- State & Local Plans
- Strategic Highway Safety Plans (SHSP)
- Asset Management Plans
- Corridor Plans
- Get stakeholder input on performance, plans, & strategies

DOTs

- Develop projects based on studies, performance metrics, and plans
- Prioritize projects consistent with goals and PBPP targets
- Address federal planning requirements for air quality & PBPP targets
- Gather public input

PLAN

INVEST

EVALUATE

Engage the Public

TPB & DOTs

- Congestion Management Process
- TPB Air Quality Conformity analysis, environmental justice analysis, and regional system performance analysis of constrained element
- Federal PBPP and other performance measures tracked at state, regional (TPB) & local level (agencies update performance targets based on performance)
- Develop, refine or prioritize strategies to address performance gaps

BeyondDC/Flickr

Air Quality Conformity Analysis Summary

The Air Quality Conformity analysis demonstrates how the region is working towards its environmental goals. One of these goals comes from the Regional Transportation Priorities Plan (RTPP), which states the TPB's work should "enhance environmental quality and protect natural and cultural resources." The financially constrained element of the Visualize 2045 update must demonstrate that future emissions under the plan are consistent— "in conformity" —with emissions levels set forth in air quality plans adopted by the states. Federal law requires "conformity findings" in all metropolitan regions that are currently not in attainment of certain federal air quality standards ("non-attainment areas"). Since the Washington region is a non-attainment area for ground-level ozone, the TPB must demonstrate that future vehicle-related emissions of ozone-forming pollutants will, under the proposed constrained element plan, remain below the approved limits. This section summarizes the Air Quality Conformity analysis, and the full document can be found in Appendix C: Air Quality Conformity Analysis Summary.

Pollutants Analyzed

Ozone pollution is harmful to people and the environment. Therefore, the region must show through a detailed technical analysis that future vehicle-related emissions of the two key ingredients in the formation of ozone—nitrogen oxides (NOx) and volatile organic compounds (VOCs)—are expected to remain below approved regional limits. The Metropolitan Washington Air Quality Committee (MWAQC) facilitates the establishment of the regional limits for on-road mobile

FEDERAL REQUIREMENTS

The Clean Air Act requires that transportation and air quality planning be integrated in regions like this one that are designated by the U.S. Environmental Protection Agency (EPA) as air quality "non-attainment" areas. In such areas, as well as in areas designated as "maintenance," federal funding and approval for transportation projects is only available if transportation activities are consistent with the region's air quality goals. Before the 2022 update to Visualize 2045 can be adopted, the TPB must approve a "conformity determination" showing that anticipated future vehicle-related emissions will remain below regional limits (known formally as "motor vehicle emissions budgets") that have been set by the region's air quality improvement plan (known as the "State Implementation Plan" or "SIP") and approved by the EPA. The Metropolitan Washington Air Quality Committee (MWAQC) is the body responsible for developing the regional air quality plan. The conformity determination will demonstrate that the constrained element of the Visualize 2045 update is consistent— "in conformity" — with the regional limits.

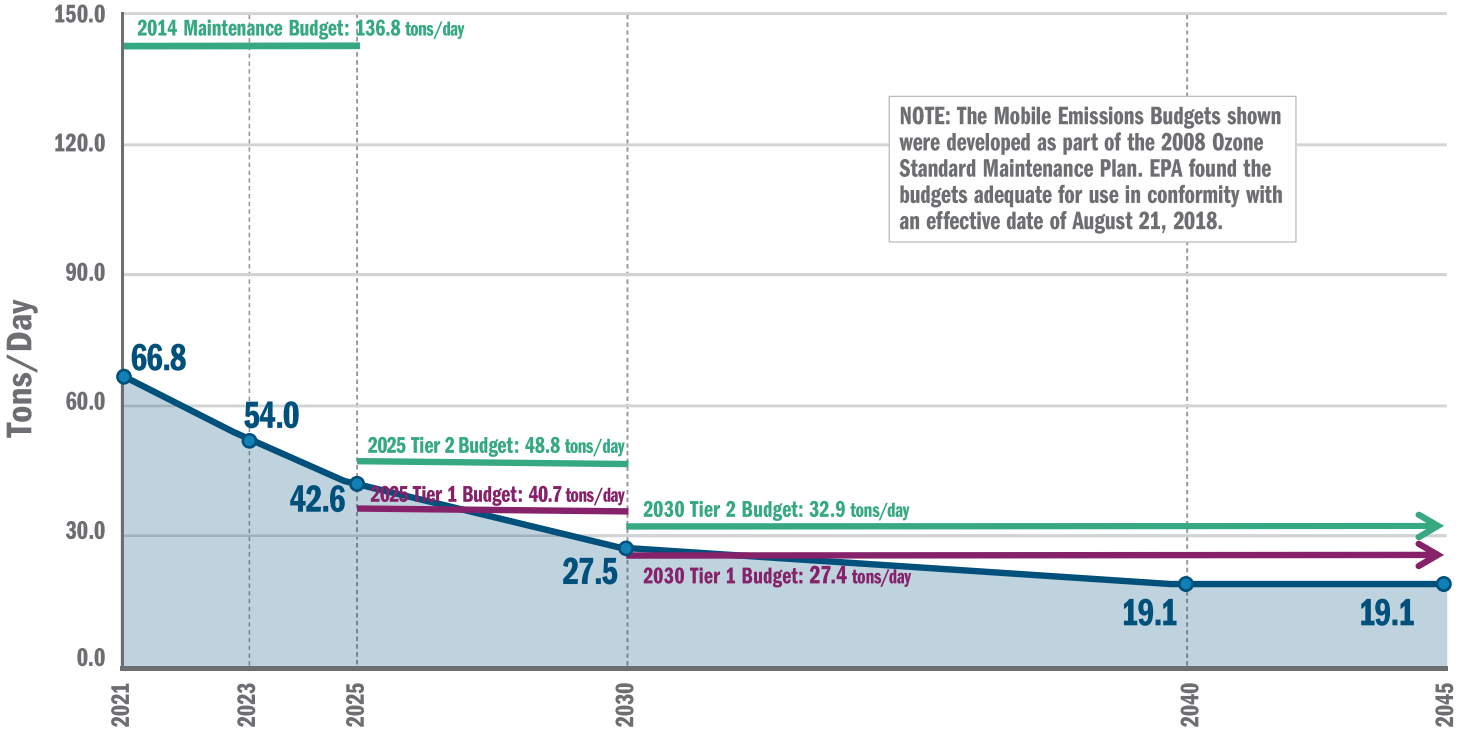
emissions of VOCs and NOx, which combine in sunlight on hot summer days to form ground-level ozone. Motor vehicles are one of several sources responsible for VOC and NOx emissions in the region. A few examples of others include power plants, residential heating and air conditioning, dry cleaners, gas stations, boats, airplanes, construction vehicles, and lawn care equipment.

Air Quality Conformity Analysis Results

Under the constrained element of the Visualize 2045 update, mobile emissions are expected to drop steadily (Figures 8.11 and 8.12) mainly due to more stringent fuel and vehicle efficiency standards.[42] In spite of increased travel, mobile emissions are expected to steadily decrease through the 2045 horizon year of the plan, mainly as cars and trucks meeting increasingly more stringent federal fuel and vehicle efficiency standards enter the region's vehicle fleet (all cars in the region) and as changes are made to the formulation of vehicle fuel. Changes in development patterns, investments in transit and other travel options, and improved operational efficiency of area roadways will also contribute to reductions in vehicle-related emissions. Project sponsors identified 171 projects in the constrained element of this plan that are expected to contribute to reductions in emissions of criteria pollutants.

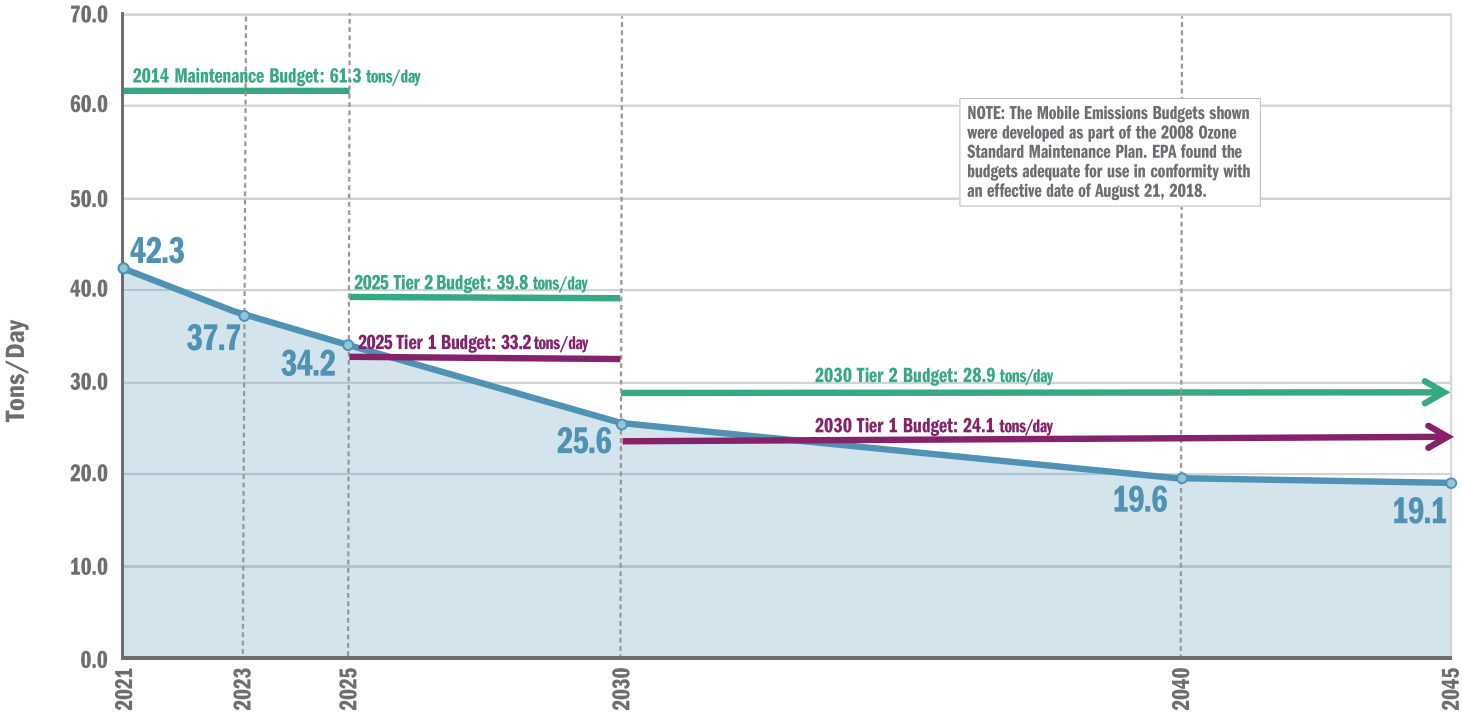
The plan's Air Quality Conformity analysis included comparing forecasted mobile source emissions to the region's two tiers of mobile emissions budgets for VOC and NOx. The conformity analysis found that forecasts of mobile emissions for VOC and NOx are within required budgets for all analysis years of the plan. Details related to the two tiers of mobile budgets can be found in Appendix C: Air Quality Conformity Analysis Summary.

Figure 8.11: 2022 Update to Visualize 2045 Air Quality Conformity Mobile Source Emissions and Mobile Emissions Budgets Ozone Season NOx



42 NOTE: The mobile budgets shown were developed as part of the 2008 Ozone Standard Maintenance Plan. EPA found the budgets adequate for use in conformity. The adequacy finding was published in the Federal Register on August 6, 2018, with an effective date of August 21, 2018.

Figure 8.12: 2022 Update to Visualize 2045 Air Quality Conformity Mobile Source Emissions and Mobile Emissions Budgets Ozone Season VOC



Performance Analysis Summary

Why the TPB Forecasts Performance

The TPB measures and forecasts future performance as one way of tracking progress on the goals and priorities presented in the TPB Policy Framework (see Chapter 3). The performance analysis considers how well the anticipated transportation system will accommodate current and forecast travel demand and address mobility, accessibility, and environmental challenges such as greenhouse gas (GHG) emissions. It also examines how future expected changes to the transportation system advance key regional goals and strategies in the TPB's policy documents. The results of the analysis can help decision-makers and the public better understand what changes to current plans and funding might be needed to achieve different future outcomes.

Regional Performance Analysis Approach for Visualize 2045

This performance analysis of Visualize 2045 uses output from the TPB's travel demand model, which forecasts where, when, and how people will travel around the region in coming decades. To make its predictions, the model relies on the latest regional population and job growth forecasts from the Metropolitan Washington Council of Governments, information on existing travel patterns from the TPB's *Household Travel Survey*, and the future transportation system laid out in the constrained element of Visualize 2045.[43]

The analysis examines more than twenty performance measures to understand how typical travel and commuting characteristics will change over time. It examines how the existing highway and transit networks serve the region and the impact of planned projects. This analysis is one of many that the TPB conducts to understand the region, as presented throughout this plan and other products. The TPB uses performance measures from other planning activities to check progress on the goals and priorities presented in the TPB Policy Framework. **Learn more about TPB performance measures at Visualize2045.org or view a summary online.**

Planning Uncertainties

Long-range planning at the TPB seeks to help area decision-makers and residents "visualize" the region's future. The TPB recognizes that many external future factors may impact mobility and accessibility (see Chapter 4). How will travel in this region more normally operate in a post-COVID-19 environment? In particular, what will be the impacts of telework? How will climate change and resiliency, changes to the global economy, and the impact of new technology—particularly vehicle automation and electrification—affect the location of people and jobs, how people travel, and funding to invest in and maintain the system? While many of these questions are beyond the scope of this analysis, the TPB does conduct planning and analyses to examine these, and other possible futures that might occur. See Chapter 6 to learn more about TPB planning activities.

Various assumptions, largely driven by federal requirements for the Air Quality Conformity analysis, are included in the TPB's travel demand model to provide a long-range forecast of where, when, and how people will travel around the region. Notably, much of the underlying data is reflective of and validated to pre-COVID-19 travel conditions. While the pandemic has changed many recent travel characteristics in the region, less is known about its impact 10 to 25 years from now and, as a result, has not been incorporated into this analysis.[44] Existing transit service, and its associated frequencies, headways, and hours of operation, reflect December 2019 schedules. Transit fares and highway tolls are current to January 2021. And vehicle fleet data, or the type of vehicles people and business use to travel and conduct business, is current to December 2020.

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43 Unless otherwise noted, the results of this analysis use the following input data: MWCOG's Round 9.2 Cooperative Forecasts of land activity, TPB's Gen2/Version 2.4 Travel Demand Model, 2020 Vehicle Registration Data, and EPA's MOVES 2014b Mobile Emissions Model. Results of this analysis use a 2023 base year "Today" scenario and are for the TPB Planning Area. These findings are based on regional model estimates that come with a degree of uncertainty.

44 Further, transit service, like frequencies, headways, and hours of operation, reflect December 2019 schedules. Transit fares and highway tolls are current to January 2021. And vehicle fleet data, or the type of vehicles people and business use to travel and conduct business, is current to December 2020.

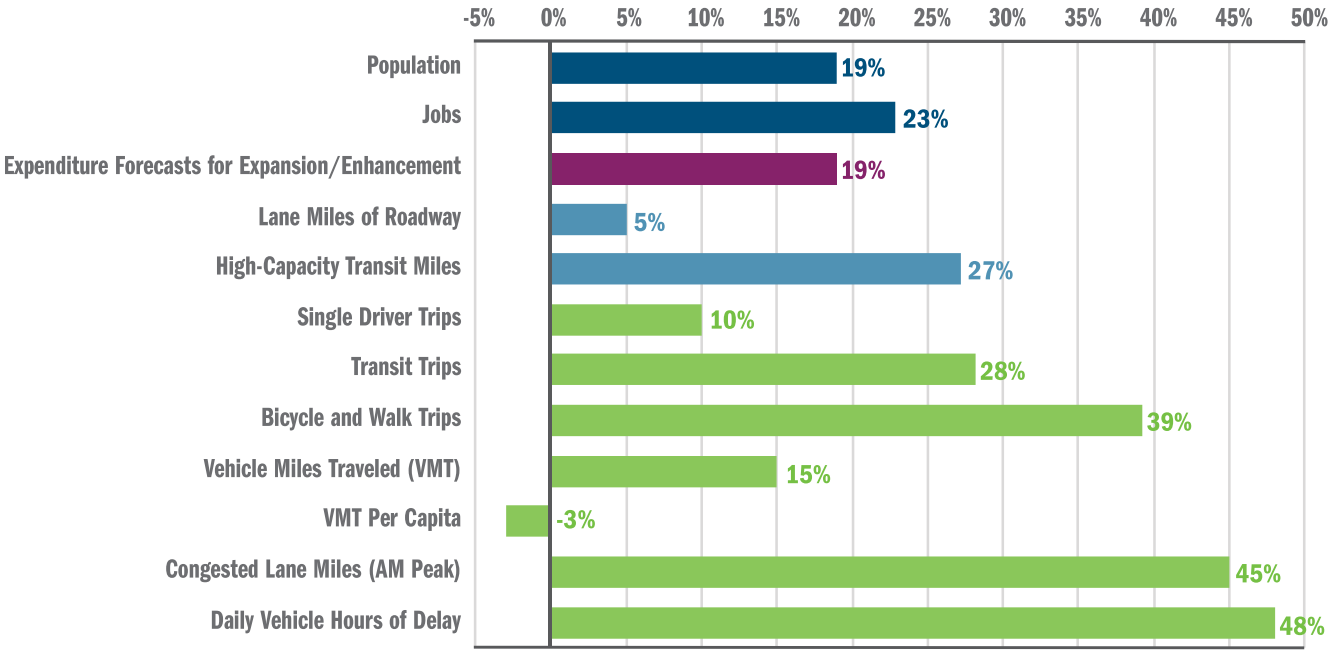
Performance Analysis Results

The performance analysis of Visualize 2045 forecasts that the region will make progress on many of its goals, due in part to the inclusion of projects that align with the Aspirational Initiatives TPB calls on its members to advance. See Chapter 7 for examples of projects in the constrained element that advance the initiatives. The land-use inputs in this analysis, COG's Round 9.2 Cooperative Forecast data, suggest that the region is looking to bring jobs and housing closer together through targeted density increases in certain parts of the region (see population weighted density analysis in Chapter 2).

People will have more and improved travel options in 2045 and that is reflected in the performance forecasts. The region will increase availability and use of High-Capacity Transit (HCT) and other "reliability-enhanced" modes (such as rail, bus rapid transit, walk and bike, and High Occupancy Toll and High Occupancy Vehicle lanes), decrease driving per person, and improve average access to jobs. Growth will likely continue to place heavy demands on the transportation network. The region expects 19 percent growth in population and 23 percent increase in jobs by 2045 compared to 2023.[45] While this growth is expected throughout the region, it will likely be focused in Activity Centers and HCT station areas, where 67 percent of jobs and 24 percent of residents are predicted to be located.

However, the region's financial obligations to maintain and operate the existing system limit the availability of funds for system expansions and enhancements, providing for an additional five percent in roadway miles and 27 percent increase in HCT miles compared to 2023.[46] Roadway and transit demand increases will likely place more stress on an already stressed transportation network, increasing delay and congestion and reducing auto-based job access for parts of the region (Figure 8.13).

Figure 8.13: Performance Overview (*Travel Demand Model outputs present data for years 2023 and 2045, therefore percentage increases vary from other reporting in this plan that is based on COG Round 9.2 Cooperative Forecast with 2020 as the base year.*)



45 Population and Job figures presented in this section use a 2023 base year and are different from figures presented in other sections of this plan, notably Chapter 2. These figures are calculated from the Gen2/Ver. 2.4 Travel Demand Model as informed by COG's Round 9.2 Cooperative Land-Use Forecasts.

46 High-Capacity Transit miles includes additional transit service mileage from Metrorail, light rail and streetcar, bus rapid transit, and commuter rail. While not included in this figure, commuter rail infrastructure improvements within existing transit service, like planned third and fourth tracks, are documented within this plan's project listings and TIP.

How is Travel Expected to Change in the Region Over Time?

Residents of the region are likely to be driving fewer miles per person in 2045 than they do today. Even though regional population is expected to increase by nearly 19 percent, on average, driving per person in the region, including residents, freight, and all other travel, is forecast to increase by 15 percent, resulting in a nearly three percent decline in vehicle miles traveled per capita (Figure 8.14). When examining vehicle miles traveled by isolating the analysis to only residents of the region, vehicle miles traveled per capita declines by an even greater amount (Figure 8.15). These findings suggest that travel behavior in the region does respond to changes to the land use and transportation infrastructure environment, particularly that of the region's residents. These can include people making shorter trips due to jobs and housing being in closer proximity, using non-auto-based modes more often as more infrastructure is built, and changes to travel behavior due to the impact of congestion and delay.

Figure 8.14: Total Roadway VMT (*Travel Demand Model outputs present data for years 2023 and 2045, therefore percentage increases vary from other.*)

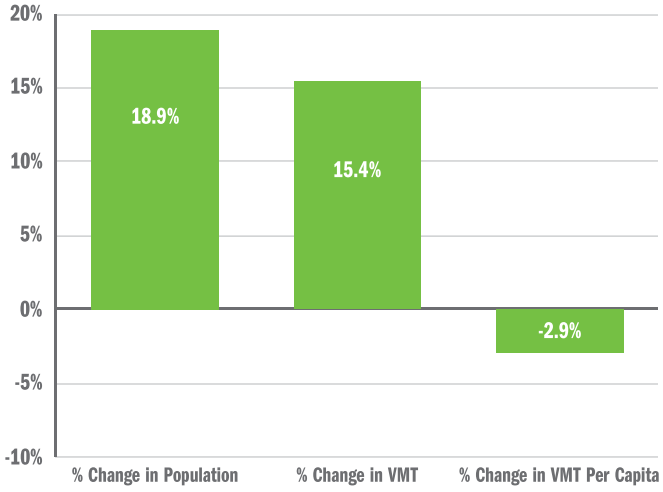
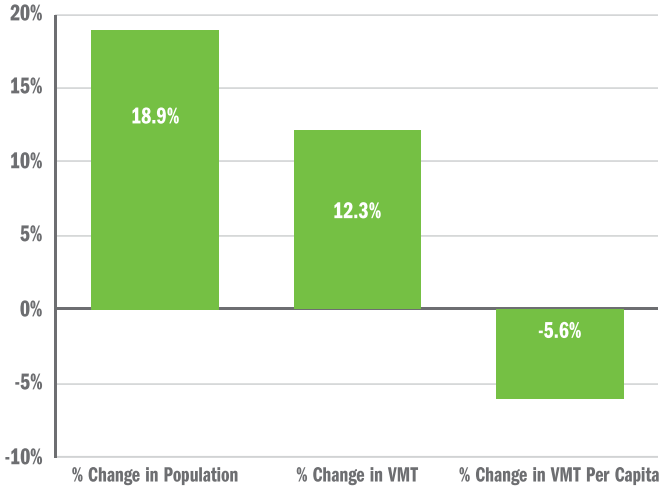


Figure 8.15: Resident VMT (*Travel Demand Model outputs present data for years 2023 and 2045, therefore percentage increases vary from other.*)



Consistent with the TPB's goals, more people will choose to walk, bike, take transit and ride together rather than drive alone (Figures 8.16 and 8.17). However, a large portion of the region continues to be auto dependent. By 2045, 78 percent of travel for all trips in the region will be auto-based, either single-occupant or high-occupancy vehicle and carpool. Over time, the rate of growth of single occupant vehicle is less than high-occupancy vehicle and carpool, estimating that by 2045 more trips will be taken with multiple individuals in a car than single occupancy (Figure 8.17).

Figure 8.16: All Trips by Mode, Today – 2045

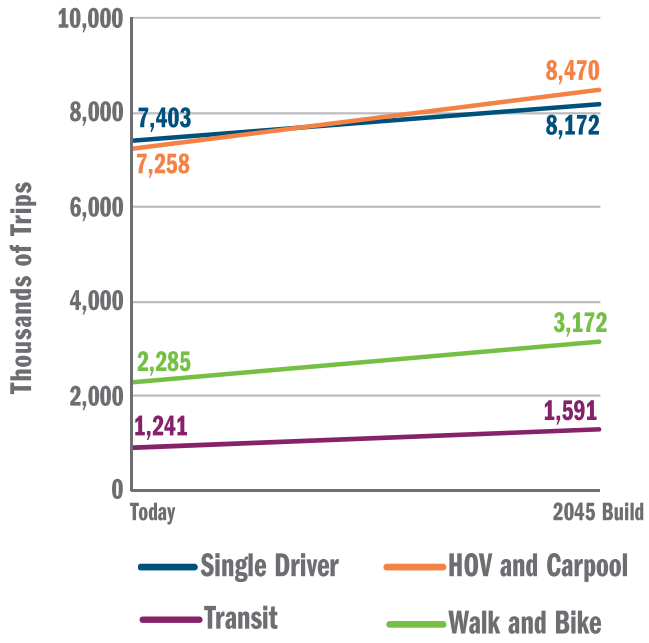
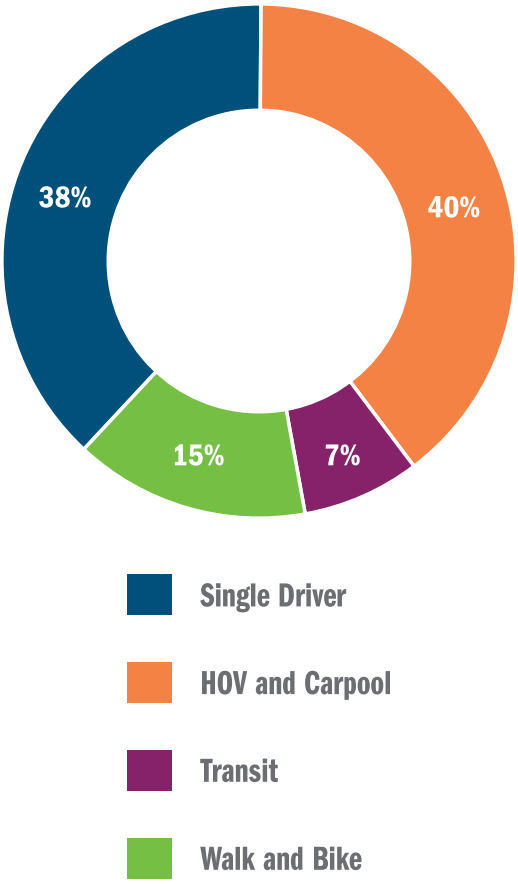
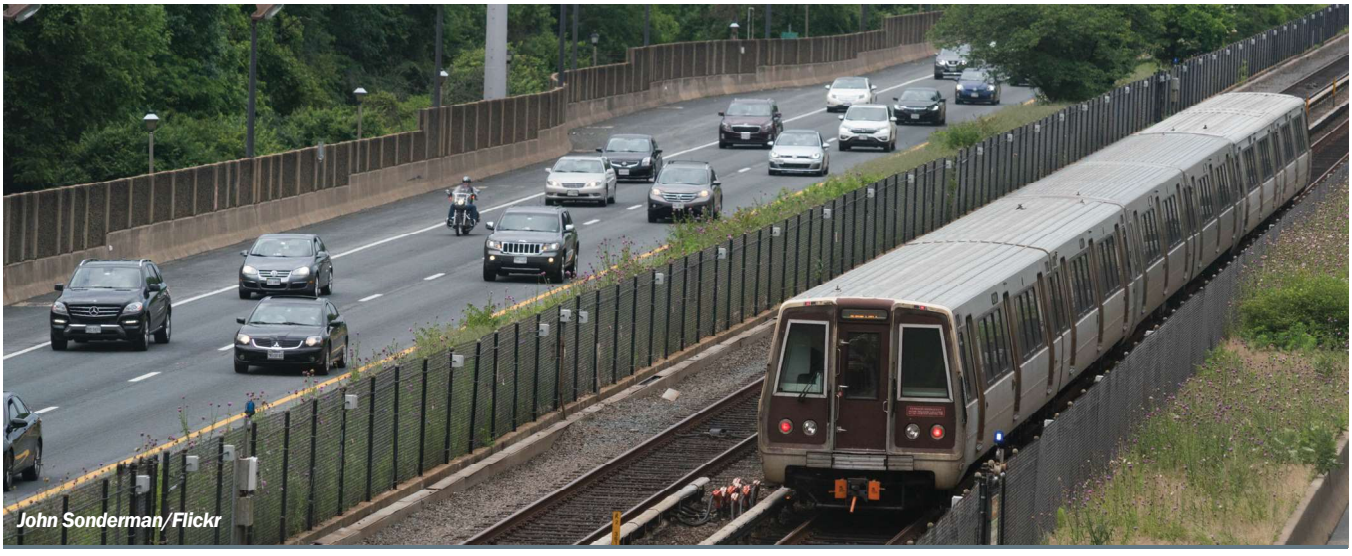


Figure 8.17: Mode Share, All Trips, 2045



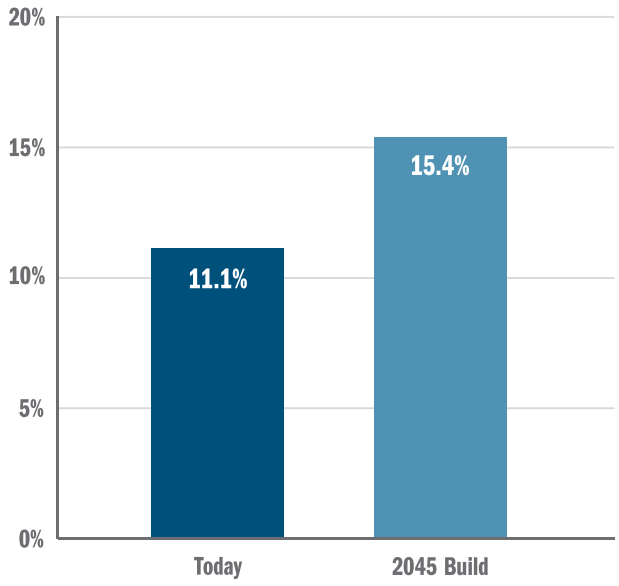

John Sonderman/Flickr

Steve Petrucelli/Flickr

While most projects in the plan are intended to improve reliability in the region through some type of infrastructure expansion or enhancement, a subset of projects described here as "Reliability-Enhanced" modes tend to provide additional enhancements to offer reliability and congestion mitigation. "Reliability-Enhanced" modes include express toll lanes/high-occupancy toll (HOT) lanes with dynamic toll rates, high occupancy vehicle (HOV) lanes, the Inter-County Connector in Maryland, Dulles Airport Access Road in Virginia, Metrorail, commuter rail, light rail, streetcar, bus rapid transit, long-haul express buses, and walk and bike travel.

The region continues to add transportation projects aimed at enhancing reliability and mitigating congestion. Forecasts estimate that a greater percent of regional travel will be on these modes, from 11 percent today to 15 percent in 2045 (Figure 8.18). The addition of these types of projects suggests greater mode choices can lead to less dependency on single-occupant vehicle travel and individuals seeking greater reliability in their travel.

Figure 8.18: Percent of Daily Person Miles Traveled on "Reliability-Enhanced" Modes



How Does the Plan Support Traveling to Work?

In the two years since the start of the COVID-19 pandemic in this region, commuting characteristics for many workers have changed dramatically. While many jobs classified as "essential" still required travel to a job location, many others could be or were optimized for episodic or permanent telework. It is still unclear if the long-term implications of these changes will remain, and, as a result, the TPB conducted this analysis reflective of pre-COVID-19 pandemic conditions. See Chapter 2 for more information on today's travel characteristics.

For forecasted commuting characteristics, travel model outputs suggest much of the pre-COVID-19 characteristics will likely be similar in 2045. The majority of commute travel in the outer suburbs will be dominated by single-occupant vehicle travel, commute travel in the inner suburbs will continue to be via a wide range of travel options, and in the region's core, where transit is most readily available, a much greater share of commuting trips will be taken on transit (Figure 8.19).

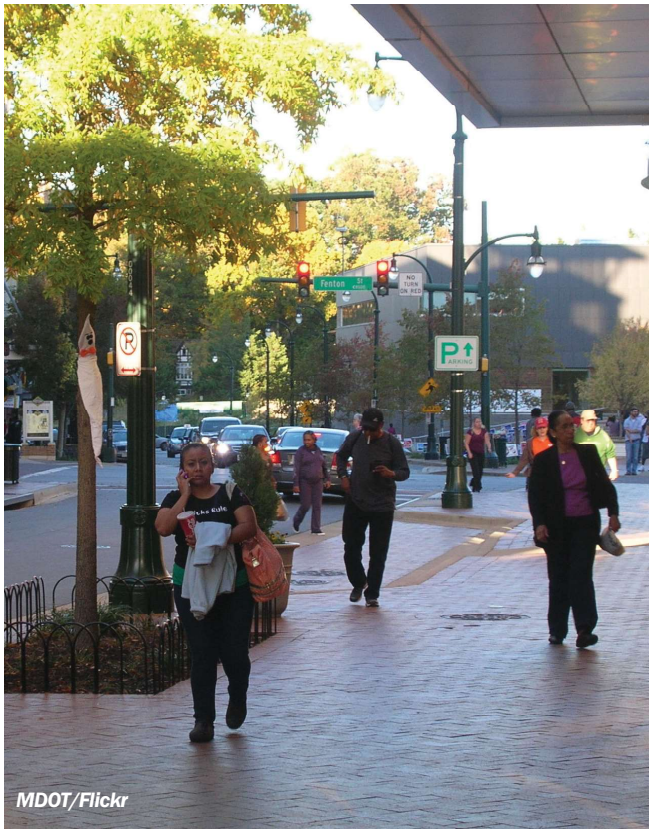

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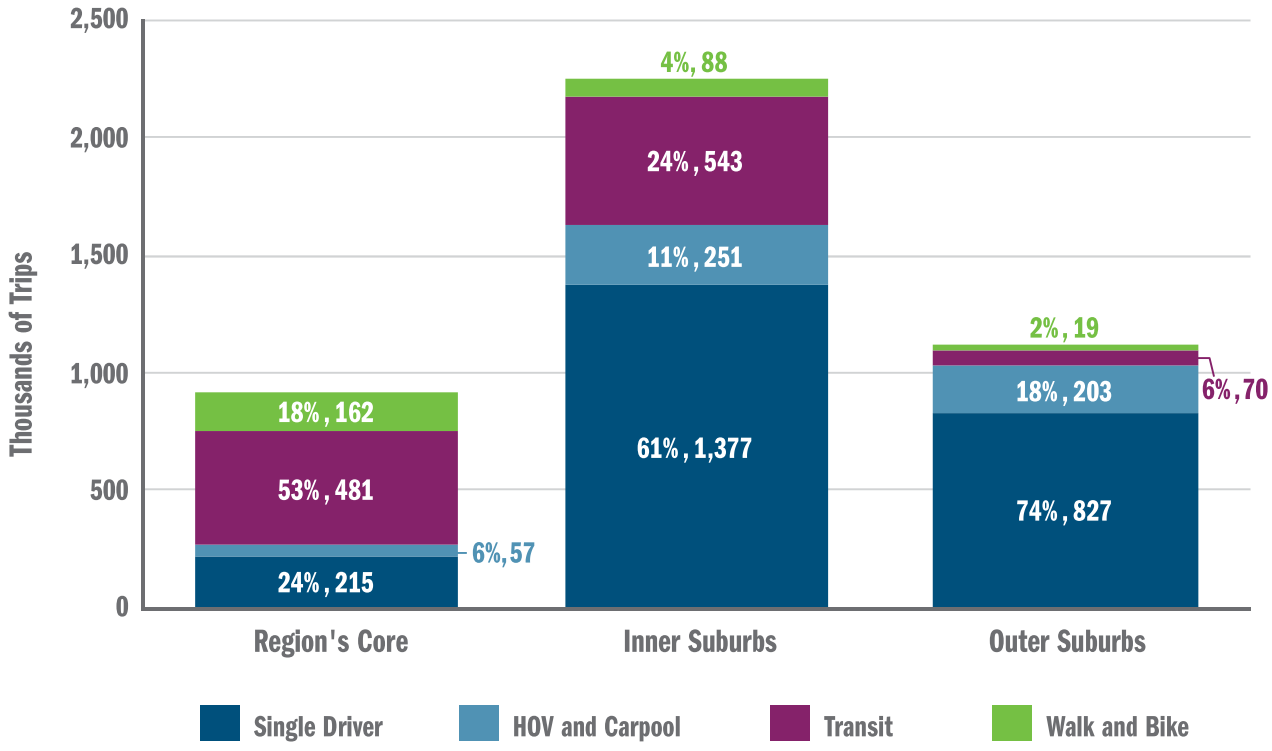
Figure 8.19: Work Trips by Mode and Geography, 2045



How Are New Transit Projects Forecast to Impact the Region?

The TPB's members are responding to the TPB's Aspirational Initiative to "Expand Bus Rapid Transit and Transitways" and "Move More People on Metrorail." By 2045, the region is planning to add an additional 27 percent of HCT miles compared to 2023, including additional light rail, streetcar, and bus rapid transit service. While not included in this figure, commuter rail infrastructure improvements and expansion, such as planned third and fourth tracks, will enhance existing transit service and are part of this plan. This section provides findings on how transit changes may impact the region.

Many more people and jobs are predicted to have better access to HCT (Figure 8.20).[47] In 2045, 27 percent of the region's population is forecast to live in close proximity to a HCT station, up from 18 percent today. In addition, nearly half of all jobs are forecast to be in close proximity to a HCT station, up from 41 percent today. These increases can be attributed to the additional HCT service planned for the region but also forecasts expecting more people and jobs close to these transit services.

Analyzing transit performance, through the number of jobs accessible during a 45-minute morning commute, the region is expected to see gains, and many smaller parts of the region will experience moderate gains. By 2045, the average number of jobs accessible within a 45-minute transit commute will increase from 414,000 to 553,000, a nearly 34 percent increase (Figure 8.21). Examining the geographic distribution of these changes shows that most places that currently have access to transit will experience increases in job access, and parts of the region where new transit projects are planned are also forecasted to gain access to additional jobs (Figure 8.22). These gains are likely linked to the forecast increase in jobs near existing transit stations and the expansion of higher quality transit service to more areas of the region, particularly Activity Centers and HCT station areas.

Figure 8.20: Percent of Population and Jobs in Proximity to High-Capacity Transit

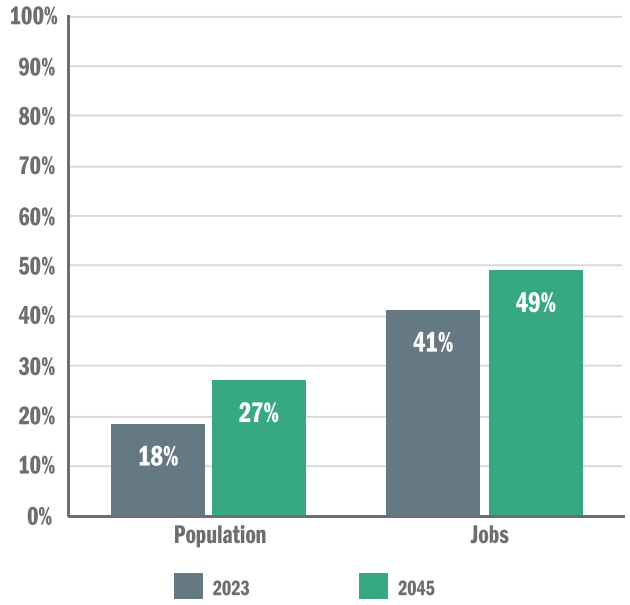
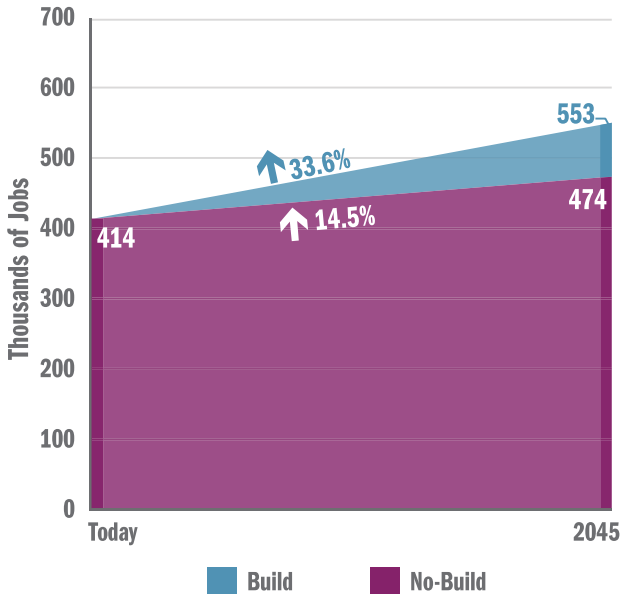


Figure 8.21: Change in Access to Jobs by Transit, Today – 2045



47 For this measure, close proximity is defined as within a half-mile of High-Capacity Transit.

Figure 8.22: Geographic Detail of Change in Access to Jobs by Transit, Today – 2045

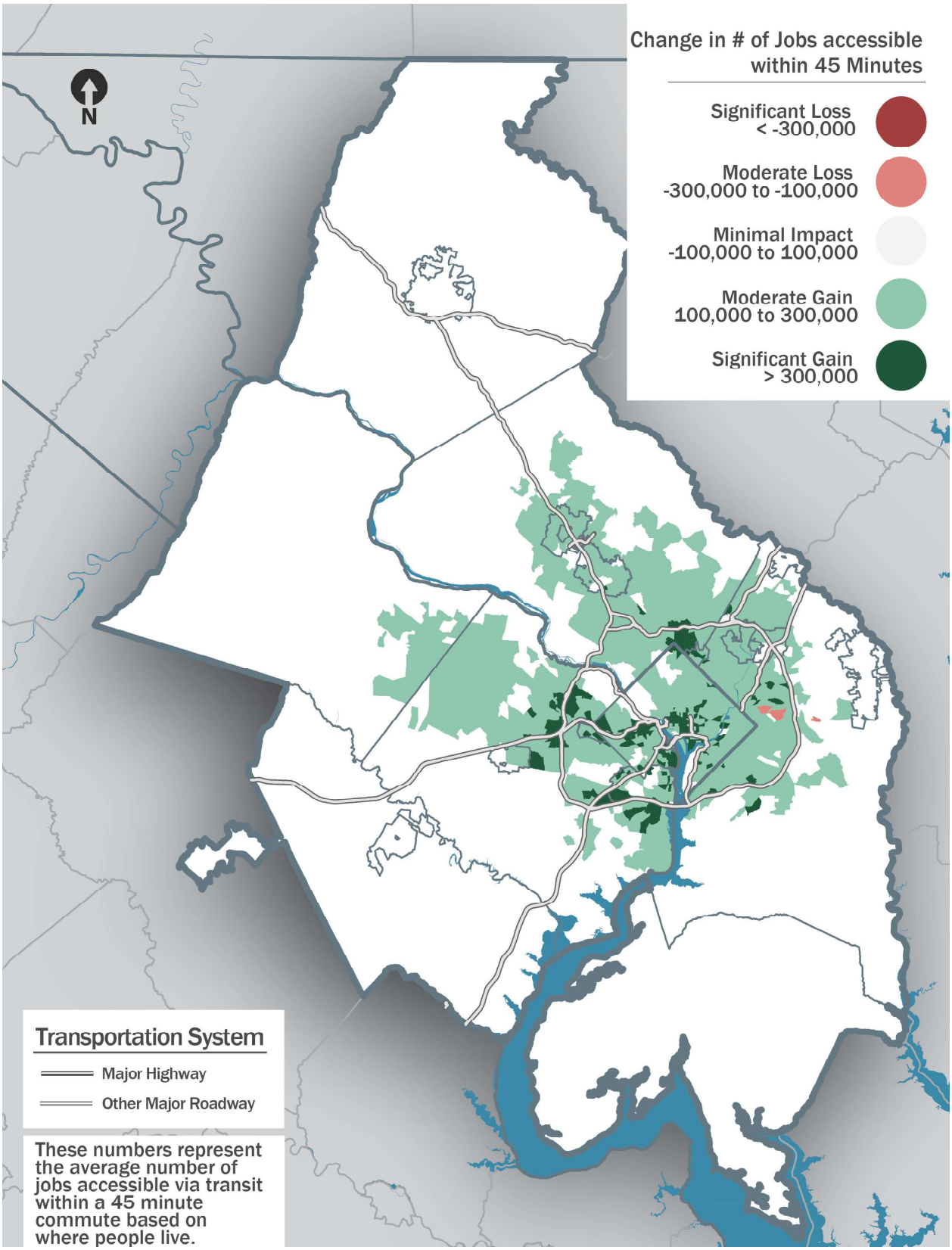


Figure 8.23: Total Daily Vehicle Hours of Delay, Today – 2045

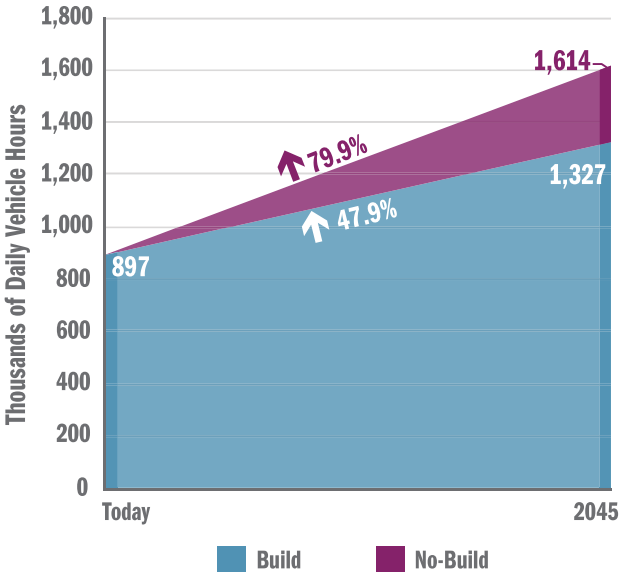
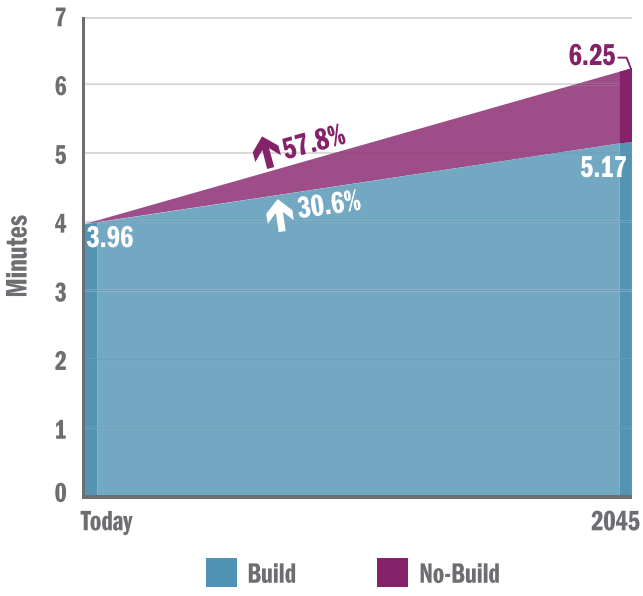


Figure 8.24: Average Minutes of Delay Per Trip, Today – 2045



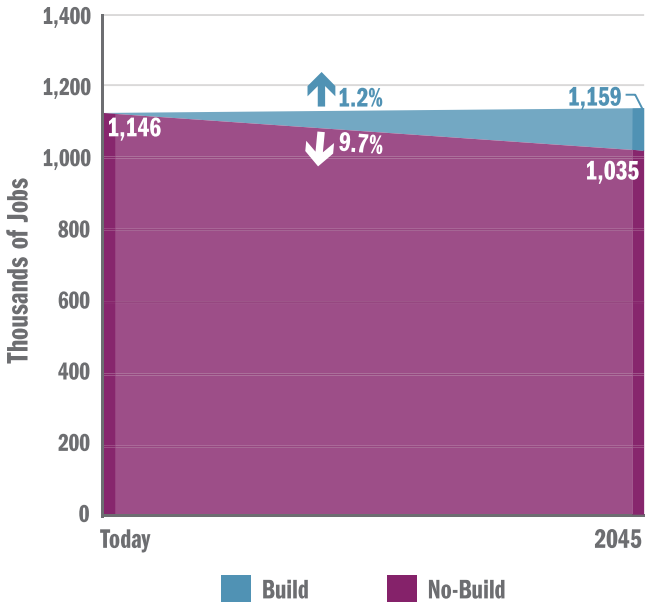
How Will the Highway Network Serve the Region?

Between today and 2045, the region's estimated increases in population and jobs, 19 and 23 percent, respectively, from 2023, will contribute to producing more trips across all modes, including single occupant vehicle and high occupancy vehicle and carpool trips. In addition, the region's financial obligations to maintain and operate the existing system limits the availability of funds for system expansions and enhancements, providing for a five percent increase in roadway miles from 2023. These increases in roadway demand and financial constraint for roadway expansion and enhancement will likely contribute to more stress on an already stressed highway network, forecasting increases in delay, congestion, and reducing access to jobs via auto for parts of the region. This is one of the reasons the TPB's documented CMP focuses on managing travel demand.

Highway congestion is forecast to get worse in the coming decades, though moderated by the projects in Visualize 2045. Even though 13 percent of the region's roadways are forecast to be congested during the morning commute in 2045, these roadways tend to be heavily used and have an outsized impact on congestion and delay.[48] Total daily vehicle hours of delay, which represents time spent in traffic in congested conditions, are forecast to increase by nearly 48 percent (Figure 8.23). A similar measure, average vehicle delay per trip, shows an increase of delay of nearly one minute and fifteen seconds or nearly 31 percent (Figure 8.24). In both metrics, by building the projects in Visualize 2045, congestion and delay are predicted to be at lower levels than if not built. Delay and congestion would have increased by nearly 80 percent and 58 percent in 2045 if projects were not built, respectively.

48 Congested is defined as a road segment with a traffic volume equal to or greater than the capacity of the road segment.

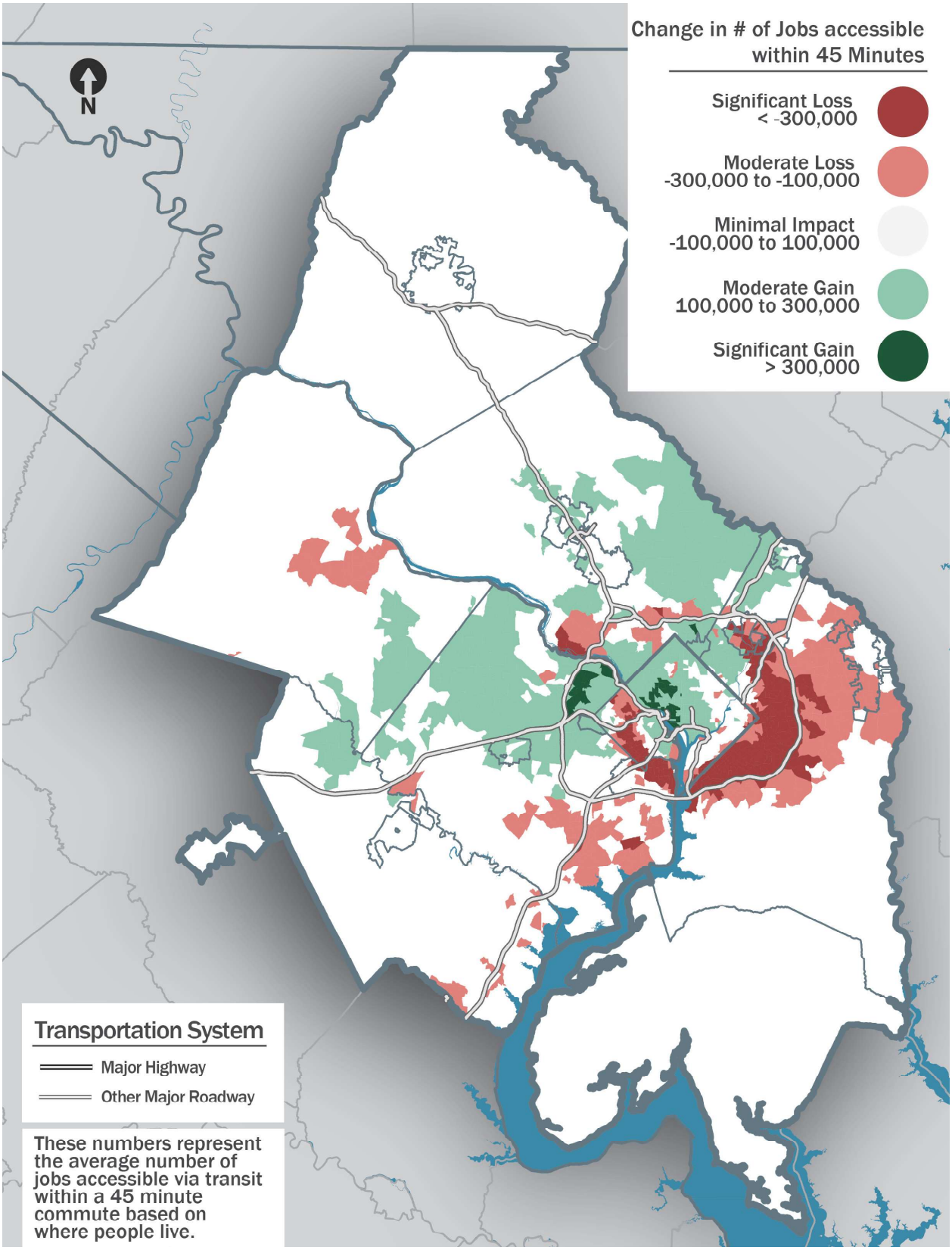
Figure 8.25: Change in Access to Jobs by Auto, Today – 2045



Analyzing roadway performance through the number of jobs accessible during a 45-minute morning commute, the region as a whole will likely see a modest gain in access while parts of the region will experience varying changes in job accessibility, from significant losses to significant gains. By 2045, the average number of jobs accessible within a 45-minute auto commute will increase by 13,000, a little over a 1 percent increase (Figure 8.25). If the region builds no new transportation projects but continues to expect increases in population and jobs, average access to jobs is forecast to decrease by nearly 10 percent for the region. These differences suggest that the transportation projects in Visualize 2045 will make a difference in providing people with access to the jobs while seeking to minimize the impact of congestion in delay.

The geographic distribution of changes in job access during a 45-minute commute in the morning is not forecasted to be equally shared in the region. The region's core, western suburbs, and northern suburbs are forecast to experience a moderate to significant gain in job access. Forecasts identify moderate to significant declines in accessibility by auto on the eastern side of the region and areas inside the Capital Beltway (Figure 8.26). Two factors are likely to contribute: The anticipated increase in congestion and delay decreasing accessibility to parts of the region by car and the additional jobs expected in this region between today; and 2045 being located largely in the western part of the region, increasing accessibility for areas near those jobs but likely reducing access to those beyond a 45-minute commute.

Figure 8.26: Geographic Detail of Change in Access to Jobs by Auto, Today – 2045

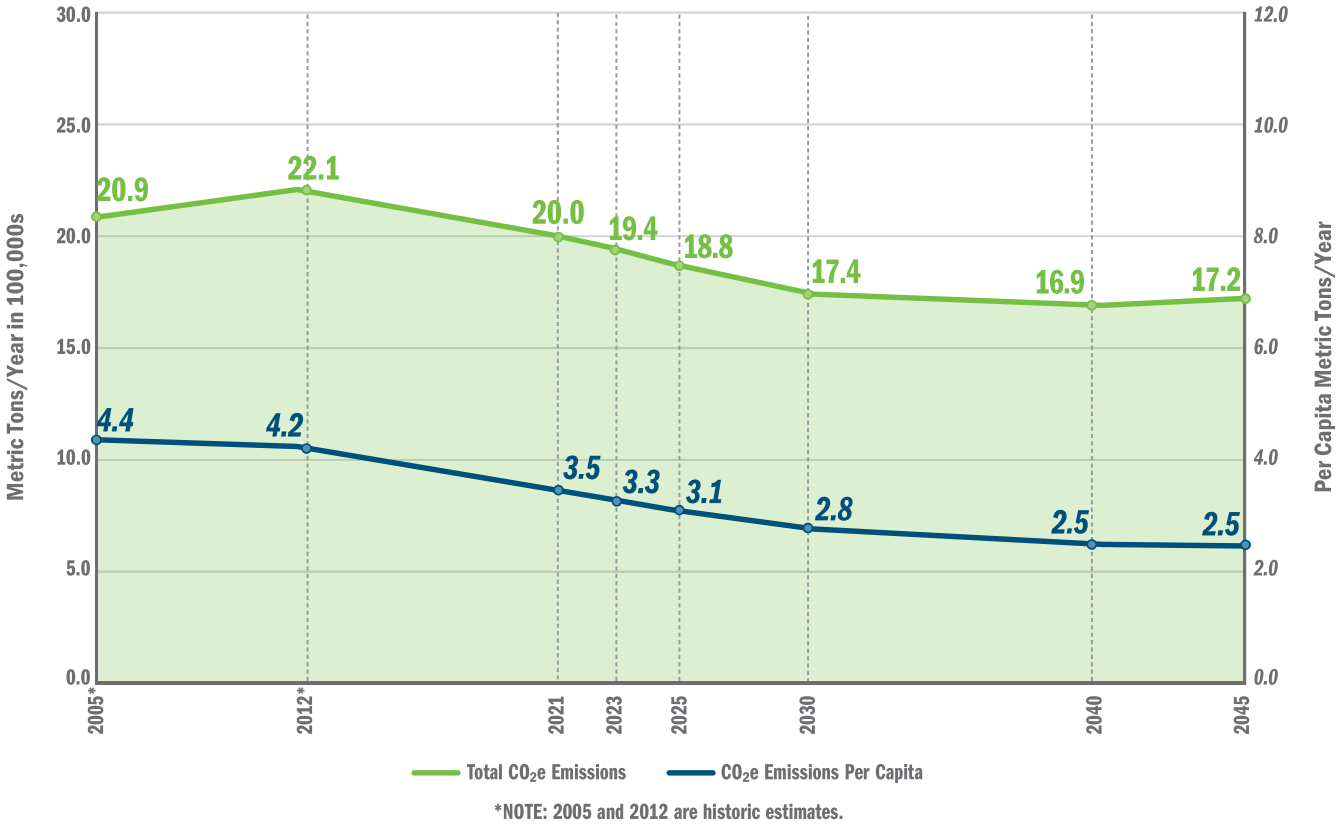


Greenhouse Gases

Unlike the two specific pollutants regulated by federal law in this region, greenhouse gases (GHGs), such as carbon dioxide, are not regulated by the federal government and are therefore not included in the Air Quality Conformity analysis. GHGs are generated by many sectors of the economy, e.g., energy, built environment, transportation, and waste. Due to the role of the transportation sector as a contributor to GHG emissions, the TPB has been tracking these emissions and has recently endorsed regional goals for reducing GHGs. Learn more about climate mitigation goals and activities in Chapters 3 and 6. In 2010, the TPB started proactively estimating and reporting future greenhouse gas mobile source emissions (as carbon dioxide equivalent or CO_2e) in the long-range transportation plan.

Since 2005, absolute annual GHG emissions in the on-road transportation sector have decreased by seven percent. By 2045, the latest analysis shows that annual GHG emissions are forecasted to be nearly 18 percent below 2005 emissions levels, or 11 percent below 2023 emissions levels, with a slight uptick between 2040 and 2045. Greenhouse gas emissions per capita are expected to decrease by 24 percent between 2023 and 2045 (Figure 8.27). The emissions reductions are largely attributed to increased fuel efficiency standards, but the uptick between 2040 and 2045 occurs as cleaner vehicles have saturated the fleet, and the benefits from fuel efficiency standards can no longer keep pace with projected VMT increases.

Figure 8.27: 2022 Update to Visualize 2045 Greenhouse Gas Mobile Source Emissions CO_2e and CO_2e Per Capita



*Since the TPB adopted the 2018 plan, the historic 2005 GHG emissions estimates were re-benchmarked using updated tools and planning assumptions and are consistent with both COG's 2030 Climate Energy and Action Plan and the TPB's Climate Change Mitigation Study of 2021. Therefore, the data varies slightly from past reporting.

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9

CHAPTER

What Happens Next?

Through this plan, our region Visualizes its Future Together. What will it look like? What challenges does the region face, and how does it work together to overcome them? This section looks back at progress, and reflects on challenges of the present moment and years ahead. It looks forward to actions needed to achieve the desired outcomes outlined in TPB goals, while continuing to meet the federal requirements for metropolitan planning.

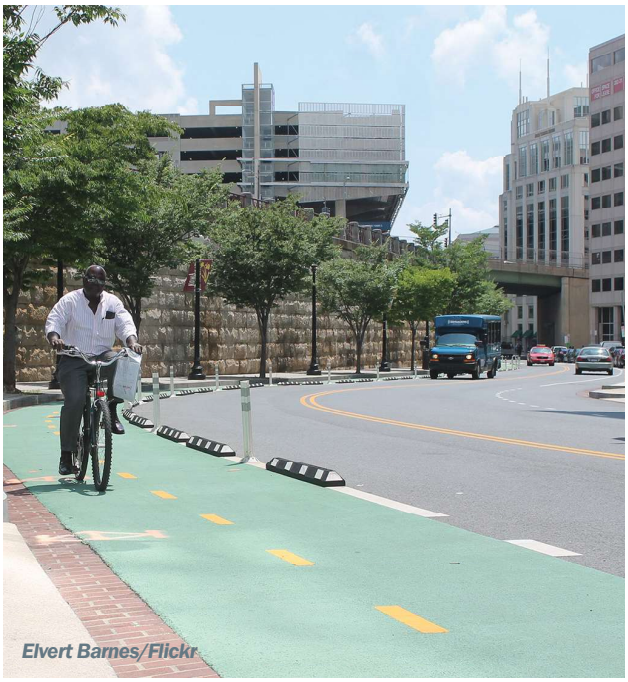
LOOKING BACK TO LOOK AHEAD

The Washington region's transportation system has come a long way in 20 years, now we look ahead. We visualize our future by planning how we get there, together.

Looking Back

The TPB has set goals and developed strategies to achieve them. The region's agencies have applied the strategies as appropriate to local context and have worked together to implement projects that span jurisdictional borders to connect the region. **Over the last few decades in the metropolitan Washington region, major investments have been made to provide more transportation options to residents, businesses, and visitors.** Significant investments have been made in public transit as

well as bicycle and pedestrian infrastructure. New Metrorail stations and lines have been built. The Silver Line connects Largo Center to stations across DC, into Fairfax County—and soon, Loudoun County, opening up job access and bridging the East/West divide. The NOMA-Gallaudet station, once an idea, now serves a new thriving neighborhood near major job centers. An ever-increasingly connected trail network enables people to bike from Montgomery County to National Harbor or Alexandria, almost entirely on trails. The Wilson Bridge was replaced with a facility that now serves all types of travel. More recently, a new multimodal Frederick Douglass Memorial Bridge replaced an aging structure over the Anacostia River, improving access to DC. New BRT and transitways have opened in Arlington County, Montgomery County, and DC, with many more planned. Expressways have been and continue to be added to the roadway system to enhance reliability. Investments in operations technologies and management help move and smooth traffic without adding roadway capacity. Road diets are a common way to make streets safe for everyone. Complete Streets are expected, not an anomaly.



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The Present Day: Tracking Progress

The people, businesses, and visitors in the region look for a range of transportation options that meet their individual needs, that are safe, reliable, and easy to access. Together, the region plans and takes actions to realize a brighter future, with a transportation system that does its part to help the region thrive. **Although some challenges that are common in a growing region still remain, the region has made incredible improvements and continues to do well in many areas.** The Regional Transportation Survey reports that approximately 17 million trips are taken per day on all modes of transportation for all purposes, including travel to work, school, medical appointments, and other destinations. Over the past 10 years, for all trip types, bicycling has doubled, walking amounts remained steady, but transit use declined. For commute trips, shares of single occupancy vehicle and carpool trips decreased while other modes such as bus transit, walk, bicycle, and taxi/ridehail increased.

Air quality has improved dramatically. Based on the ozone and fine particles data from the air quality monitors, the air quality in our region has improved tremendously over the past 20 years and is expected to continue to improve into the future. As more and more workers have the option to work from home, teleworking has changed the landscape of transportation in this region by reducing the total number of people commuting to work, and telework has seen pandemic-fueled growth.

Looking Ahead

The TPB's transportation system performance forecast for 2045 shows, as the population and jobs increase in the region, they are expected to be increasingly guided into mixed-use developments in Activity Centers and near HCT station areas, as they have over the last 20 years. Already high access to transit and nonmotorized opportunities is forecast to improve further for most residents of our region. More people are expected to travel by carpool, transit, biking, and walking. A higher

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THE POWER OF WORKING TOGETHER

The region has made progress toward its goals, but challenges remain. While we have further to go, together, we'll go far.

percentage of our region's residents is expected to take advantage of the congestion-free travel on the more reliable high-capacity transit, nonmotorized, and express lane modes. TPB surveys show that if given the choice to return to a work location once the COVID-19 pandemic is over, two-thirds said their preference would be to telework some days and 38 percent said they will probably have different travel habits than before.

But, the performance analysis also shows, given the additional demand of more people and jobs added to current demand, delay and congestion on main travel corridors will continue to rise—but more slowly than if the transportation investments were not made. Reducing GHG emissions poses a challenge. Many people still lose their lives or are injured on the region's roadways. The combined cost of housing and transportation puts a strain on the region's residents quality of life.

Transportation agencies must spend about 81 percent of their budgets to maintain and operate the existing expansive system, with remaining funding called on to integrate its many parts, expand options, and improve safety, mobility, access and reliability for all. Together, our region can explore how to generate new funding and maximize existing funding.

When agencies develop projects, they need to- and do-address more than one goal area. But, projects can also make progress on a policy priority (such as improved mobility for historically disadvantaged populations) while hindering another priority, such as reducing VMT and GHG. Overcoming challenges of funding, lengthy project development timelines, and the other hurdles of enhancing a transportation system in a region that is already built out, means implementation faces many challenges.

Over the last decade, the TPB's numerous studies have pointed toward multimodal solutions to address challenges, alleviate congestion, improve reliability and safety, reduce transportation emissions, and provide real choices for people and businesses across the region. These studies led to the TPB-endorsed Aspirational Initiatives—planning concepts already underway in the region that the TPB seeks more of, sooner, as they have the potential to significantly improve the region's transportation system performance compared to past plans and programs.

During the development of this plan, the TPB conducted activities to support the implementation of the Aspirational Initiatives to address the TPB's entire policy framework, including a survey that explored potential impacts of the pandemic, transportation barriers and preferred enhancements. The TPB conducted focus

groups to hear perspectives of underrepresented populations, and, a QR-code based event to better understand how the types of projects aligned with the initiatives impact people's lives. We heard that these projects make a real difference, and that the TPB needs to keep making progress on its aspirations.

The TPB conducted studies that focused on issues that impact the region's ability to address many of its goals—equity, roadway safety, and climate change mitigation and resiliency. Each study identified key challenges and strategies to make progress. For example, the Transit Fare Equity study found that fare relief can increase ridership, could reduce the cost burden for many riders, and improve the safety of riders and operators. The TPB Safety Study revealed that EEAs contain 42 percent of the urban core's population, yet they account for 59 percent of the urban core's fatalities and identified strategies to reduce fatalities and injuries that occur on the region's roadways. The *Climate Change Mitigation Study of 2021* found no silver bullet to meet the region's 2030 interim and 2050 climate goals, but identified the potential impacts of numerous multisectoral pathways that could help the region reduce the amount of GHG spilled into the air from transportation emissions.

THE KEY TO SUCCESS

The region identifies and works together to overcome challenges, whether they be regional, national, or global.

Together, Our Region Can Take Action

This plan includes many projects, programs, and policies that advance TPB policy priorities, including the Aspirational Initiatives. But there's more to do.

With challenges ahead, the region needs to prepare for the additional growth that we know is coming. As noted in COG's *Region United* planning framework, which builds on several of the Aspirational Initiatives and other TPB efforts, "it is clear that our region needs to take collaboration to the next level to address a variety of interconnected and urgent challenges more effectively, including housing supply and affordability, transportation accessibility and mobility, climate change—as well as long-persisting racial inequities. And while these issues are daunting, there's also growing consensus: if the challenges are interconnected, so are the solutions."

While studies have informed solutions, the **TPB and COG are focused on strategy implementation.** Together, our region is bringing the slogan, 'Think Regionally, Act Locally' into action. Each jurisdiction and agency can take action by identifying the region's priority strategies that work best at the local level and where possible, take steps to accelerate delivery. How projects, programs, and policies are implemented also matters, COG and the TPB call for strategies to have an equity lens. Recognizing that getting the most out of every dollar is necessary, planning and implementation activities can include considering how each investment can become an interconnected solution by examining opportunities to incorporate climate, land use, and other strategies into each solution.

Together, our region can continue to make headway on its goals as it establishes policies and makes investments in programs and projects for future generations.

When We Plan Together, We Prosper, Together.

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