ITEM 8 – Information
September 21, 2018

Visualize 2045: Draft Review

Staff Recommendation: Briefing on the draft of Visualize 2045, TPB's new long-range transportation plan.

Issues: None

Background: Staff will introduce the draft of Visualize 2045, the TPB's new long-range transportation plan for the National Capital Region, which was released for public comment on September 7. After the 30-day comment period, the TPB will be asked to approve Visualize 2045 at its October 17 meeting.

- Introduction, Regional Policy, Regional Context
- Aspirational Element
- Financially Constrained Element
  - Projects in the financially constrained element
  - Financial plan
  - Performance analysis
  - Air Quality Conformity determination
- Performance Planning
- Additional Plan Elements
- Public Participation

visualize2045
A LONG-RANGE TRANSPORTATION PLAN FOR THE NATIONAL CAPITAL REGION

Visualize 2045

Highlights from the Draft Plan

Transportation Planning Board
September 21, 2018

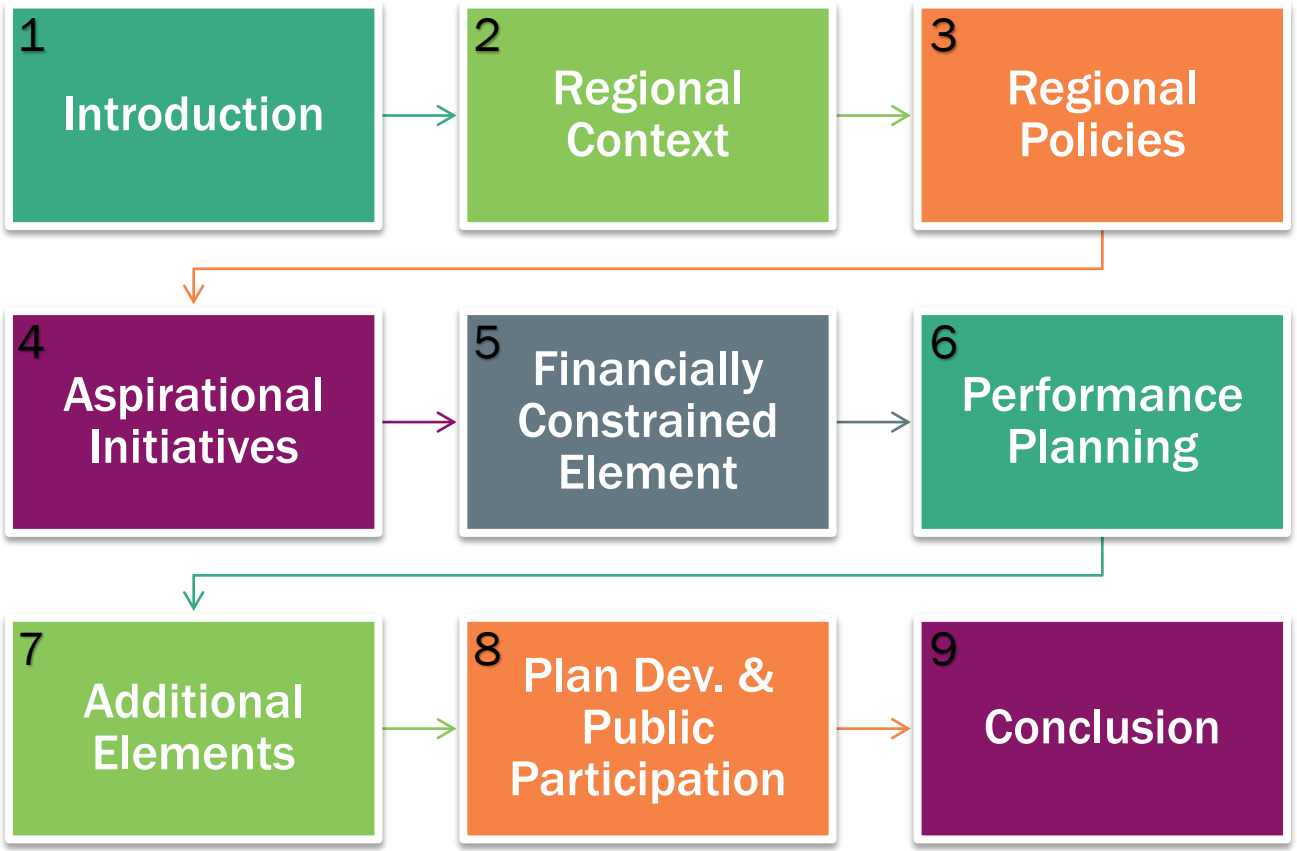
Item 8

Introduction

Visualize 2045 aims to help decision makers and the public “visualize” the region’s future by illustrating:

- What the region aspires to do if more resources were available,
- What the region can do with current levels of funding and,
- What the region must do to meet federal requirements

Overview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Appendix F	Safety Planning
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Appendix I	Report on Phase 2 of Public Outreach: Public Forums and Open Houses
Appendix J	Summary of Public Comment Periods

*Available online at visualize2045.org

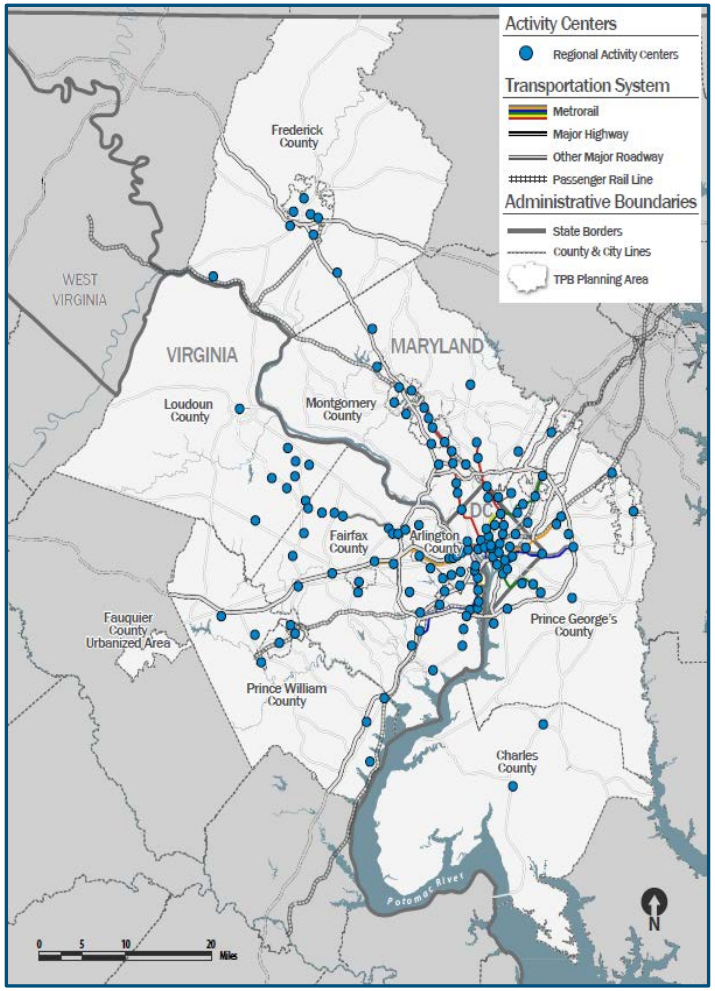
Transportation Planning Board

- The designated metropolitan planning organization (MPO) for the Washington region
- 23 local jurisdictions
- 44 members, 38 of which are voting members

(mariordo59/flickr)

Our Region

- Approx. 3,500 square miles
- 5.7 million people
- 3.3 million jobs
- 141 Activity Centers

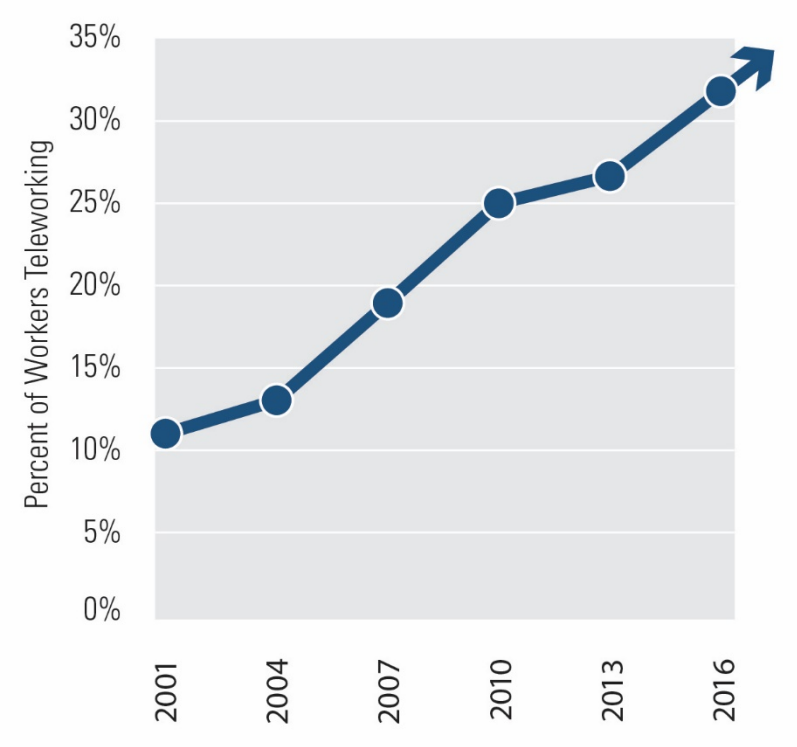


Our Transportation System

- More than 17,000 lane miles of highways and major roads
- 118 miles of Metrorail and 91 Metrorail stations
- 167 miles of MARC and VRE commuter rail and 39 commuter rail stations
- Six miles of bus rapid transit, light rail and streetcars
- Over 500 of miles of off-street paved trails and paths for walking and biking and over 200 miles of bike lanes
- Over 15 local and commuter bus systems and over 10 paratransit service providers

Transportation Trends - Highlights

- The rate of single occupancy vehicle trips has been declining in favor of other modes, although:
  - 41% of all trips are people driving alone
  - 61% of work trips are people driving alone
- Telework, ride-hailing apps, bikeshare (docked and dockless) all on the rise



Forecast Population Growth

- Population is forecast to grow by 23% between now and 2045
  - 5.7 million people today
  - 6.9 million people in 2045 (approx. 1.2 million more people)
- While the projected rate of growth varies for each jurisdiction, the regional core will grow at the highest rate (35%), followed by the outer suburbs (28%), then inner suburbs (17%)
- Fairfax County and the District of Columbia are forecast to gain the most residents, each planning to grow by over a quarter-million people

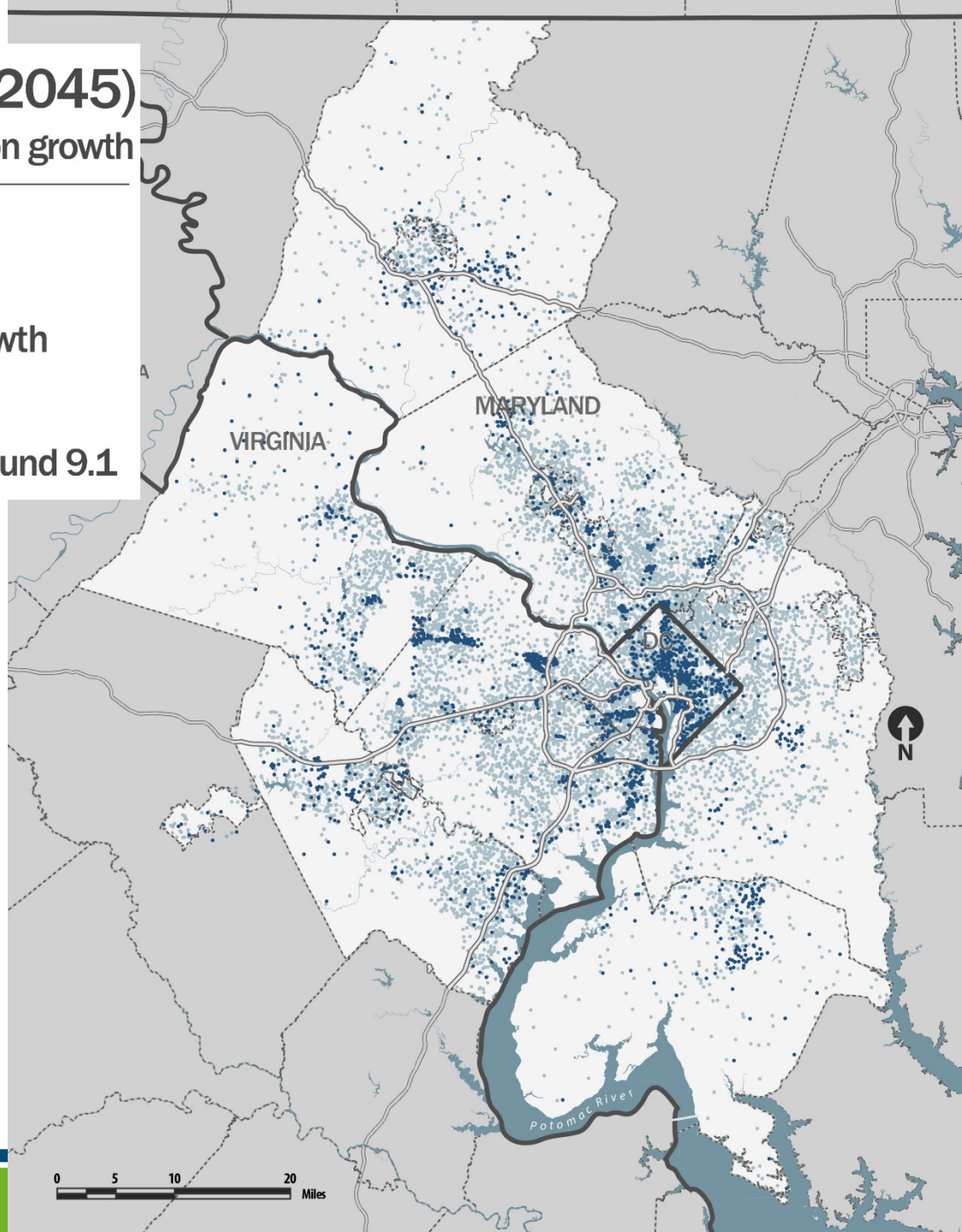
Population Growth (Today - 2045)

Existing population and forecast population growth

Today Existing Population

2045 Forecast Population Growth

1 dot = 500 People
Source: MWCOG Cooperative Forecast Round 9.1



Forecast Job Growth

- Regional employment expected to grow 29% between today and 2045
  - 3.3 million jobs today
  - 4.3 million jobs in 2045 (approx. 1 million more jobs)
- Growth is distributed throughout the region, however growth is forecast to be higher on the western side
- Fairfax County and the District of Columbia are forecasted to have the most jobs gained, while the highest rates of job growth are forecasted in Loudoun and Prince William Counties

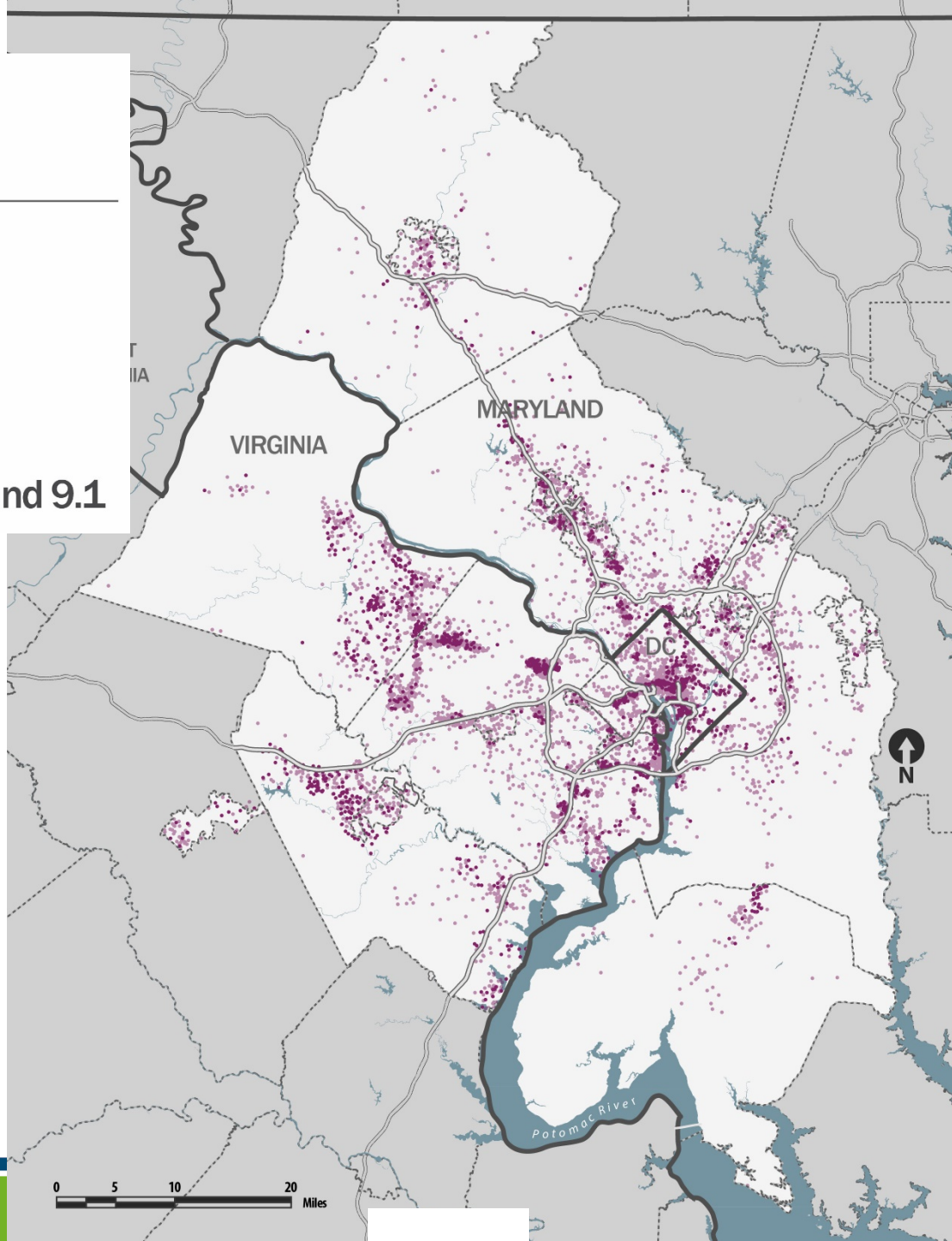
Job Growth (Today - 2045)

Existing jobs and forecast job growth

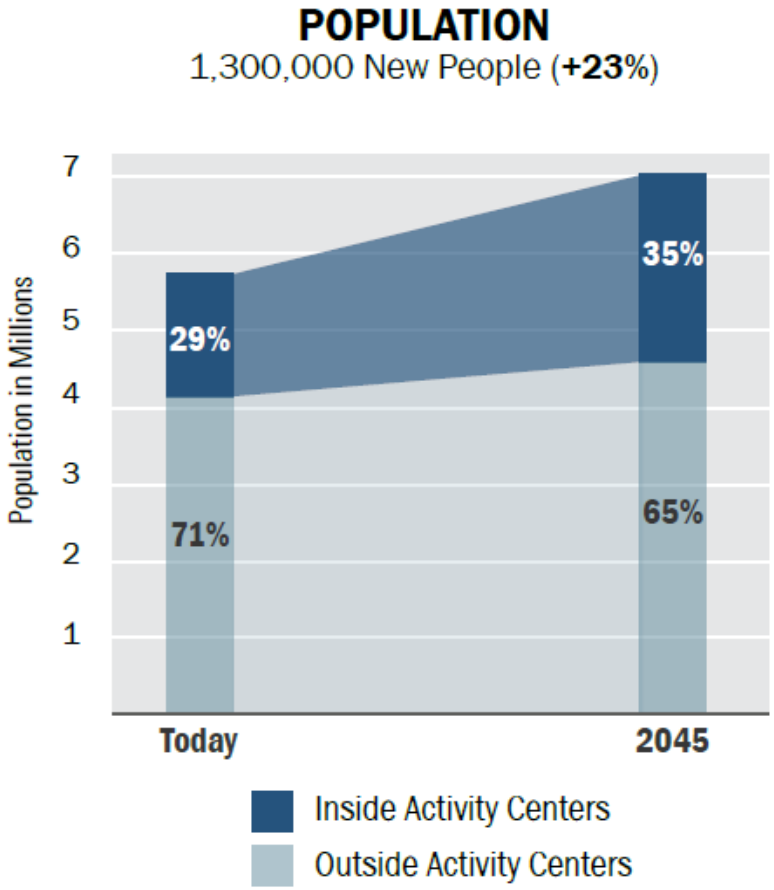
Today Existing Jobs

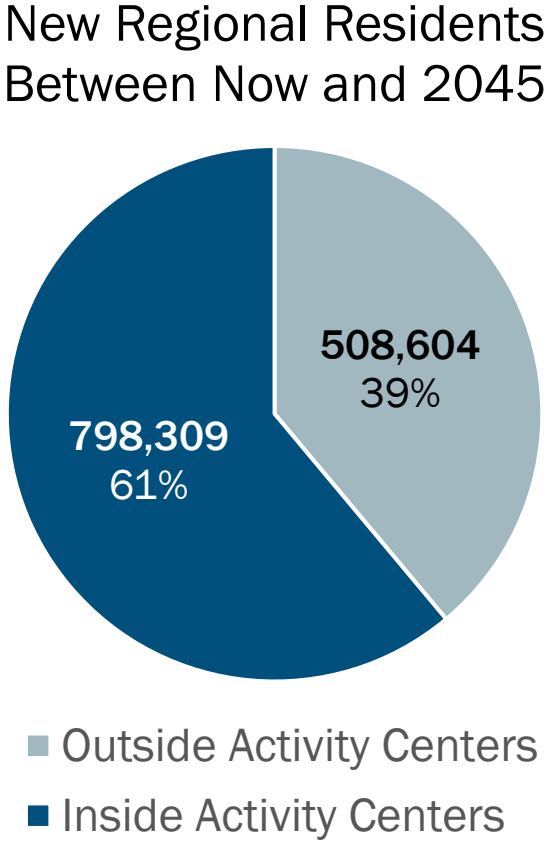
2045 Forecast Job Growth

1 dot = 500 Jobs
Source: MWCOG Cooperative Forecast Round 9.1



Growth Inside and Outside Activity Centers





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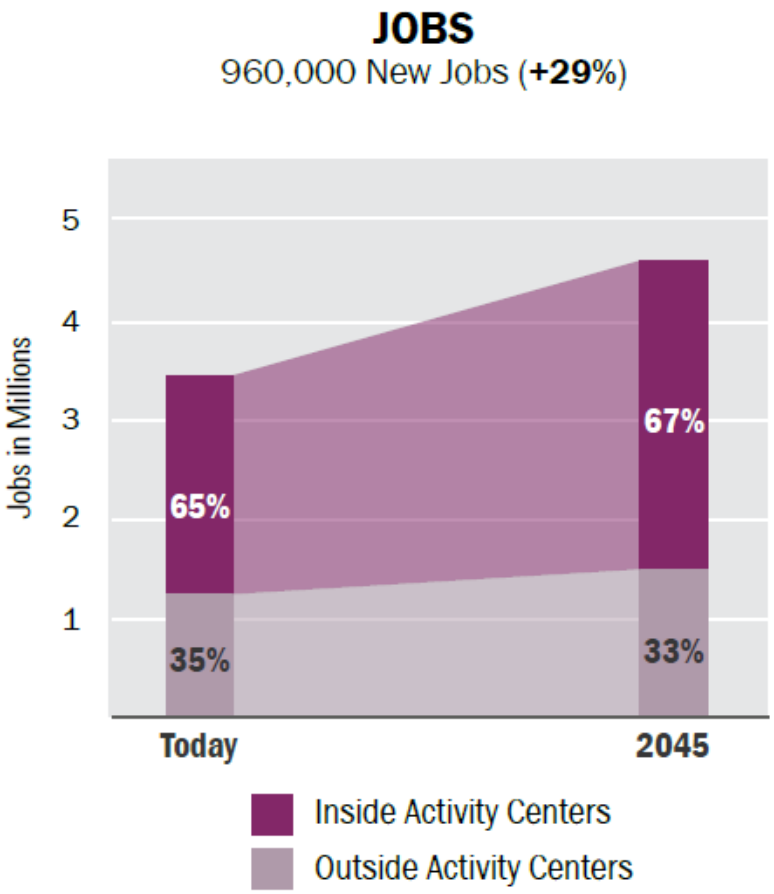
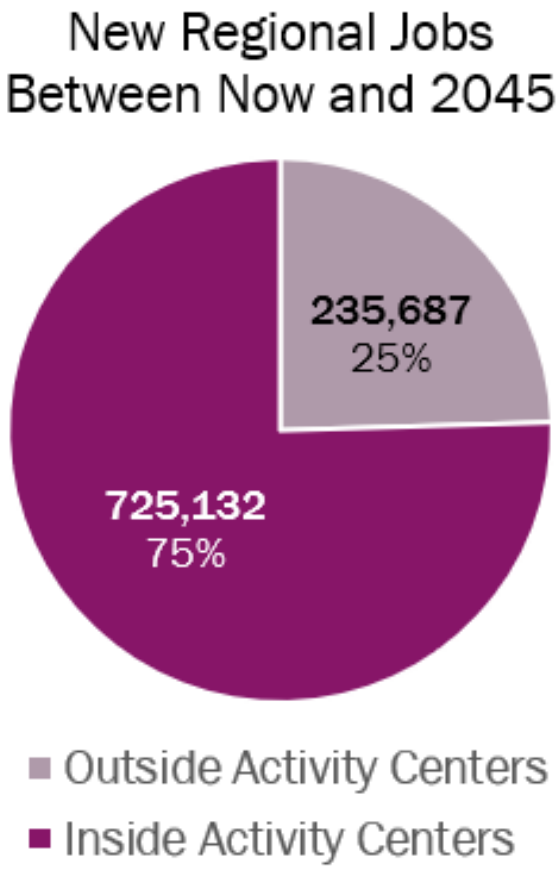
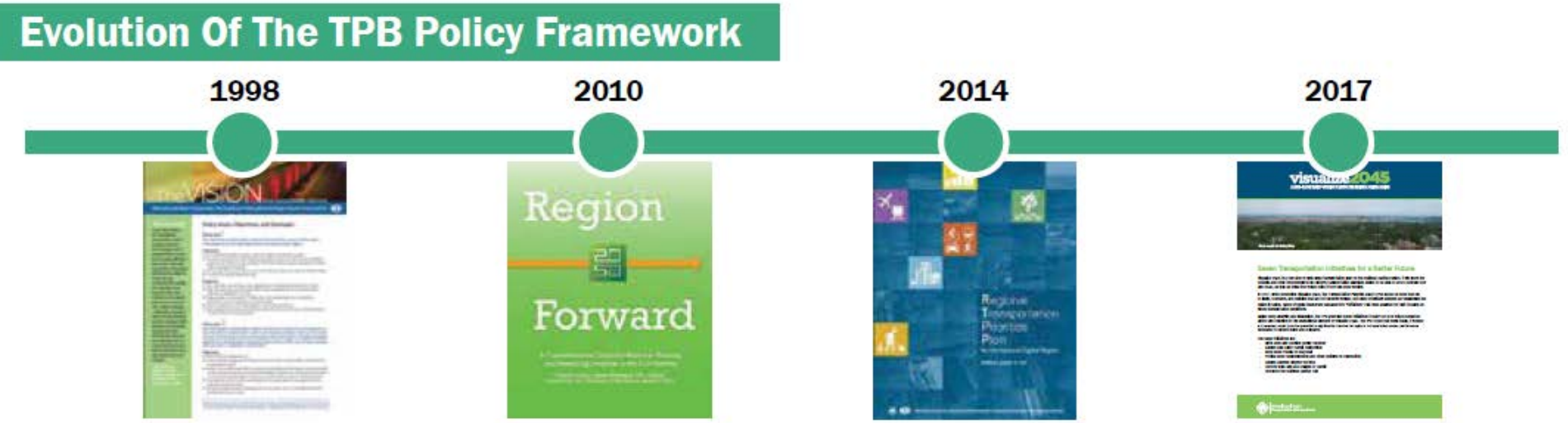




Regional Policy

A regional policy framework guides the plan

- TPB Vision
- COG Region Forward
- TPB's Regional Transportation Priorities Plan
- Seven aspirational initiatives



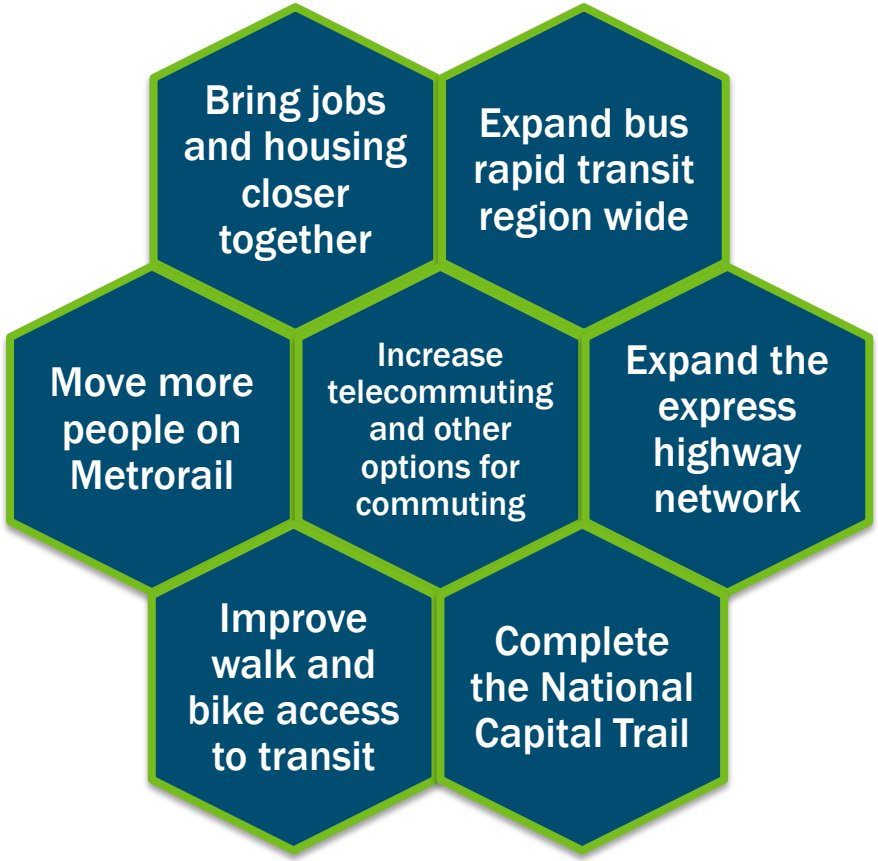
Aspirational element

What the region **aspires to do** if more resources were available


(Fort Belvior Community Hospital/Flickr)

Aspirational Element

Seven endorsed initiatives



Aspirational Element

TPB's December 2017 endorsement:

The TPB "endorses the attached list of five initiatives, found to have the most potential to significantly improve the performance of the region's transportation system compared to current plans and programs, for future concerted TPB action, and directs staff to include these initiatives in the aspirational element of the TPB's long-range transportation plan, Visualize 2045."

*Jan 2018 TPB passed two others

Aspirational Element

- Aspirational initiatives are now part of the regional policy framework
- Conducted public forums to learn what people think about the initiatives
- 14 programs highlighted in the plan show how they can support the initiatives
- Highlights projects in the financially constrained element that help support the initiatives

Financially Constrained Element

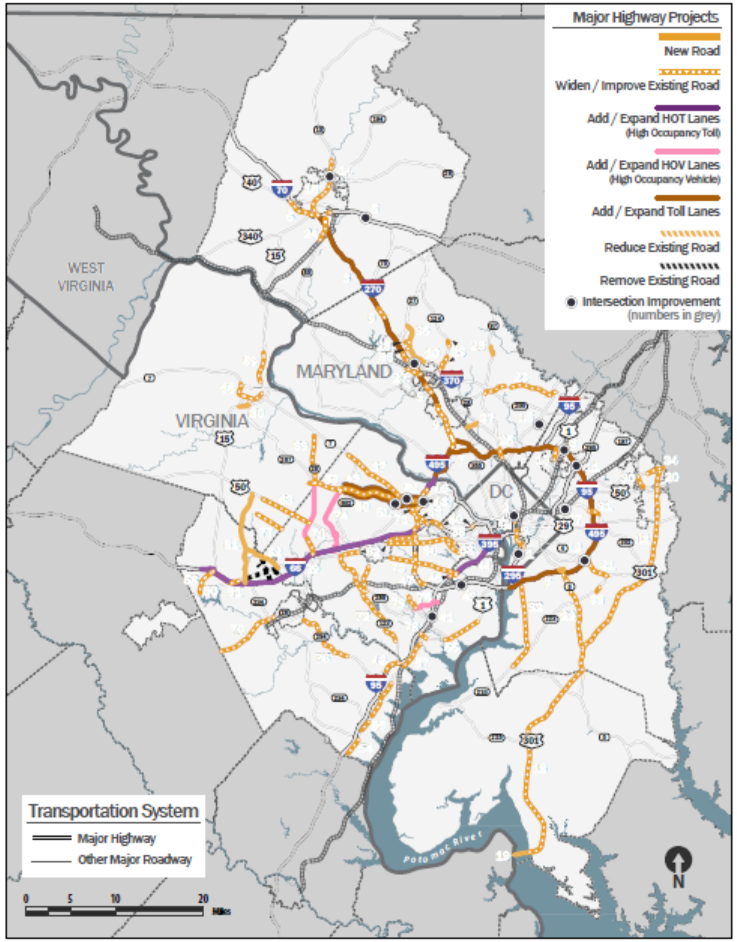
What the region can do with current levels of funding

- Project highlights
- Financial plan
- Performance analysis
- Air Quality Conformity

(BeyondDC/Flickr)

Projects in the Financially Constrained Element

- Includes more than 100 major projects that expand or change the region's highway or transit system capacity
- More than 600 projects in total
  - Listed in Appendix B
- Visualize 2045 added capacity:
  - Roadway: 1,388 lane miles
  - Tolled: 461 lane miles
  - Transit: 124 miles



Projects in the Financially Constrained Element

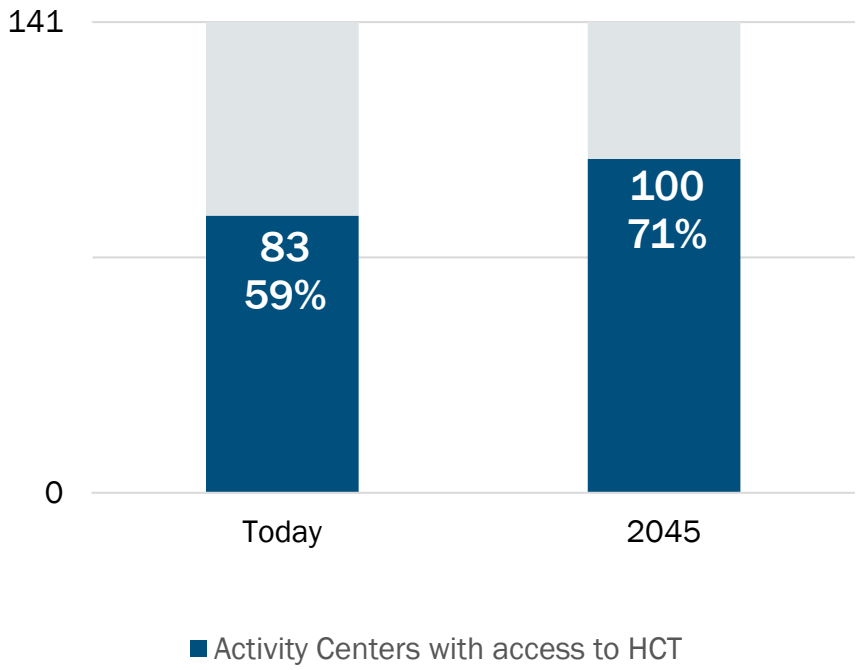
New Capacity in Visualize 2045

	Roadway	Managed Lanes (subset of roadway)	High-Capacity Transit*
Existing	17,048 lane miles	436 lane miles	292 miles
Added by Visualize 2045	1,388 lane miles	461 lane miles	124 miles
Total 2045	18,436 lane miles	897 lane miles	416 miles

* “High-Capacity transit” defined to include Metrorail, commuter rail, streetcar, light rail or bus rapid transit.

Projects in the Financially Constrained Element

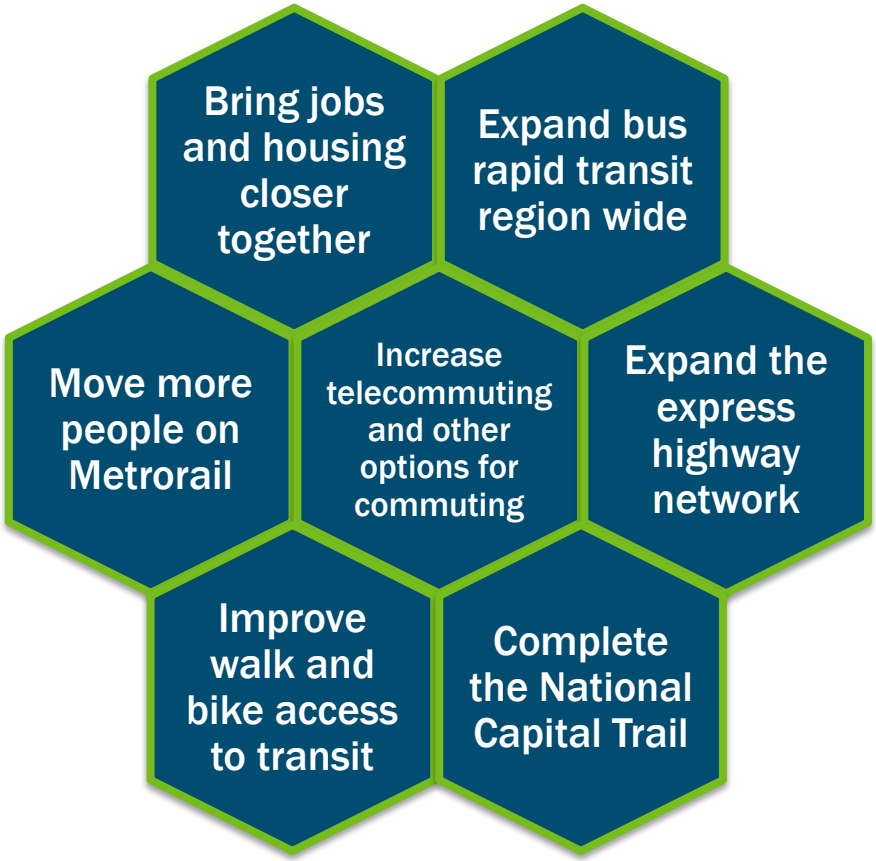
More Activity Centers connected to High-Capacity Transit



* “Proximity” defined as within one mile of rail or within ½ mile of BRT.

Projects in the Financially Constrained Element

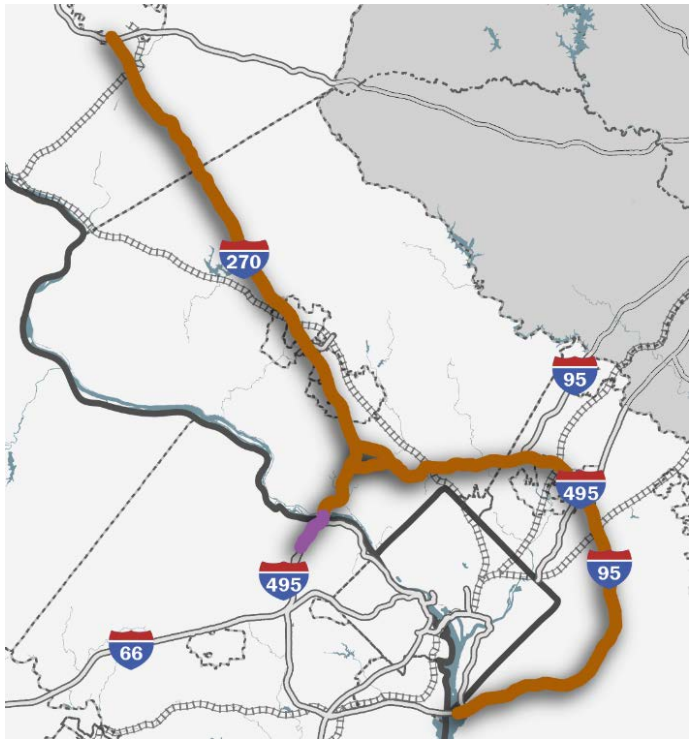
The following slides highlight new or changed projects submitted for Visualize 2045 that support some of the **Seven Aspirational Initiatives**



Project Highlights

New I-270 and I-95/I-495 Managed Lanes Projects in Maryland and Changes to I-495 HOT Lanes Project in Virginia

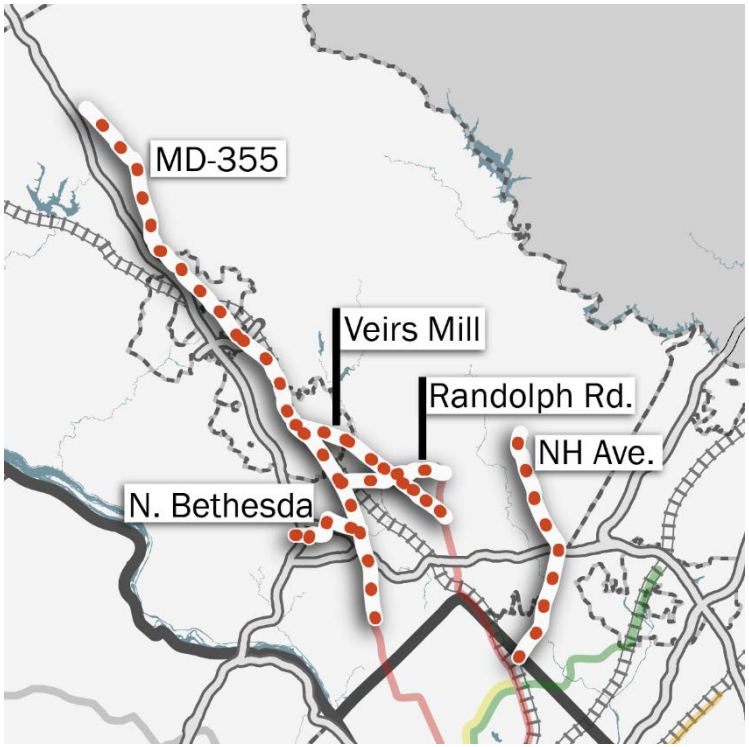
- Complete by 2025
- $8.1 billion
  - ($7.6 B in MD, $0.5 B in VA)
  - Mostly private funding
- 116 new lane miles
  - 56 miles, 2 managed lanes each direction in Maryland
  - 2 miles, 2 HOT lanes each direction in Virginia
- **Expand Express Highway Network**



Project Highlights

New Bus Rapid Transit (BRT) Projects in Montgomery County

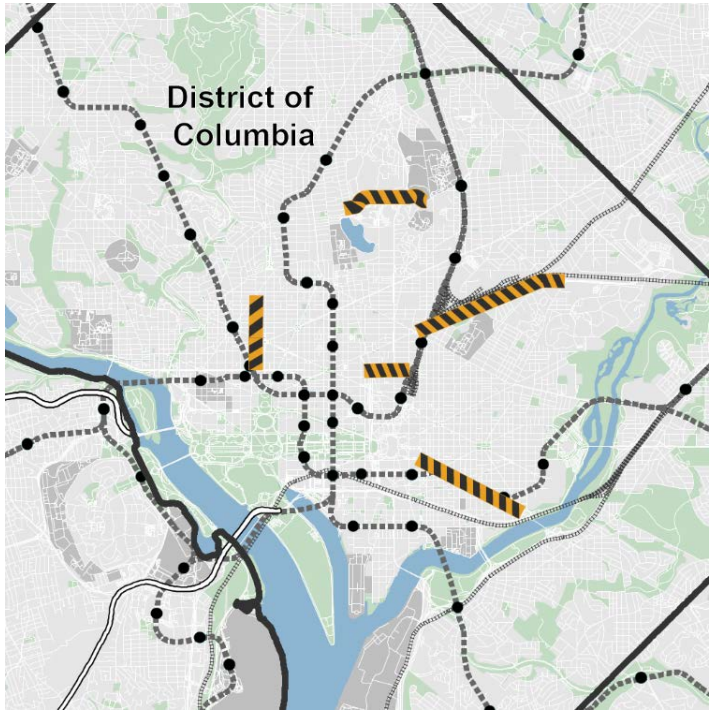
- Various segments complete in 2030, 2035, 2045
- $1.7 billion
- 50 miles
  - Randolph Rd. (10 mi.)
  - North Bethesda (3.5 mi.)
  - MD 355 (22 mi.)
  - New Hampshire Ave. (8.5 mi.)
  - Veirs Mill Rd. (6 mi.)
- **Expand BRT Regionwide**



Project Highlights

New Bicycle Lanes in the District of Columbia

- Various segments complete in 2018, 2023
- $28 million
- 6 miles
  - Pennsylvania Ave. SE
  - 17th St. NW
  - K St. NE/NW
  - Irving St. NE/NW
  - New York Ave. NE
- **Improve Walk and Bike Access to Transit**



Project Highlights

Metrorail Core Capacity Improvements

- Complete by 2045
- $5.4 billion
- Implement 8-car trains system-wide during peak periods.
- Make capacity improvements to stations in the core and upgrade power systems
- Removes core capacity constraint
- **Move More People on Metrorail**

Financial Plan

- Federal regulations require a financial plan that demonstrates how the adopted long-range plan can be implemented
- Forecast revenues must cover the estimated costs of maintaining, operating, and expanding the highway and transit system
- The plan demonstrates that the forecast revenues are reasonably expected to be available to implement Visualize 2045

(BeyondDC/Flickr)

Financial Plan - Methodology

- For the near-term years, agencies used revenue and expenditure budgets from the approved TIP and Capital Improvement Programs (CIPs)
- For long-term years:
  - Revenues are estimated from extrapolation of past trends as well as assumptions about future increases (beyond current legislation and appropriations)
  - Expenditures are developed from project costs in the CLRP project database as well as extrapolated costs for maintenance and operations
- Estimated inflation rates are applied to convert estimates of revenues and expenditures to year of expenditure (YOE) dollars

Financial Plan – Key Assumptions (States)

- District of Columbia
  - Revenue growth rate of 2.4% after 2023
  - Most revenue come from general tax revenues
- Suburban Maryland
  - State growth rate of 5%, federal growth rate of 3%
  - Increased private funding to build toll roads
  - Increased contribution to WMATA by the state
- Northern Virginia
  - State growth rate of 2.4%, federal growth rate of 2%
  - More regional revenues to WMATA; reduced NVTA funds
  - Assumption that state transit capital funding will continue

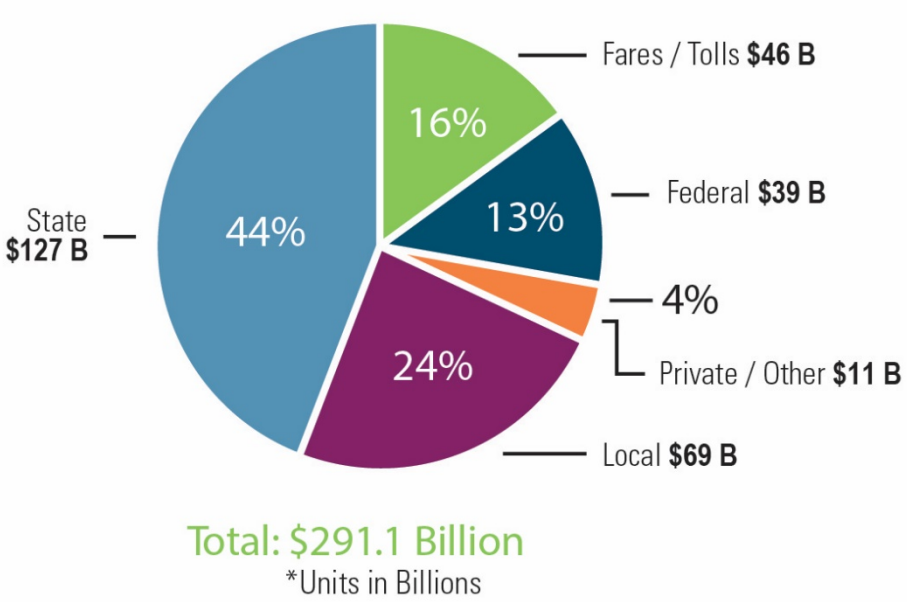
Financial Plan – Key Assumptions (WMATA)

- WMATA inputs
  - Operating revenues and costs based on extrapolation of current trends
  - Capital costs based on Capital Needs Inventory (CNI) and GM/CEO's plan
  - Assumption that PRIIA funding ($150M/year federal, matched by DC-MD-VA) will be extended through 2045
- TPB staff modified inputs following approval of dedicated funding by DC, MD, and VA
  - New dedicated capital revenues of $500 million annually begin in 2020 and continue through 2045
  - Removal of transit core capacity constraint from Air Quality Conformity Determination travel demand model

Regional Revenues: Visualize 2045

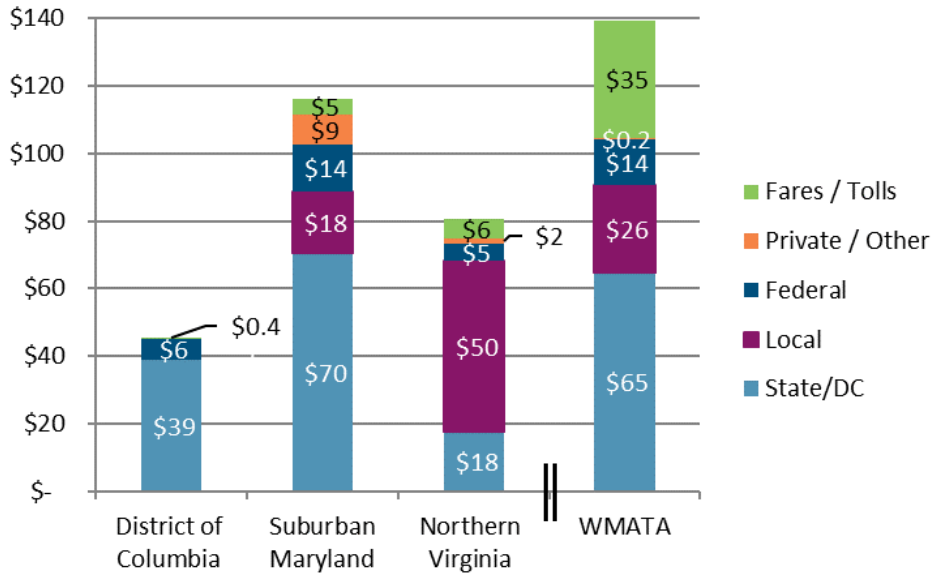
Visualize 2045 Revenues

$ Billions Year of Expenditure



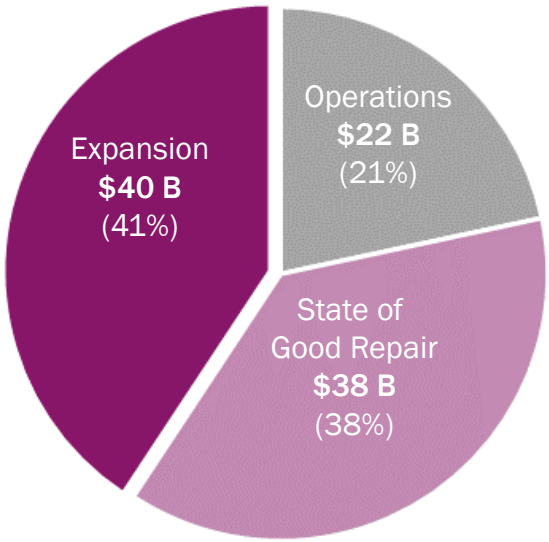
Revenue Source State/WMATA

(2019 – 2045)



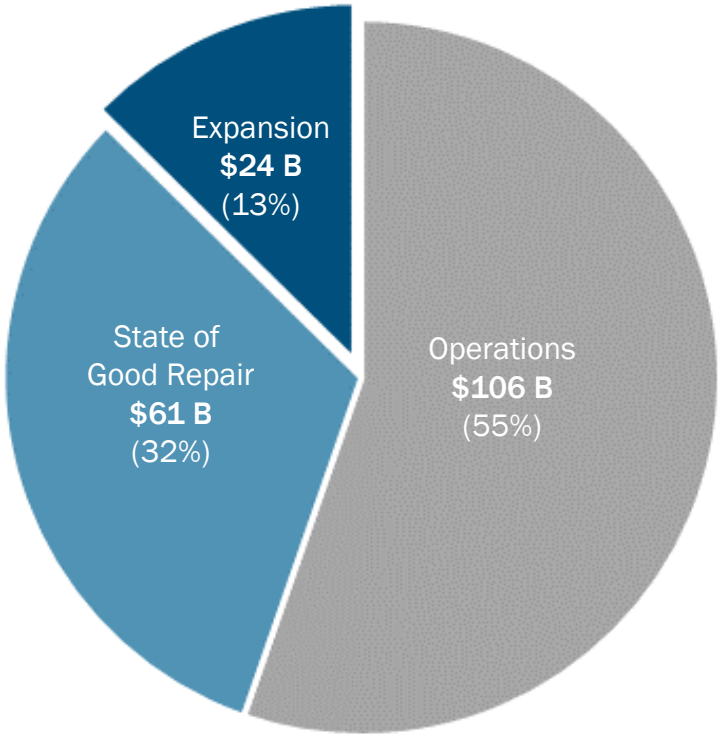
Regional Expenditures: Visualize 2045

Highways



$99.5 Billion
(34% of total expenditures)

Transit



$191.6 Billion
(66% of total expenditures)

Financial Plan: Conclusions

The Financial Analysis demonstrates that the forecast revenues are reasonably expected to be available to implement Visualize 2045

- Demonstrates the region's commitment to maintaining a State of Good Repair for highways and public transportation systems
- Provides for operations and maintenance of the existing transportation system
- Provides for capacity expansion to address forecasted growth in the region's population and economy

The Financial Analysis is Appendix A of the Visualize 2045 plan

visualize2045
A LONG-RANGE TRANSPORTATION PLAN FOR THE NATIONAL CAPITAL REGION

Performance Analysis Summary

Sergio Ritacco
Transportation Planner

Transportation Planning Board
September 21, 2018

Item 8

Air Quality Conformity

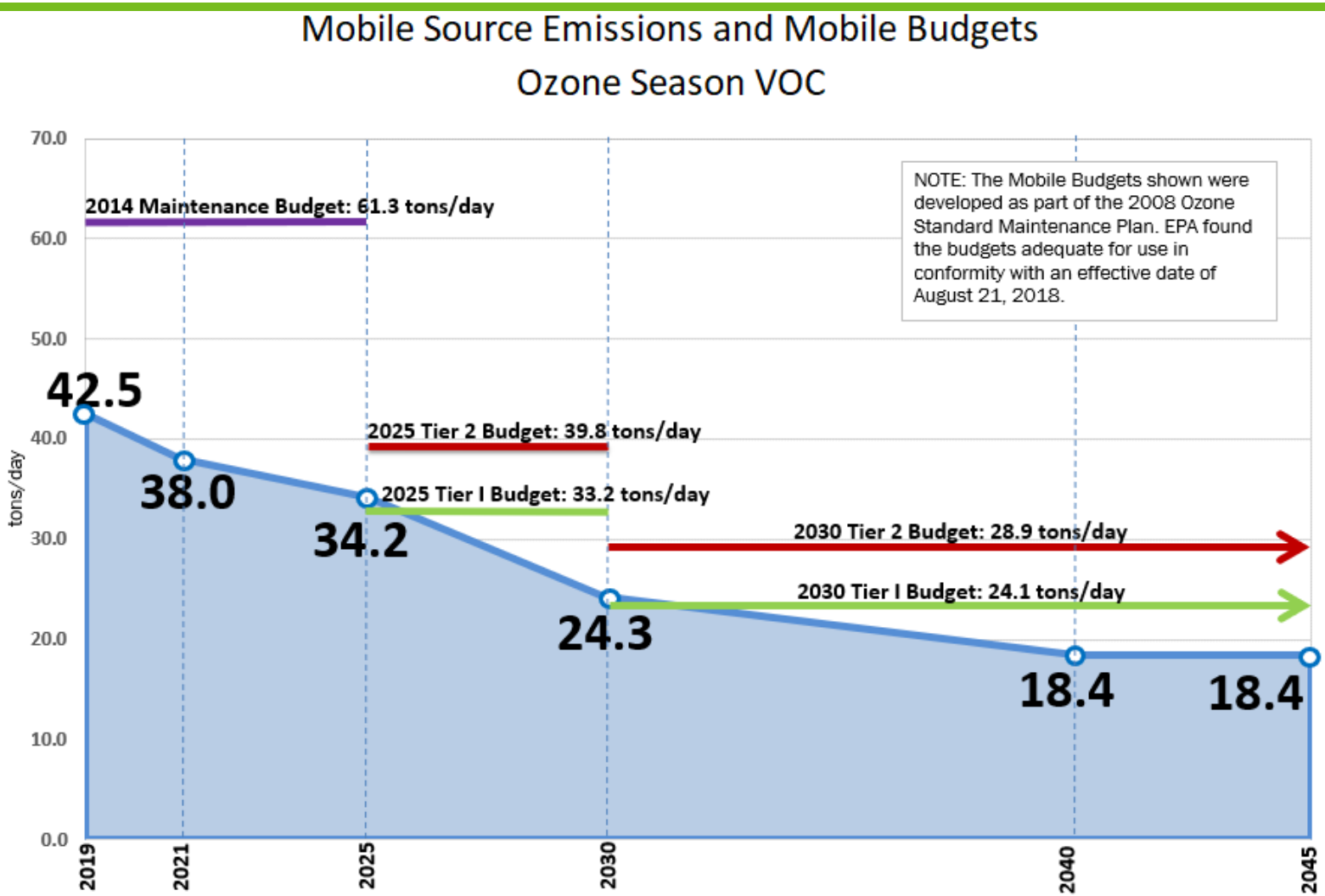
What the region must do to meet Federal Clean Air requirements

- Estimate emissions from the future transportation system
- Compare forecasted emissions to regional limits (mobile budgets)

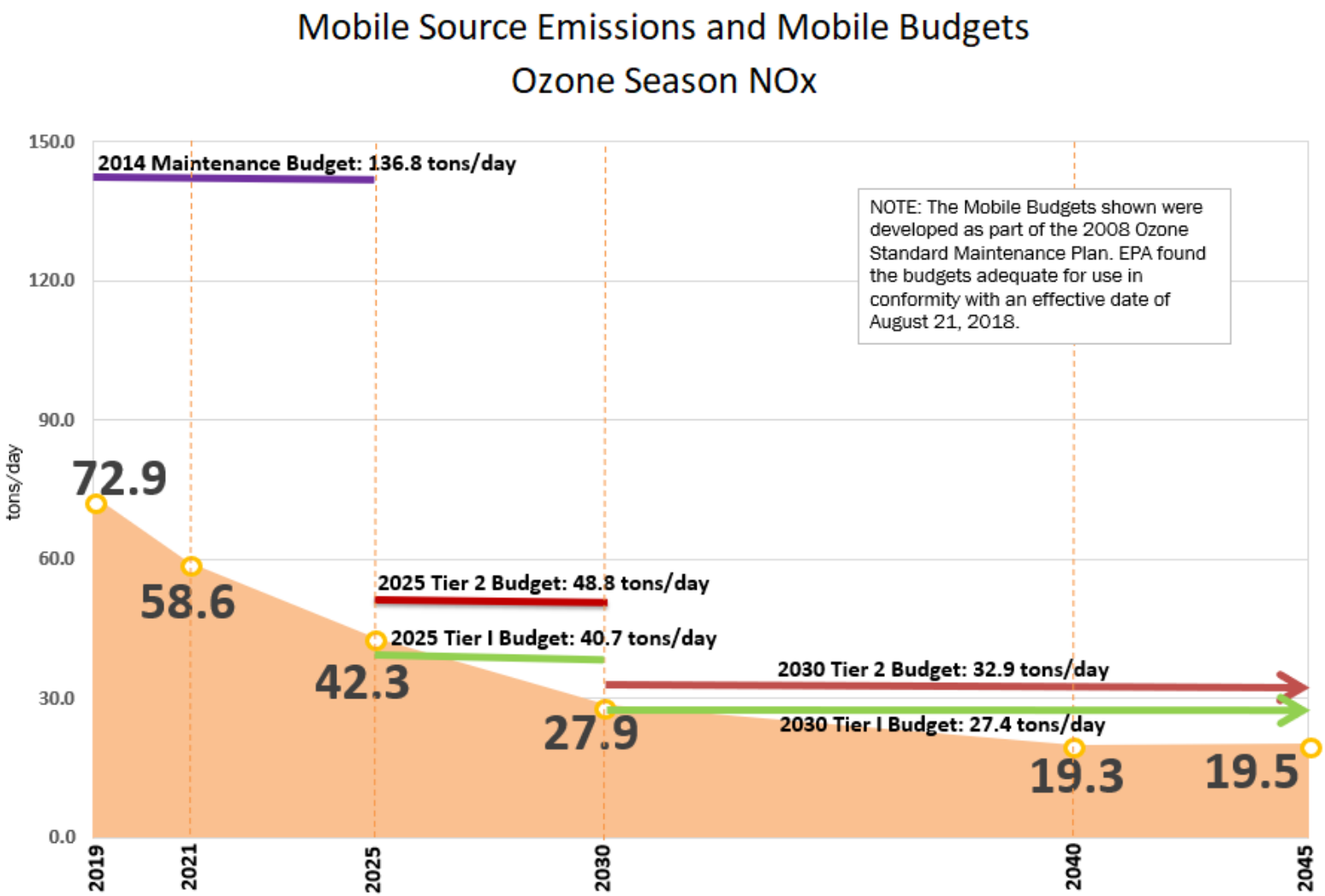
Visualize 2045 conforms to Federal Standards

(Aimee Custis/Flickr)

Air Quality Conformity



Air Quality Conformity



Air Quality Conformity

From the August 6, 2018 Federal Register – Notice of Adequacy Finding for the Mobile Budgets in the 2008 Ozone Maintenance SIP:

"The MVEBs …that include a transportation buffer will be used only as needed in situations where the conformity analysis must be based on *different data, models, or planning assumptions, including, but not limited to, updates to demographic, land use, or project-related assumptions*, than were used to create the first set of MVEBs in the maintenance plan"

Air Quality Conformity

Different in Visualize 2045:

- Cooperative Forecasts
- Vehicle Fleet
- Travel Demand Model
- Project Inputs
- Metrorail Constraint Procedures

Conformity Inputs: Demographics

Cooperative Forecasts*
Round 9.0 → Round 9.1

12K ↑ households (policy action by 3 States to increase housing in the region) in 2045

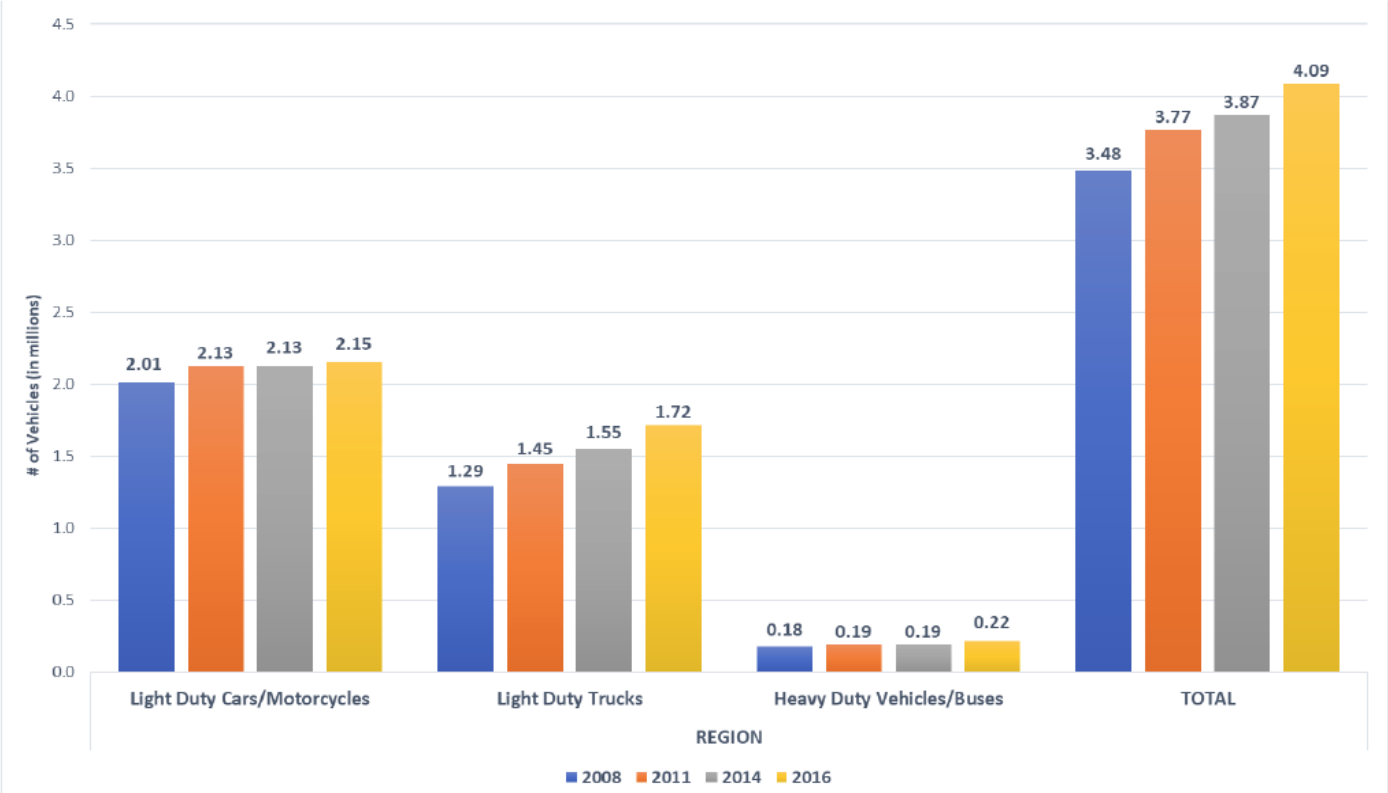
40K ↑ population in 2045

8K ↓ jobs in 2045, but
14K ↑ jobs in 2025
11K ↑ jobs in 2030

*TPB modeled area

Conformity Inputs: Vehicle Fleet

2014 VIN vs 2016 VIN
Historical Growth in Vehicles By Type



* Based on Decoded Records

Conformity Analysis: Travel Model

Travel Demand Model
v2.3.66 → v2.3.75

- Improved accuracy of airport trip modeling
- Enhanced managed lanes modeling

Conformity Inputs: Projects/Programs

2016 CLRP → Visualize 2045

- New Managed Lanes on I-270 and MD Beltway
- VA Beltway Express Lanes Connection with MD Beltway
- New BRT – Five Corridors in Montgomery County
- Metrorail Core Capacity Improvements ($5.4 Billion)*
- US 301 Widening
- Bike Lane Corridors in the District

*Allowed for removal of “transit constraint”

Conformity Results: Sensitivity Test

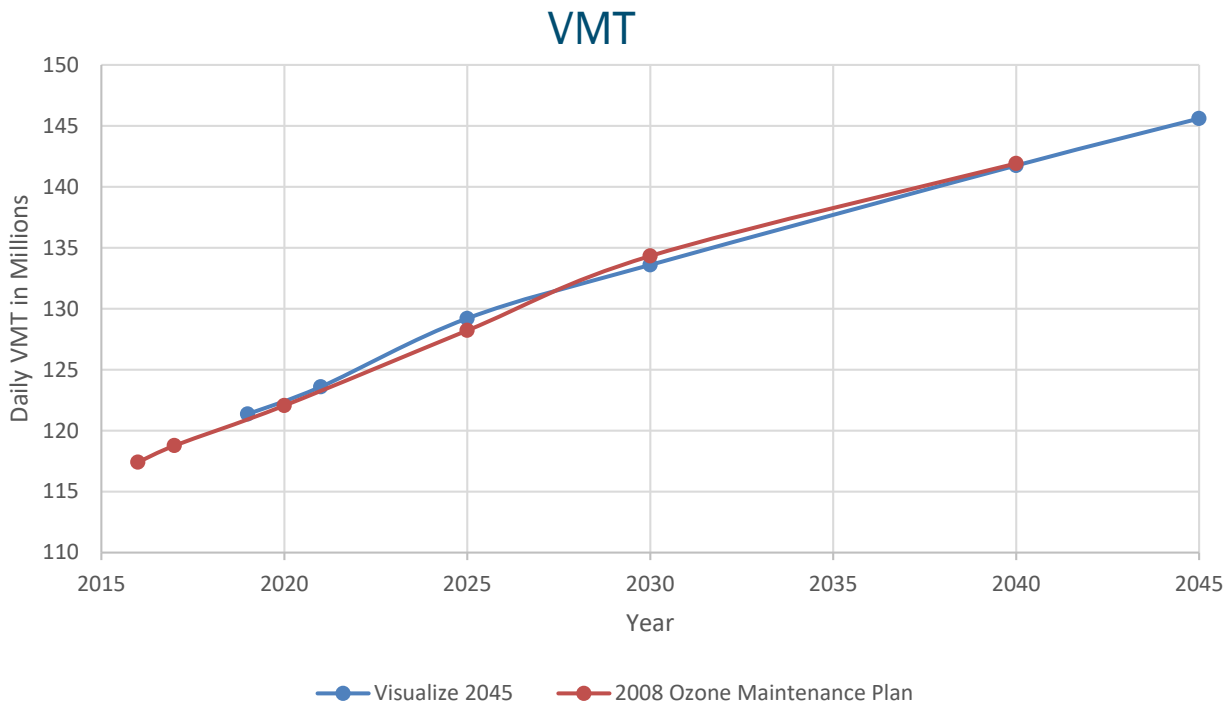
VIN Sensitivity Test: 2025 Analysis Year

EMISSIONS VS TIER 1 MOBILE BUDGETS

		2016 VEHICLE FLEET			2014 VEHICLE FLEET		
	2025 Tier 1 Mobile Budgets (tons/day)	Conformity Analysis (tons/day)	Conformity Analysis Difference (tons/day)	Conformity Analysis Percent Diff	VIN Sensitivity Test (tons/day)	Sensitivity Test Difference (tons/day)	Sensitivity Test Percent Diff
VOC	**33.2**	34.188	0.988	3%	33.608	0.408	1%
NOx	**40.7**	42.321	1.621	4%	40.5	-0.2	-0.5%

Conformity Results: MP vs Visualize

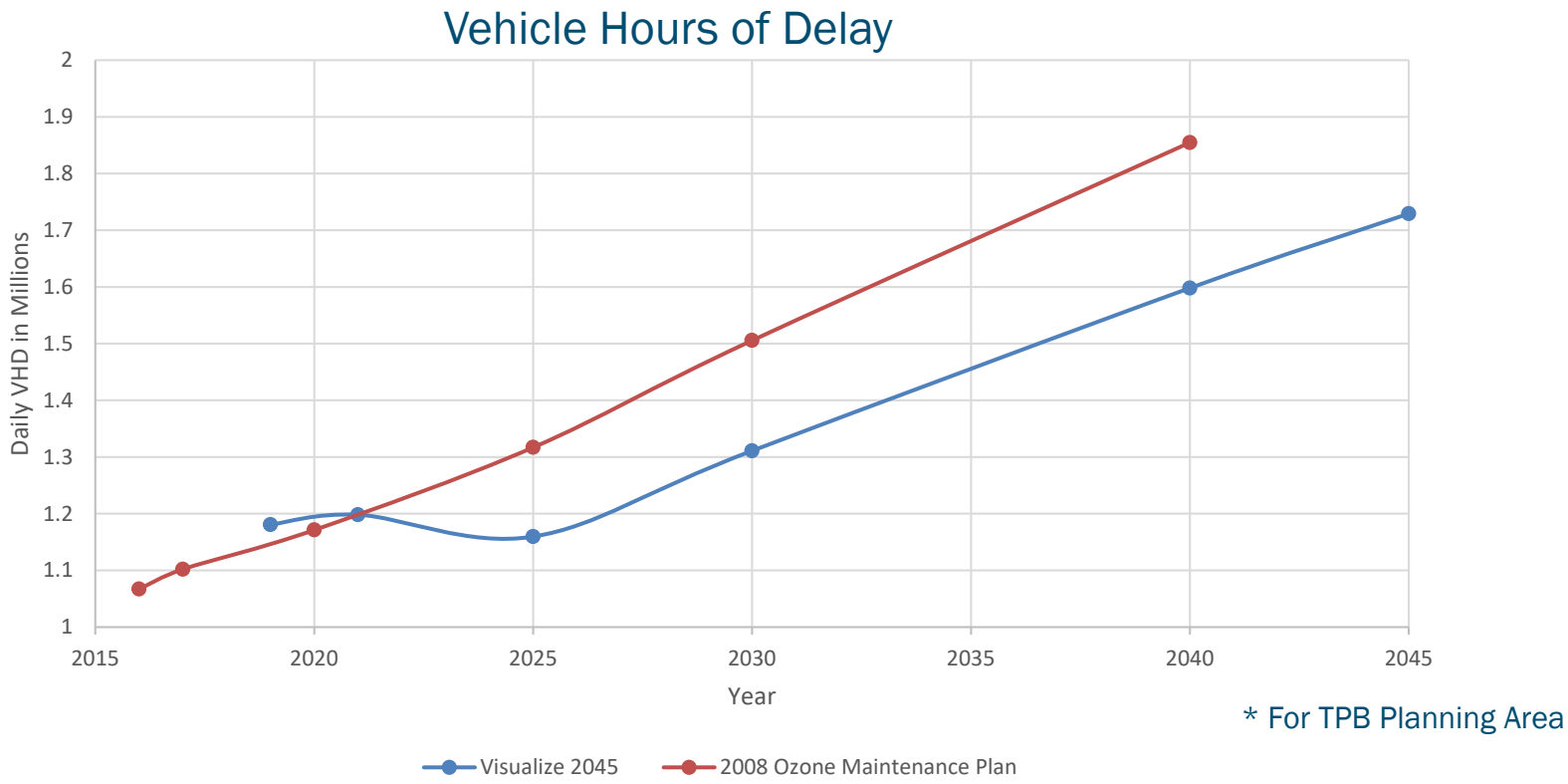
TRAVEL DEMAND OUTPUT*
Visualize 2045 vs 2008 Ozone Maintenance Plan



* For TPB Planning Area

Conformity Results: MP vs Visualize

TRAVEL DEMAND OUTPUT*
Visualize 2045 vs 2008 Ozone Maintenance Plan



Conformity Results: MP vs Visualize

TRAVEL DEMAND OUTPUT*

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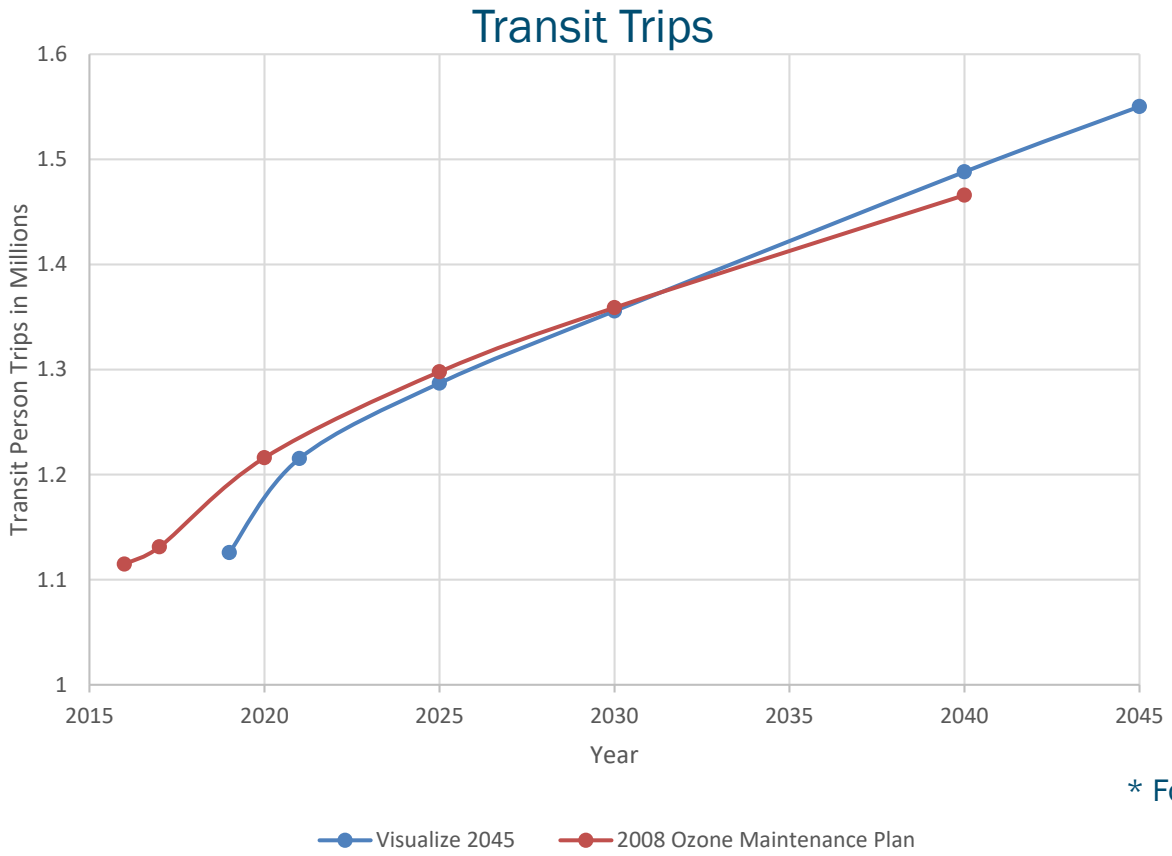
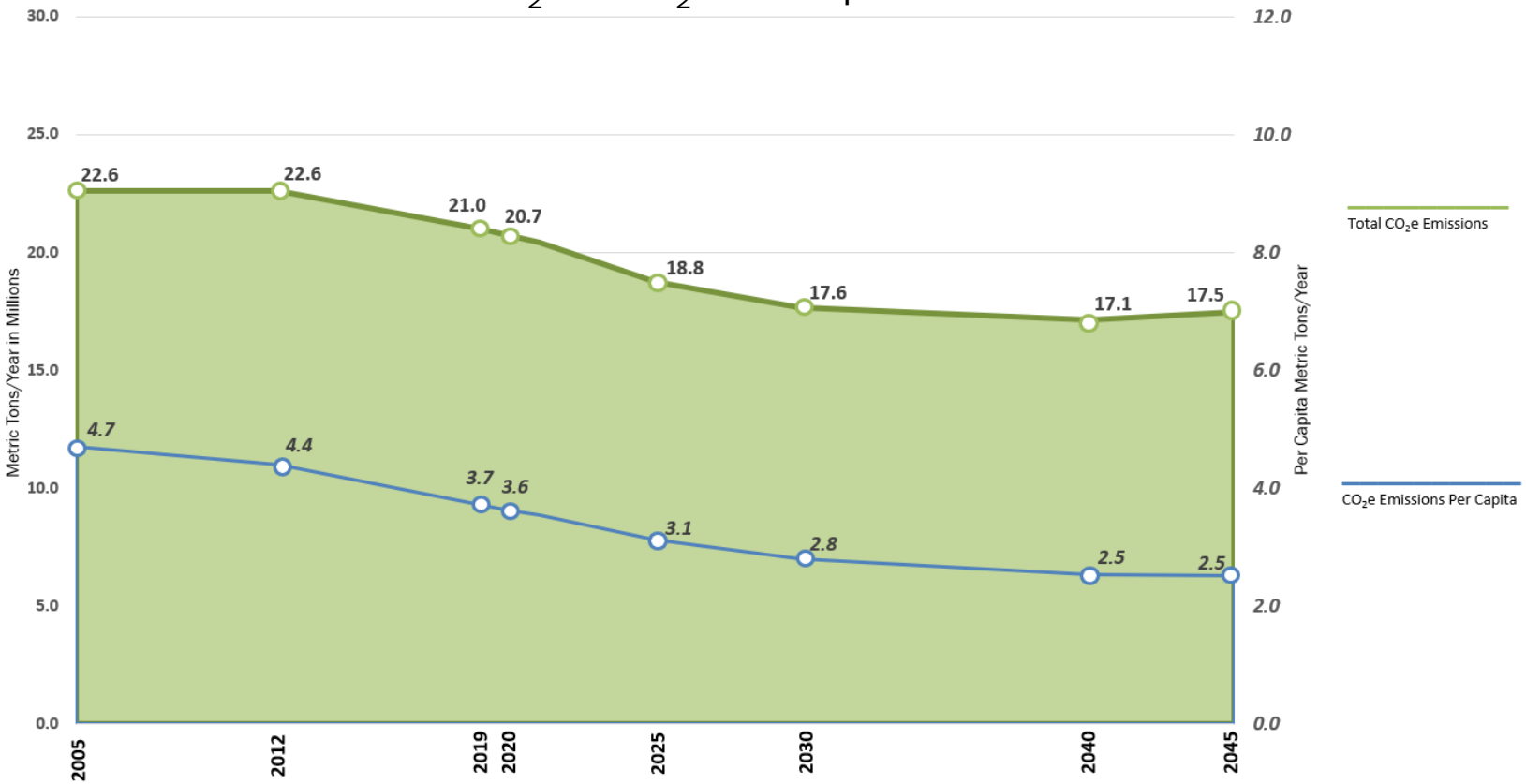


* For TPB Planning Area

Greenhouse Gases

Visualize 2045
Greenhouse Gas
Mobile Source Emissions
CO_2 and CO_2 e Per Capita

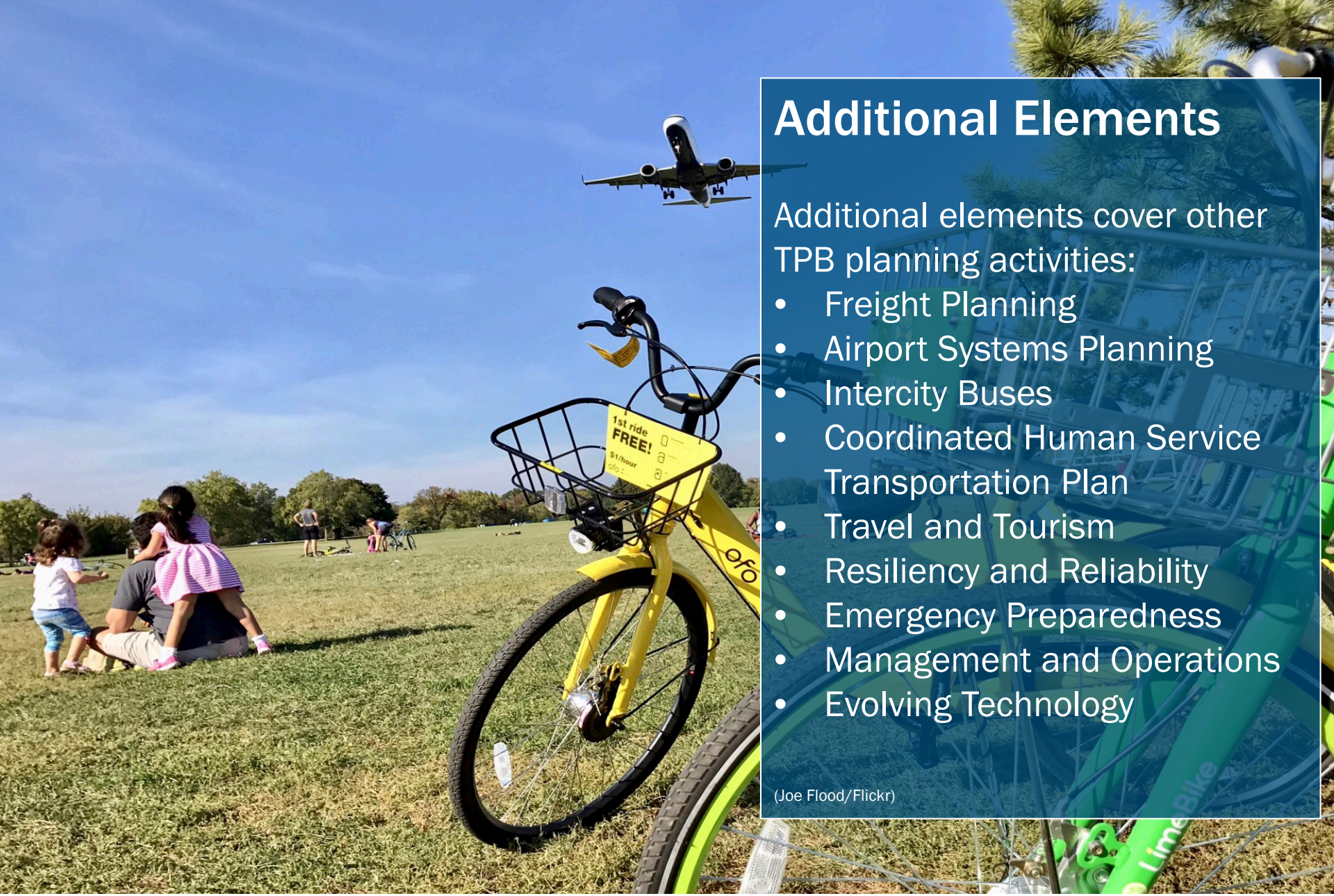


Performance Planning

Performance Based Planning and Programming, the Congestion Management Process, and Safety

- TPB champions improvements in the ways the transportation system is managed and operated
- Federal laws require target setting and progress reports through PBPP
- Visualize 2045 includes these elements of performance planning as drivers of decision making

(Geoff Livingston/Flickr)



Additional Elements

Additional elements cover other TPB planning activities:

- Freight Planning
- Airport Systems Planning
- Intercity Buses
- Coordinated Human Service Transportation Plan
- Travel and Tourism
- Resiliency and Reliability
- Emergency Preparedness
- Management and Operations
- Evolving Technology

(Joe Flood/Flickr)

Bicycle and Pedestrian Planning

- TPB's Bicycle and Pedestrian Plan
- Street Smart
- Aspirational initiatives:
  - Complete the National Capital Trail
  - Improve Walk and Bike Access to Transit
- Complete Streets Policy
- TLC and TAP

Land-Use Coordination

Land-use and transportation are complex and intertwined

- TPB staff work closely with COG's Department of Community Planning and Services
- Activity Centers - locations that will accommodate the majority of the region's future growth, including existing urban centers, priority growth areas, traditional towns, and transit hubs
- Transportation/Land-Use Connections (TLC) program
- Aspirational initiative focused on bringing jobs and housing closer together

Equity and Inclusion

- Equity Emphasis Areas (EEAs) adopted by TPB in 2017:
  - Small geographic areas that have concentrations of low-income and/or minority populations based on Census data
- EEAs can be used to
  - Examine demographic patterns
  - Analyze the constrained element of the plan for disproportionate and adverse impacts
- Access for All Advisory Committee
  - Advises the TPB on transportation issues, programs, policies, and services important to traditionally underserved communities

Transportation Demand Management (TDM)

- Commuter Connections is the TPB's TDM program
  - Creates awareness of alternatives to driving alone
  - Promotes and encourages TDM strategies such as employer-based parking cash-out, transit/vanpool benefits, teleworking, and flexible work schedules
- One aspirational initiative focuses on increasing the use of telework and other modes of travel besides driving alone

(Fort George G. Meade Public Affairs/Flickr)

Environmental Consultation and Mitigation

A new interactive map provides a regional-level resource to inform the relationship between the transportation and environmental concerns.

mwcog.org/EnviroInventoryMap

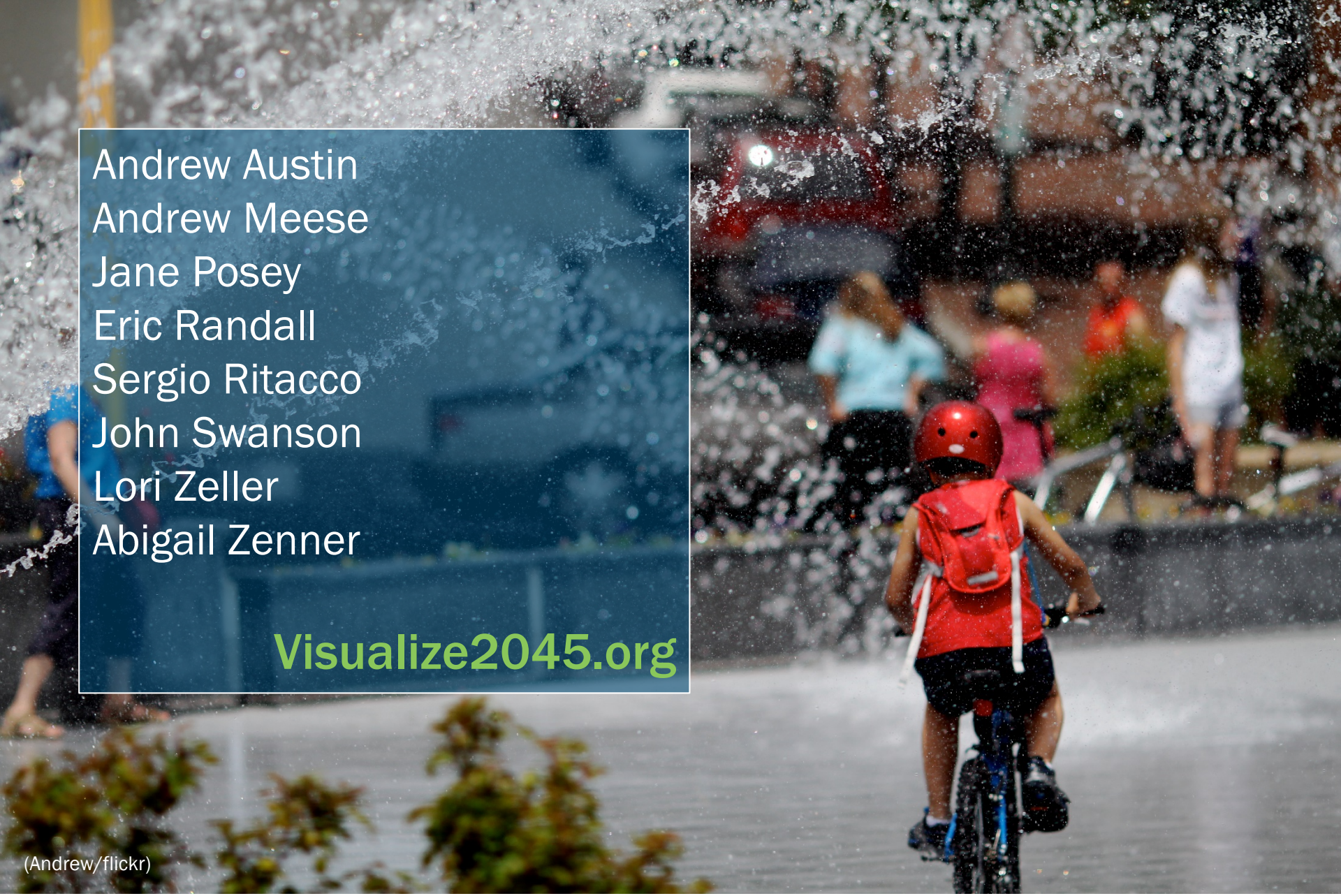
Public Participation

- Public Input Survey
  - Two groups of survey respondents
  - Outreach included 15 survey events, social media, and other promotion
- Public Forums across the region
  - Focus on the aspirational initiatives where input is most needed
- Open Houses
  - 3 Open Houses so people in the region can learn more about the plan

Public Participation

What people said:

- Frustrations with system reliability
- General familiarity with the aspirational initiatives
- Desire to move more quickly in implementing changes
- Concerns about equity and regional balance
- Calls for thinking “outside the box”



(Andrew/flickr)

visualize2045
A LONG-RANGE TRANSPORTATION PLAN FOR THE NATIONAL CAPITAL REGION

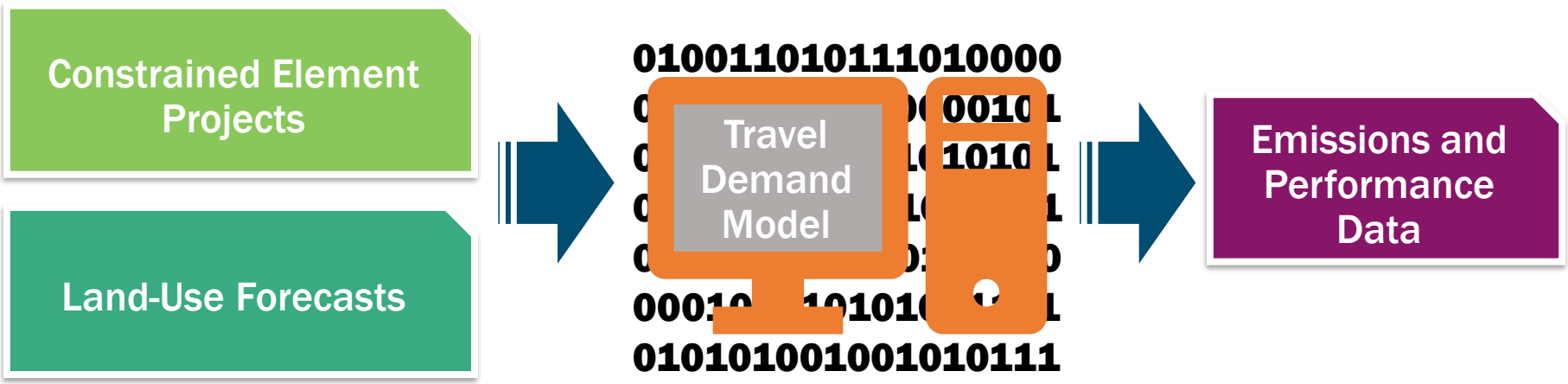
Performance Analysis Summary

Sergio Ritacco
Transportation Planner

Transportation Planning Board
September 21, 2018

Item 8

What is the Performance Analysis?



- Round 9.1 Cooperative Land-Use Forecasts
- Version 2.3.75 Travel Demand Model
- Analysis of TPB Planning Area
- 2016 Vehicle Registration Data
- EPA's MOVES 2014a Mobile Emissions Model

Comparison of Three Scenarios

Today (2019)

Today's households and jobs

Projects on the ground in 2019

2045 No-Build

Grow but don't build

Forecast growth for 2045 households and jobs

No new projects beyond what is on the ground in 2019

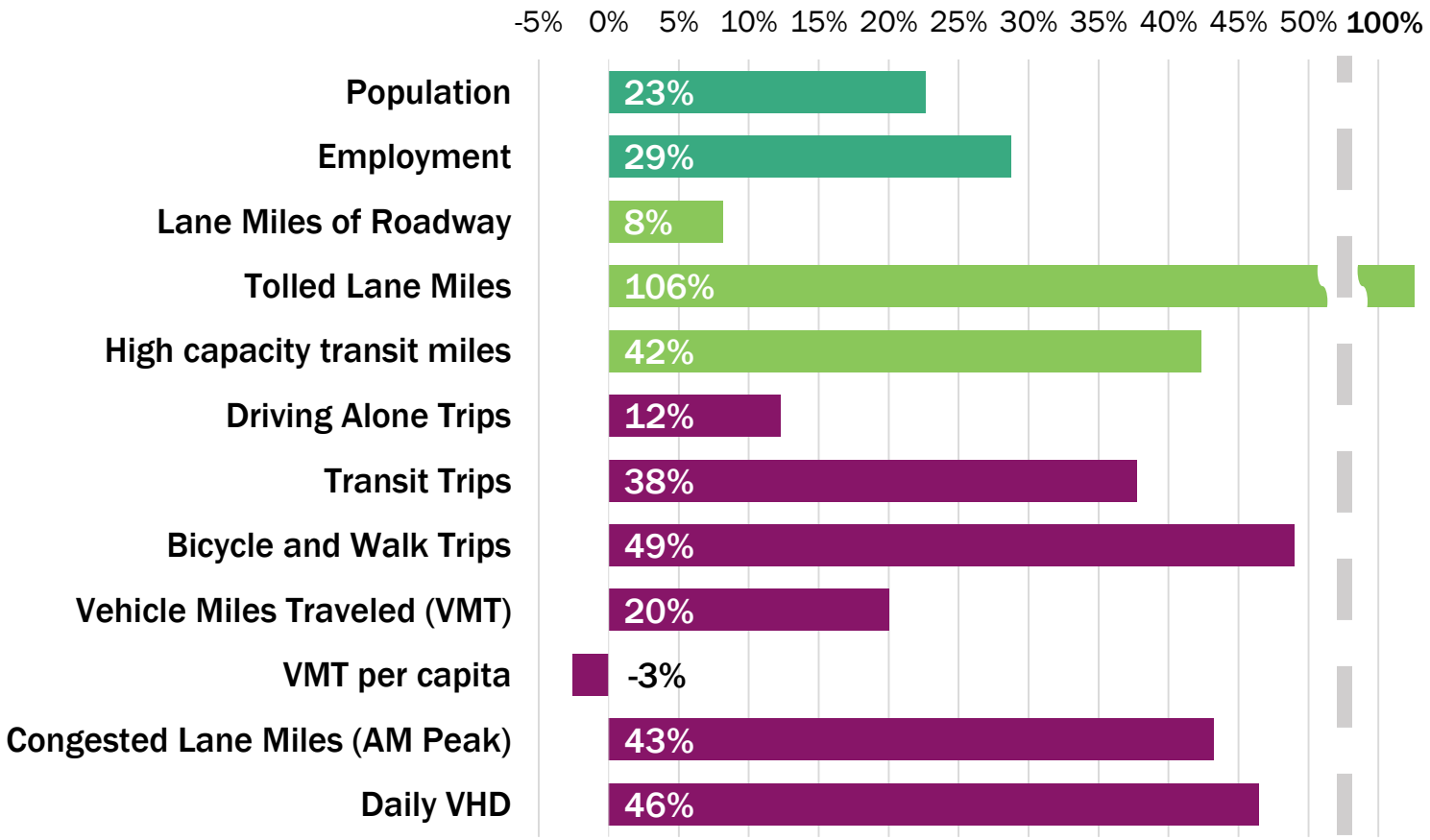
2045 Planned Build

Grow and build

Forecast growth for 2045 households and jobs

All constrained element projects would be built by 2045

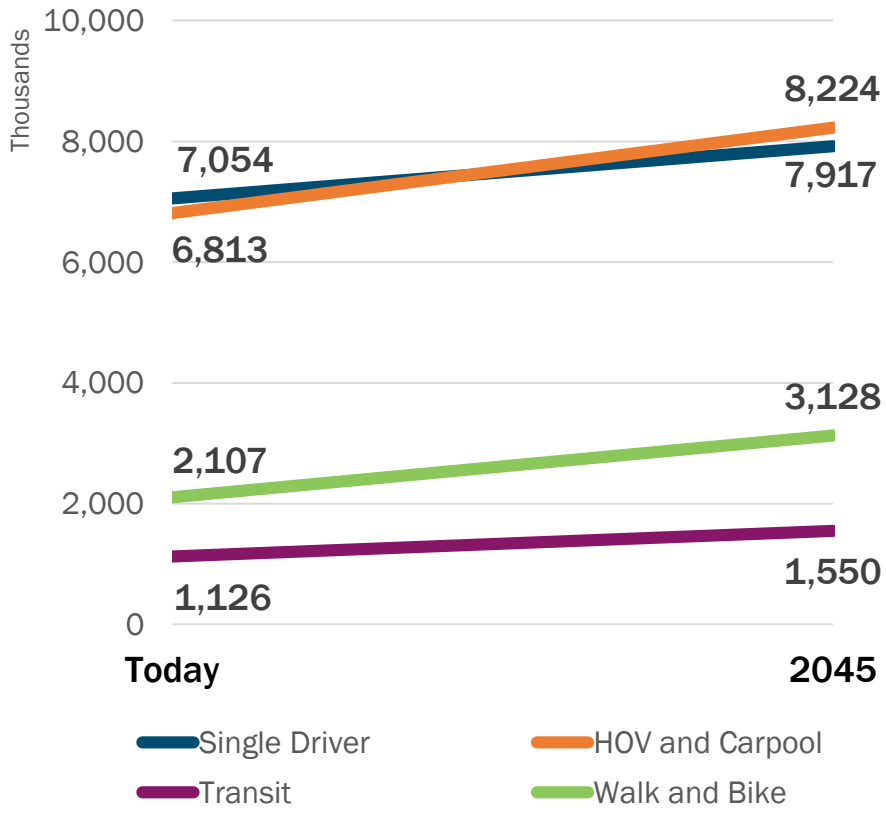
Performance Overview, % Change 2019 – 2045 Build



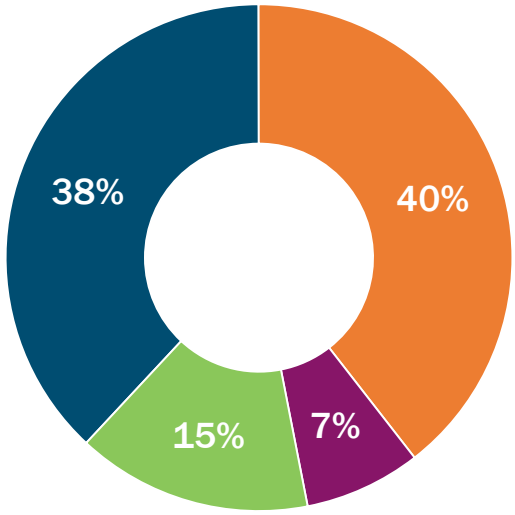
How does the plan provide for a comprehensive range of transportation options?

All Trips: HOV surpasses Driving Alone

HOV trips will be more common than driving alone.
Walk and Bicycle trips ↑ by 49% and Transit trips ↑ by 38%.

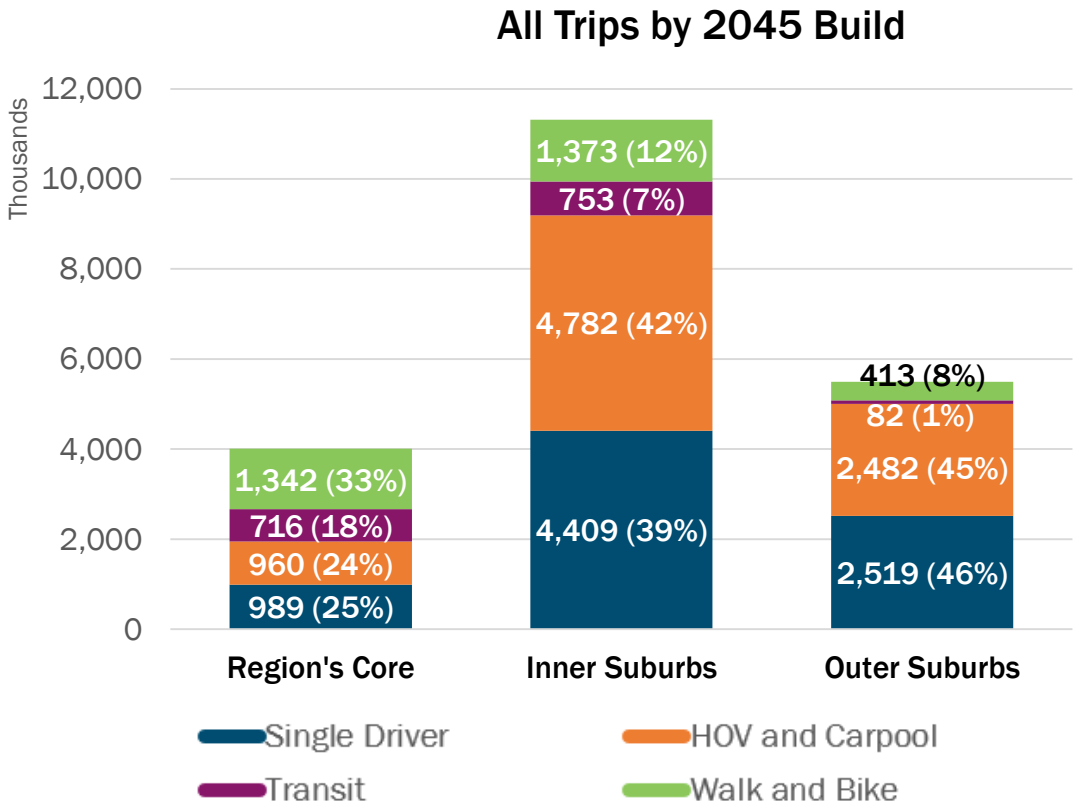


Mode Share in 2045 Build



All Trips: Geographic Differences

Majority of trips will continue to be generated in the Inner Suburbs.
Walk, Bike, and Transit shares decline the further one is from the core.



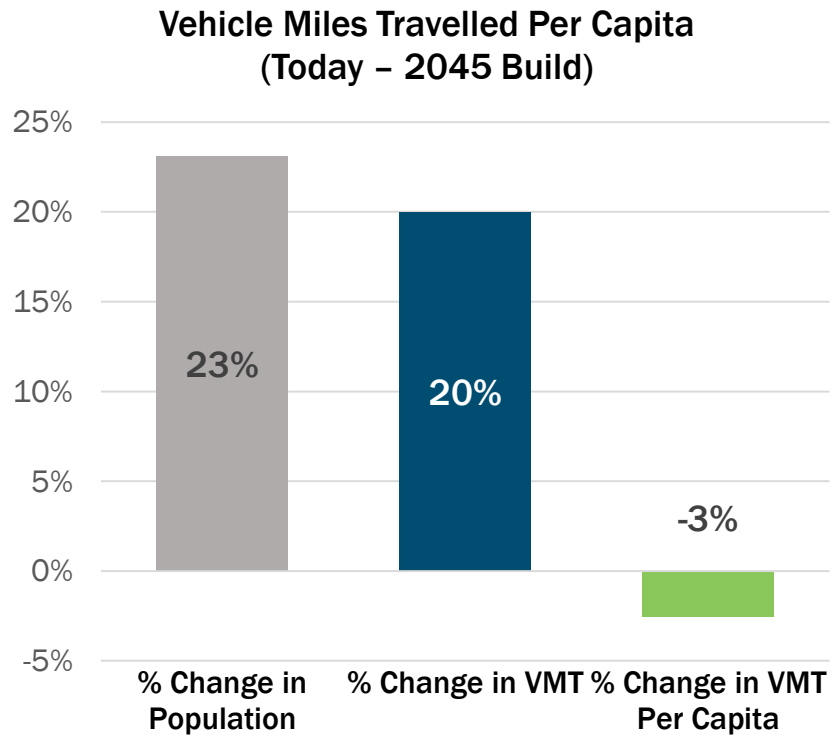
Regional Core:
District of Columbia
Arlington Co.
Alexandria

Inner Suburbs:
Montgomery Co.
Prince George's Co.
Fairfax Co.
Fairfax City
Falls Church

Outer Suburbs:
Charles Co.
Frederick Co.
Prince William Co.
Loudoun Co.
Manassas
Manassas Park
Fauquier Co.
(Urbanized Area)

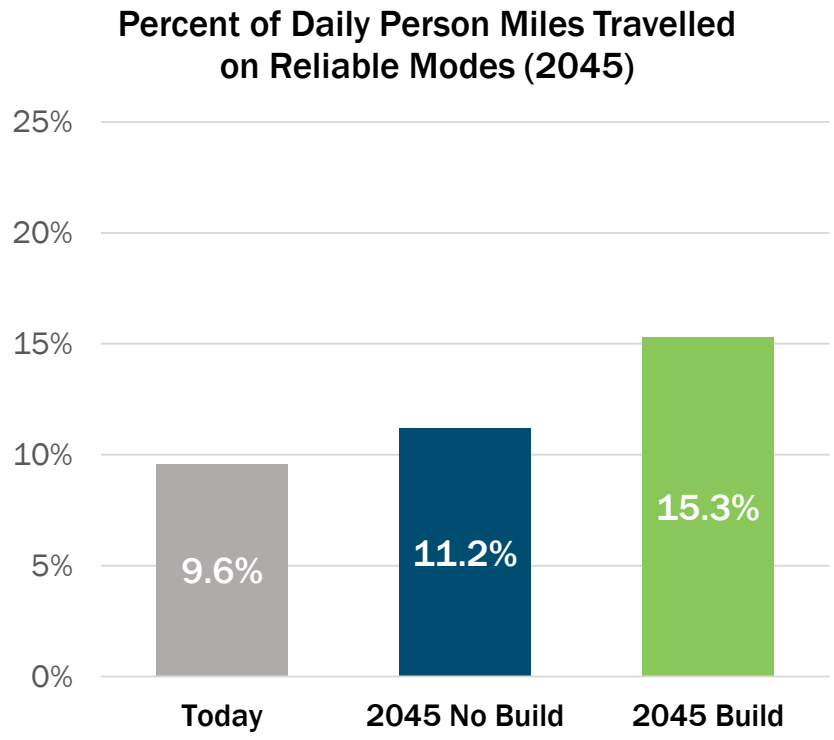
Average driving per person decreases

Total daily driving in the region is expected to grow but at a rate lower than population growth.



Travel on reliable modes will increase

A 59% increase in the proportion of daily travel on reliable modes in 2045 Build relative to Today suggests people will use modes with greater reliability if available.

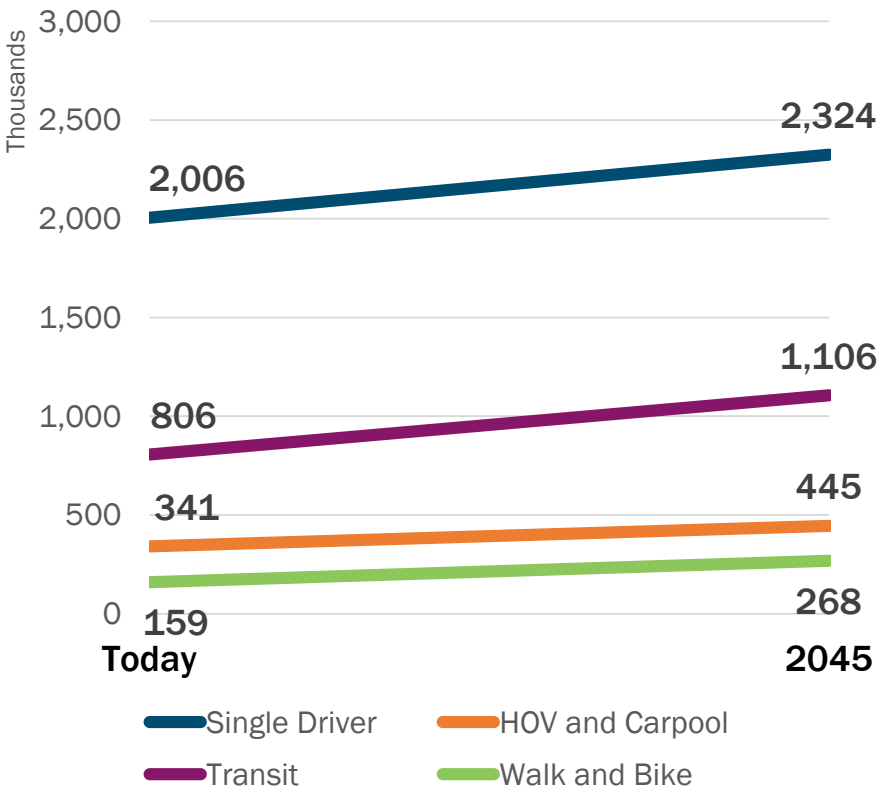


Includes express toll lanes with dynamic toll rates (HOT), HOV lanes, the ICC, Dulles Airport Access Road, Metrorail, Commuter Rail, Light Rail, Streetcar, Bus Rapid Transit, long-haul express buses, and bike and pedestrian

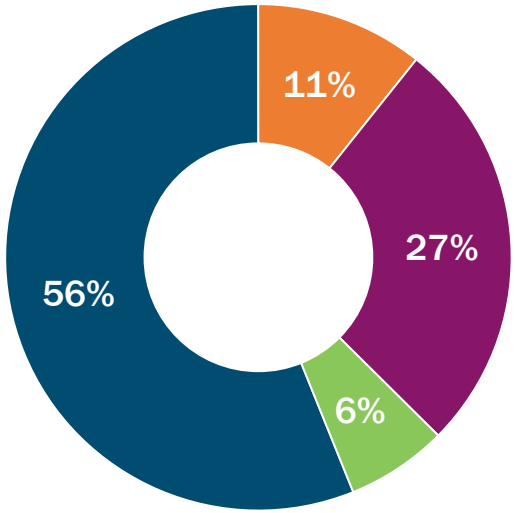
How does the plan affect commuting to work?

Work Trips: Driving alone predominates

Though Walk and Bicycle trips ↑ by 68% and Transit trips ↑ by 37%.

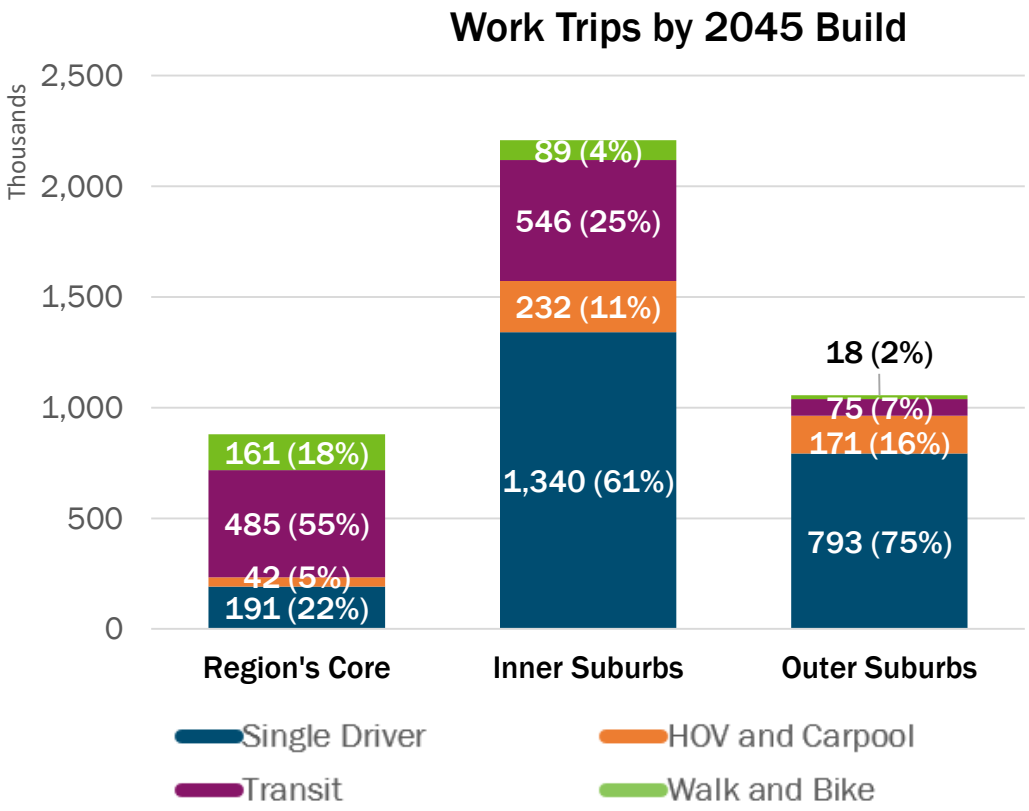


Mode Share in 2045 Build



Work Trips: Geographic Differences

In the Region Core workers are more likely to use transit. Outside the core driving alone is the predominant mode.



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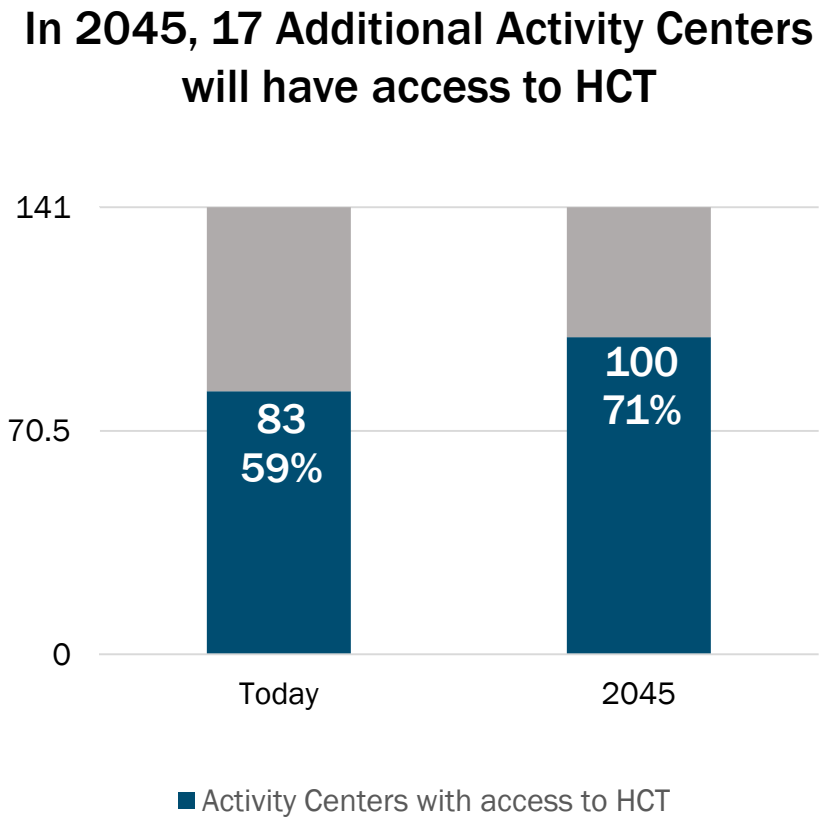
Prince William Co.
Loudoun Co.
Manassas
Manassas Park
Fauquier Co.
(Urbanized Area)

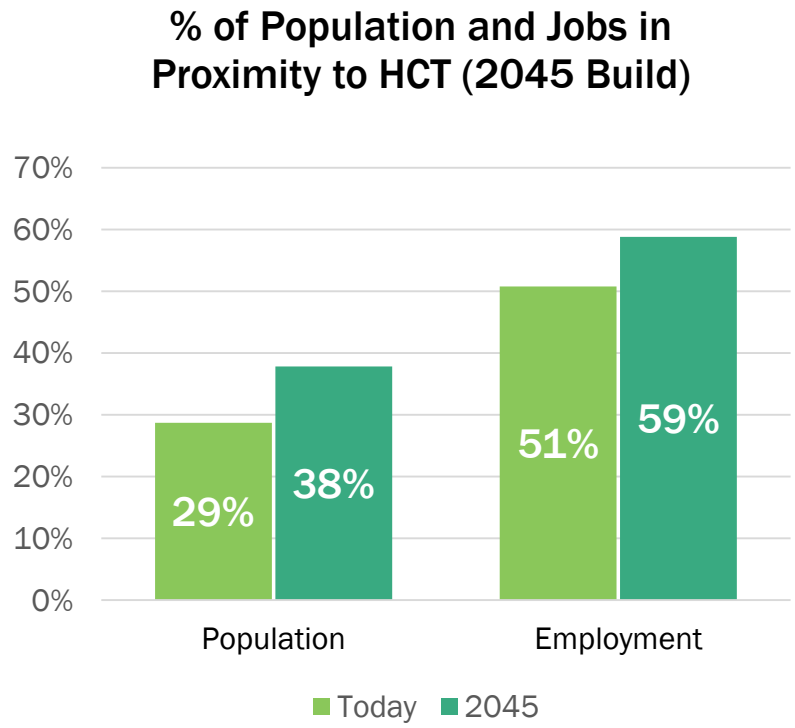
How does the plan affect transit access and connectivity?

Increase in People and Jobs close to High Capacity Transit (HCT)



- "Proximity" defined as within one mile of rail or within a ½ mile of BRT
- "High-capacity transit" defined to include Metrorail, commuter rail, streetcar, light rail or bus rapid transit.

Increase in People and Jobs close to High Capacity Transit (HCT)



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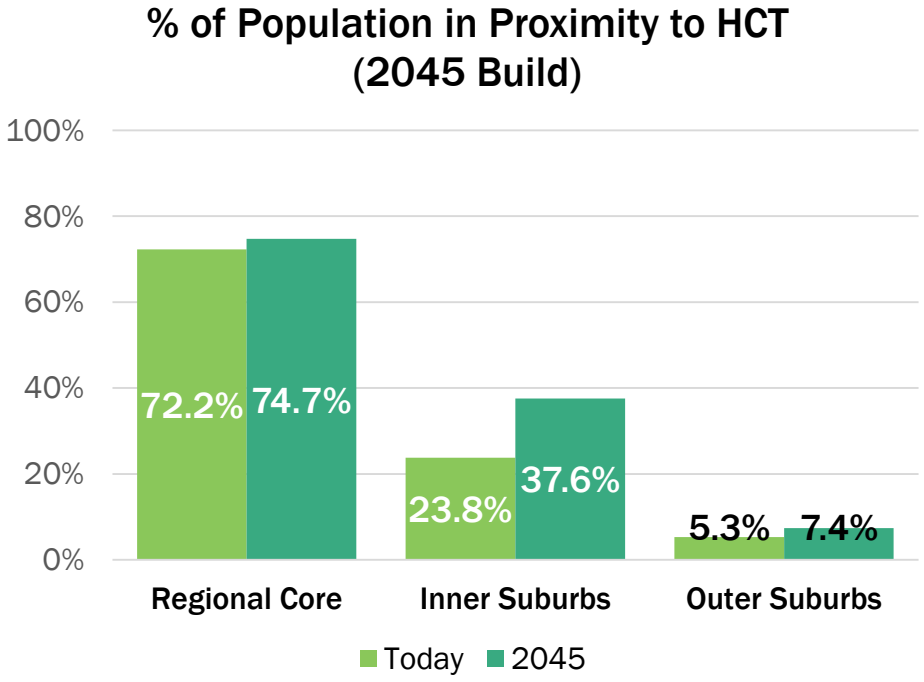
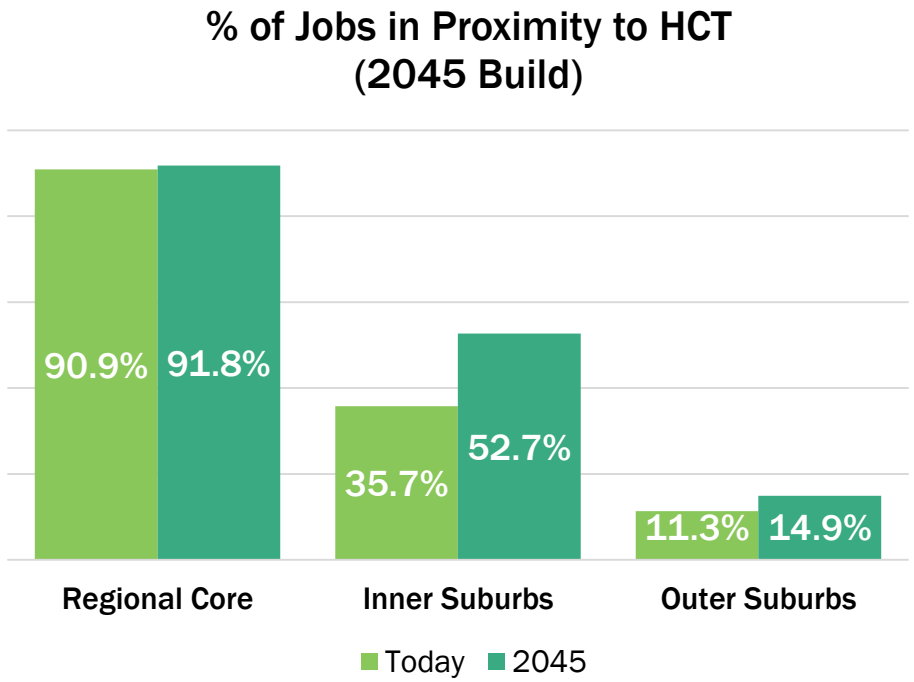
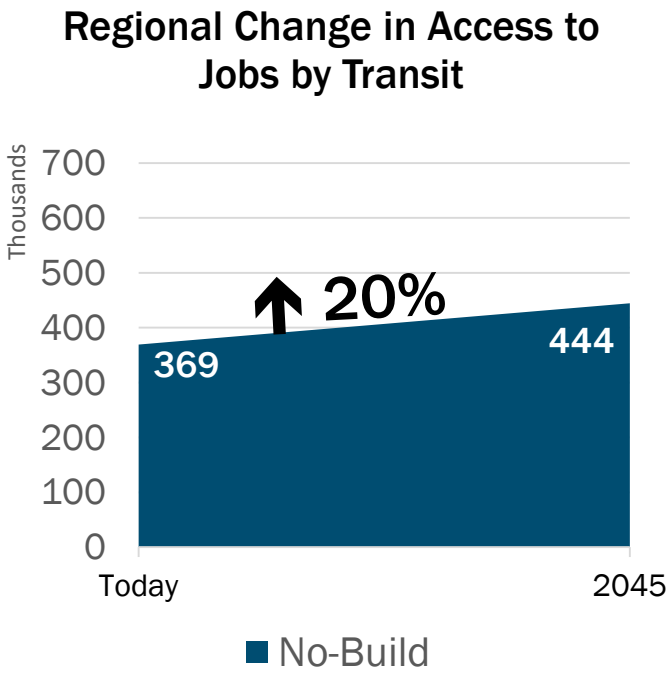
Increase in People and Jobs close to High Capacity Transit (HCT)



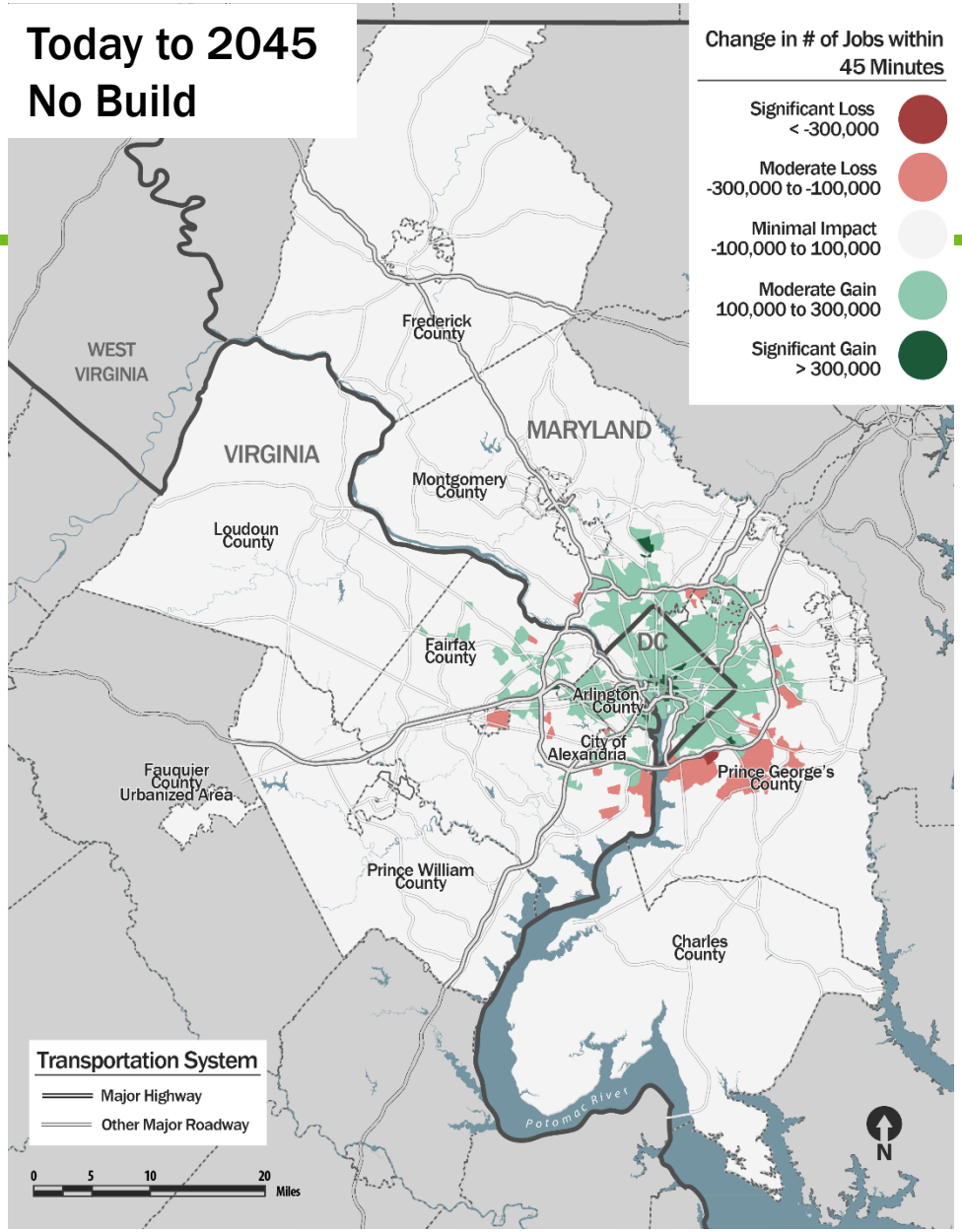


- "Proximity" defined as within one mile of rail or within a ½ mile of bus rapid transit (BRT).
- "High-capacity transit" defined to include Metrorail, commuter rail, streetcar, light rail or BRT.

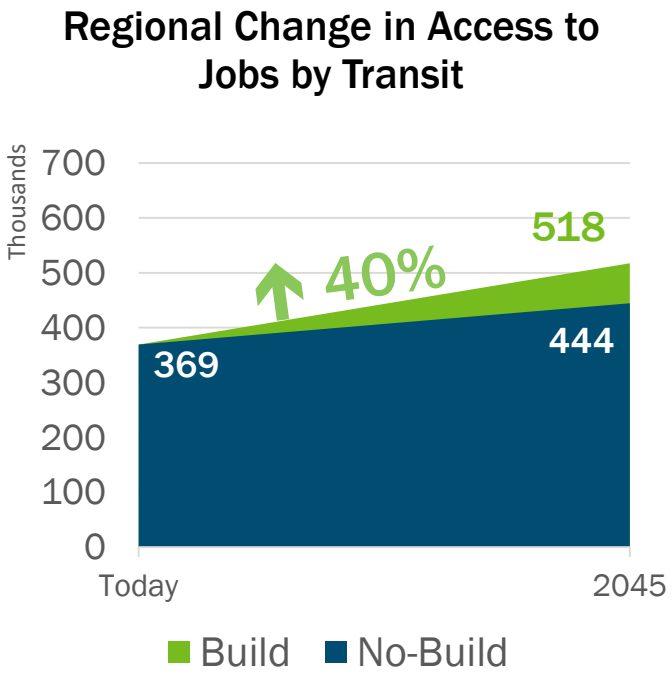
Change in Access to Jobs by Transit



These numbers represent the average number of jobs accessible via transit within a 45-minute commute based on where people live.



Change in Access to Jobs by Transit



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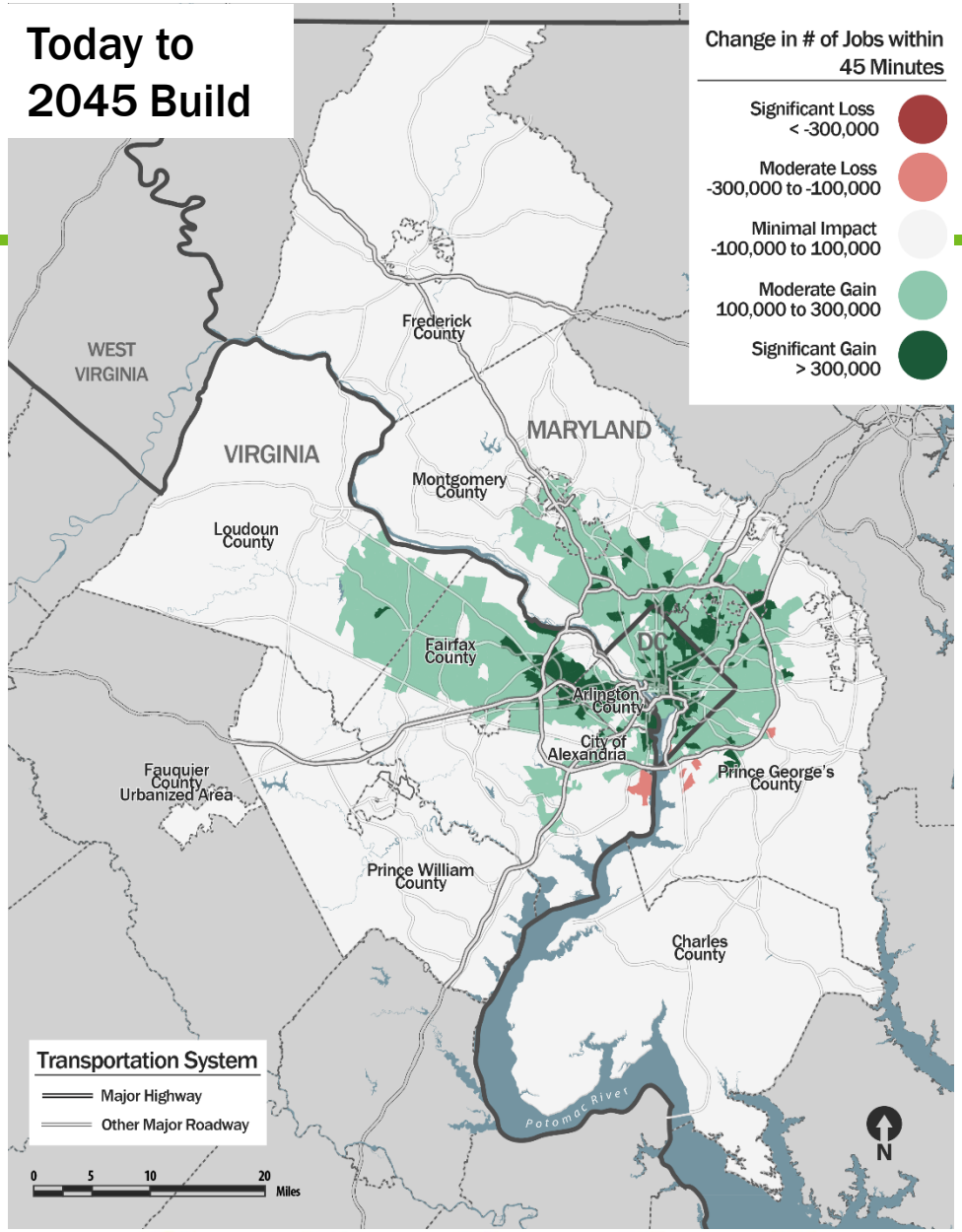
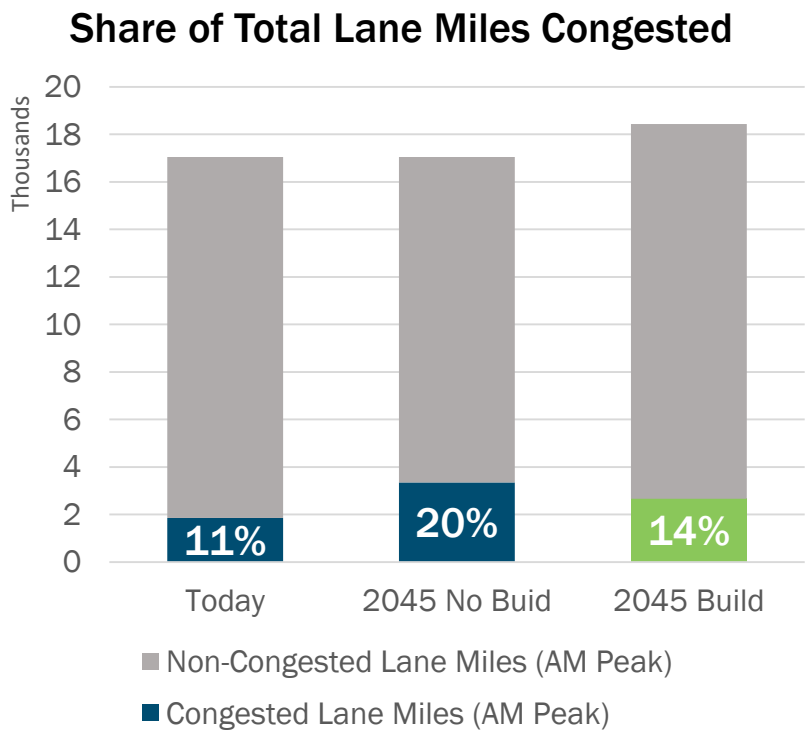


How will roadway congestion change?

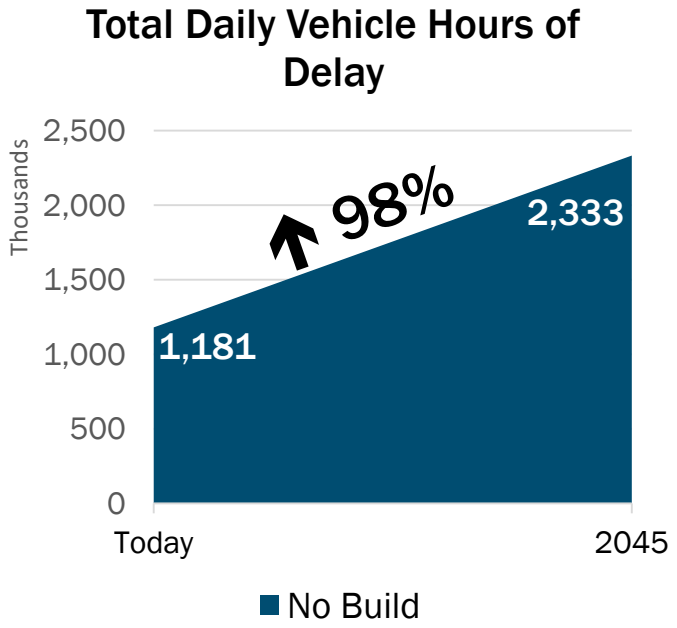
System-wide roadway congestion will increase

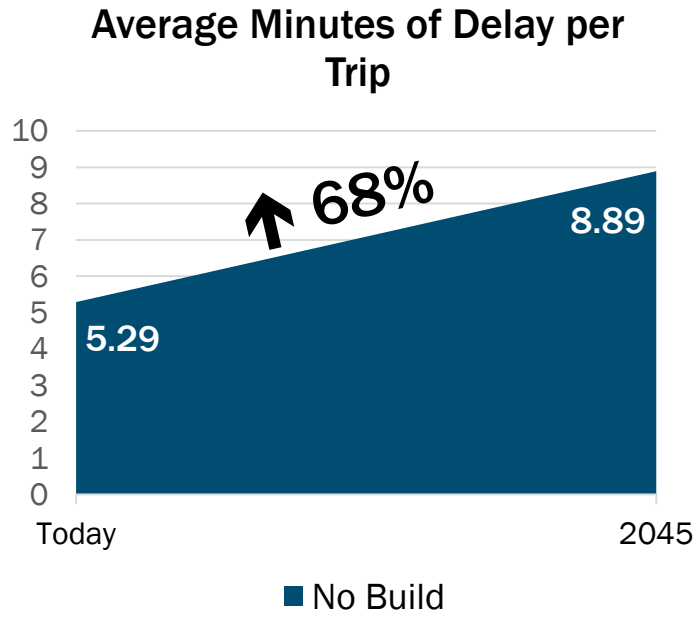
- By 2045, congested lane miles during the AM peak will increase from 1,857 to 2,660, a 43% increase to Today.
- Share of lane miles congested makes up a small but growing percent of roadways.
- Congested lane miles will be 21% lower than in No Build scenario (*Grow but don't build*).



Lost time in traffic

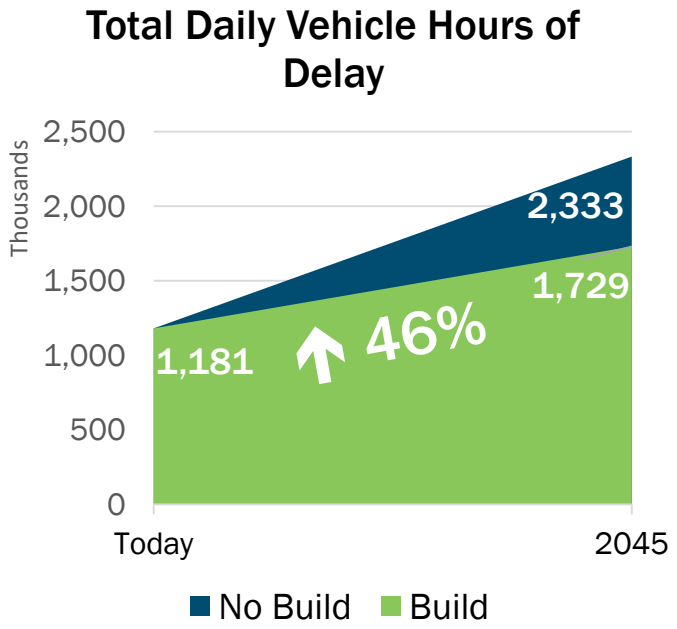
If we grow and don't build, total vehicle hours of delay will double and avg. delay per trip will grow by 3 mins 30 secs.

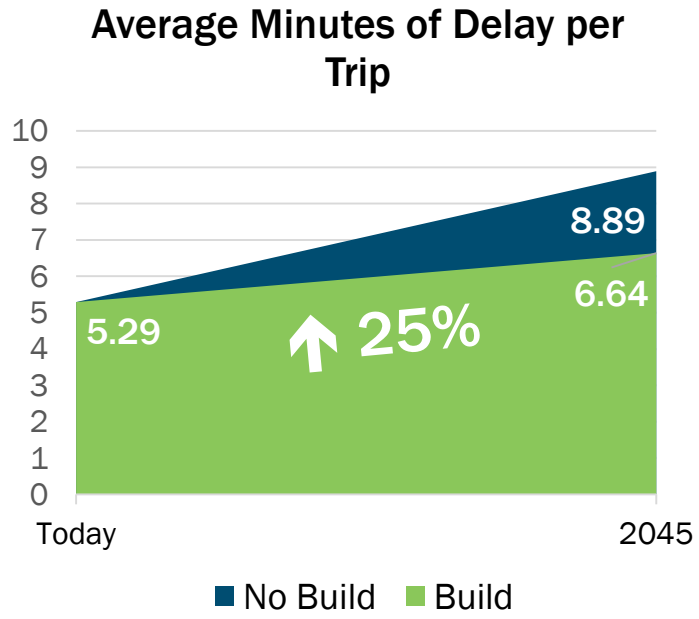




Lost time in traffic

If we grow and build what is planned, total vehicle hours of delay and avg. delay per trip will still grow though less severe.

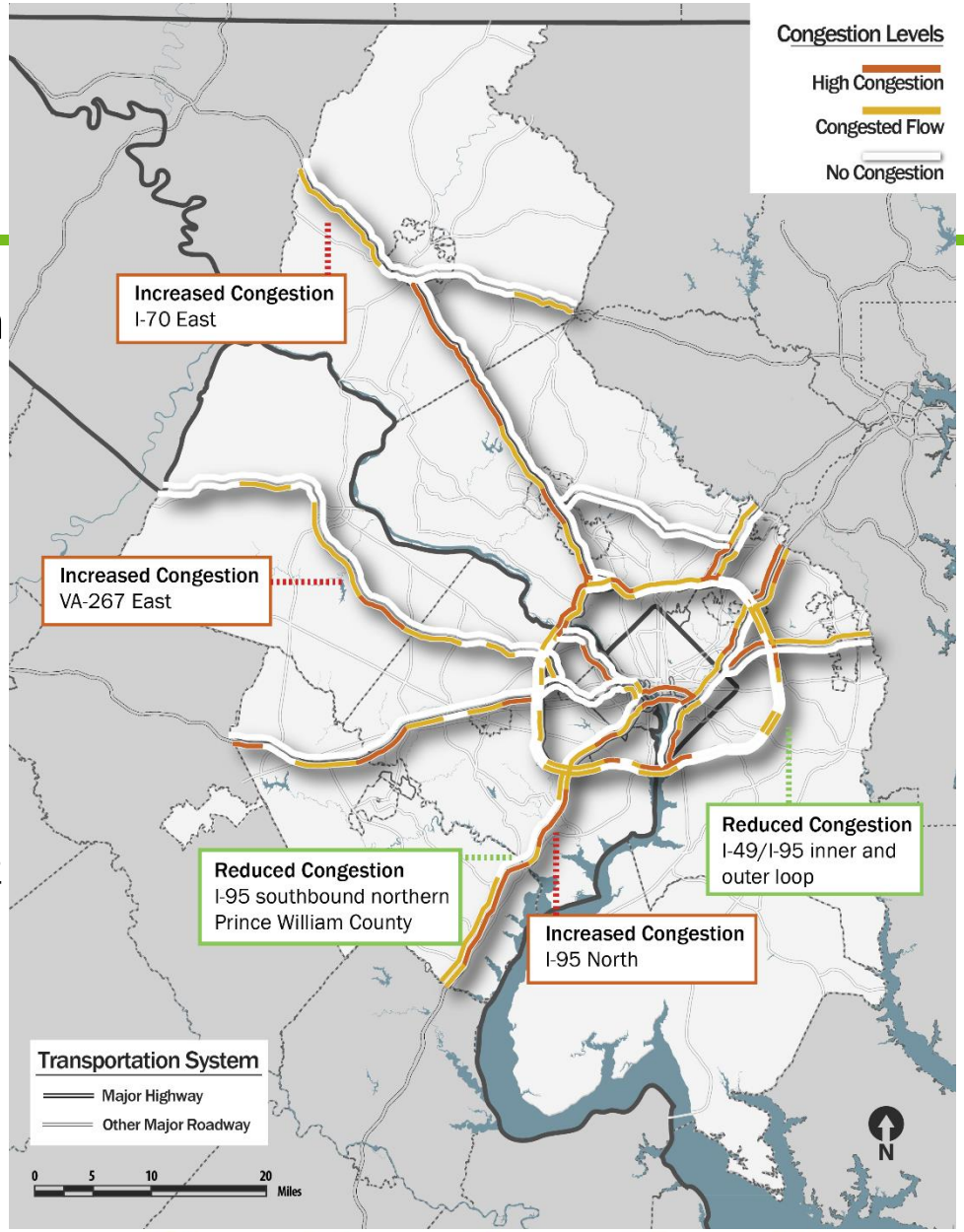




Roadway congestion

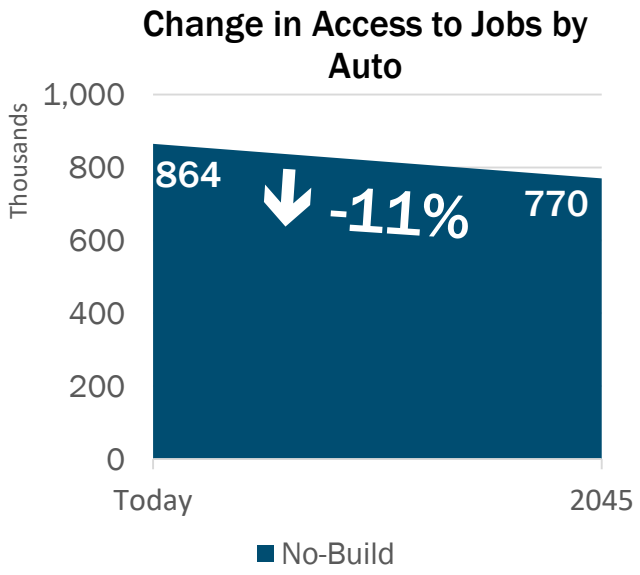
2045 Major Highway Congestion (AM Peak, General Purpose Lanes)

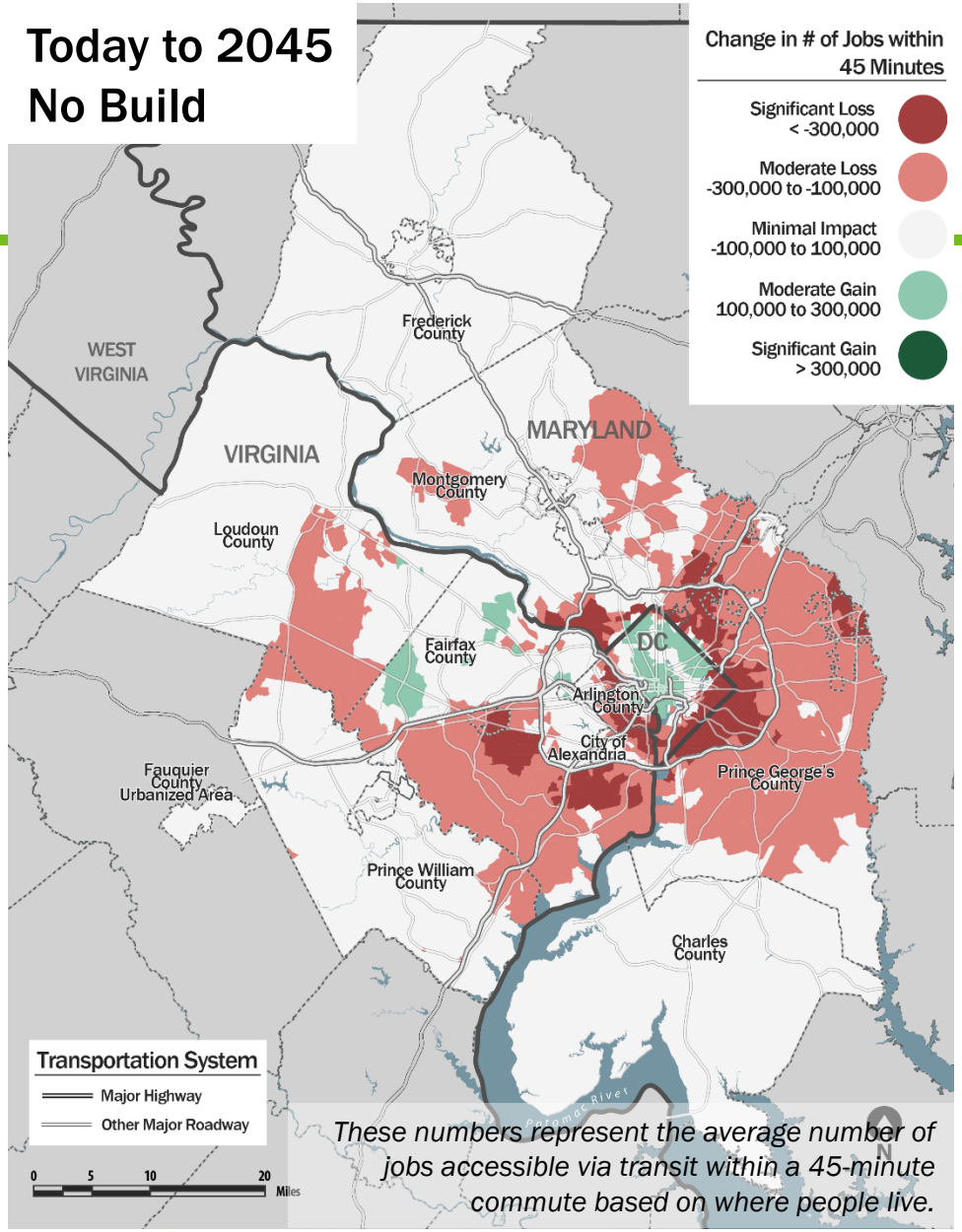
- Congestion on many segments of the region's major highway system is expected to get worse.
- Some segments will see relief due to capacity expansions, inclusion of managed lane projects, or Metro core capacity expansion.
- All tolled managed lanes facilities (not shown) are projected to experience free flow conditions in 2045 as designed.



Change in Access to Jobs by Auto

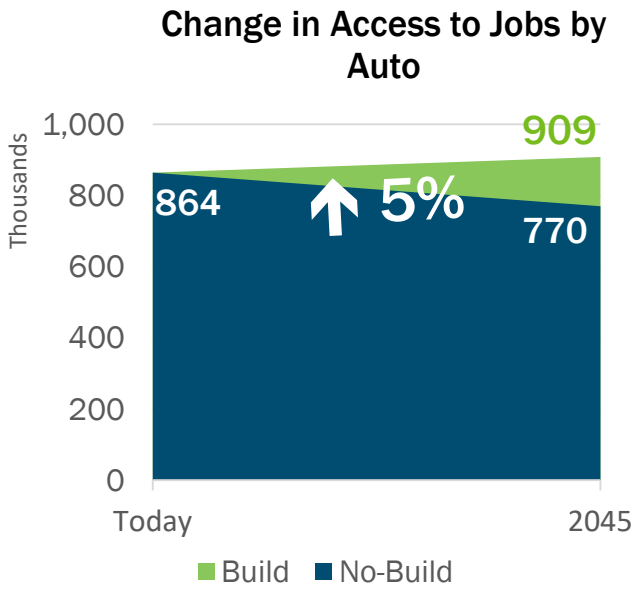
- If we grow and do not build, the region will experience significant declines in job access in 2045 compared to today.

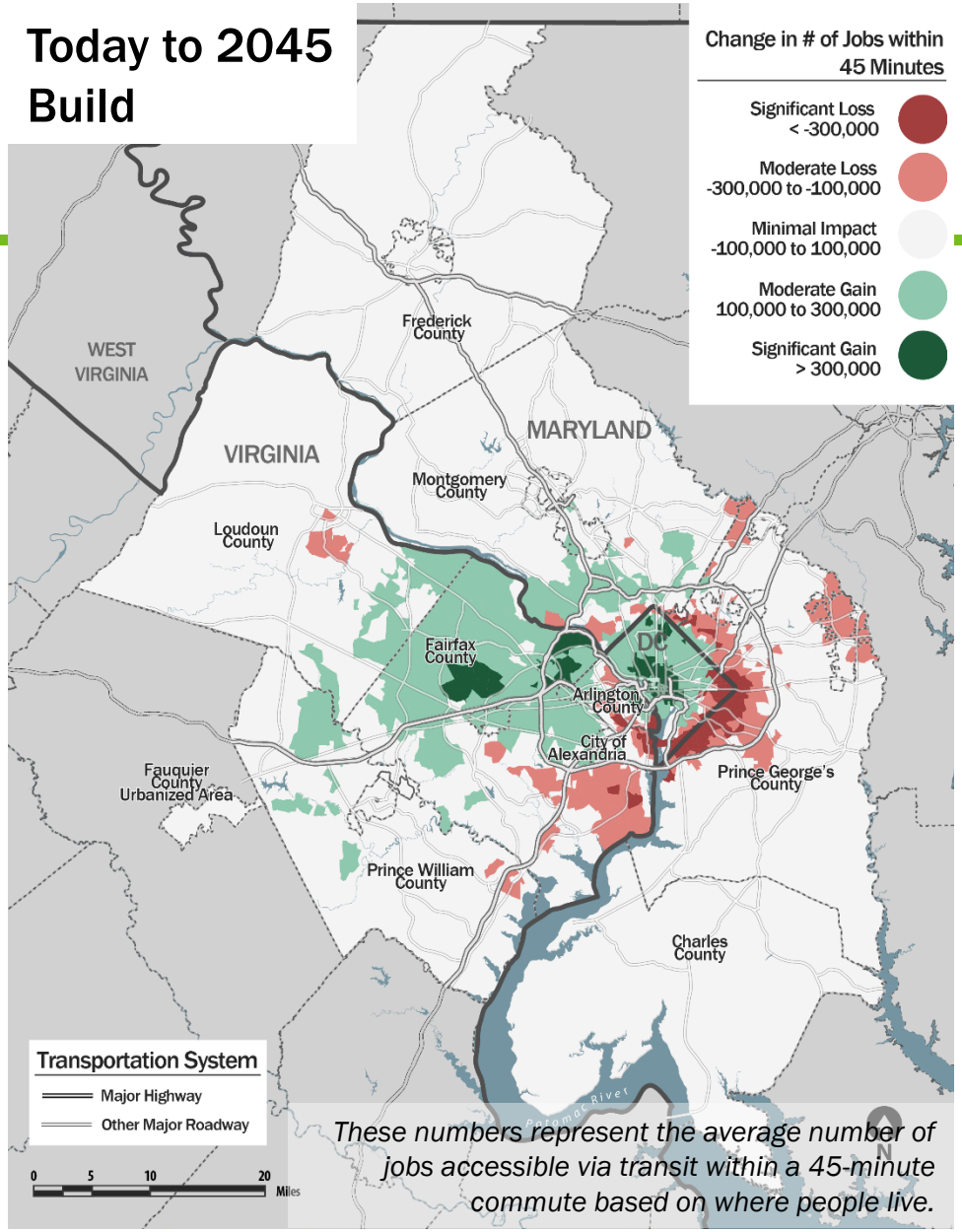




Change in Access to Jobs by Auto

- If we grow and build as planned, the region will experience more access to jobs on average.
- Some areas will continue to see declines in access to jobs within 45 mins.





Findings overview

- Growth in the region will continue to place demand on the transportation network.
- The region will employ various elements to meet the demand and make progress towards regional transportation policies, however, challenges will continue to exist though at levels less severe than identified in previous analyses.
- HOV will be more common than driving alone.
- Walk and bicycle trips ↑ by 49% and
  Transit trips ↑ by 38%.
- The average person will drive 3% ↓ in 2045 (miles).

Findings overview, contd.

- Use of reliable modes, including managed lanes and HOT lanes, high capacity transit, and walk and bike facilities, ↑ by 6% points.
- By 2045, 38% of people and 59% of jobs will be close to High Capacity Transit.
- By 2045, total vehicle hours of delay ↑ by 46% and avg. delay per trip ↑ by 25%.
- The region will experience ↑ of 40% in transit and ↑ of 5% in highway access to jobs, although some areas will still see declines.

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