

TransAction Update

NVTA Work Session

May 19, 2022

presented to

*Northern Virginia
Transportation Authority*

Monica Backmon, Keith Jasper, and Sree Nampoothiri, NVTA

Tom Harrington, Cambridge Systematics



NVTA's
TransAction
*Transportation Action Plan
for Northern Virginia*

Agenda – 1

- » Welcome and Introductions (5 mins)
- » Purpose of the Work Session (15 mins)
- » TransAction Update Process (20 mins)
- » Draft Project List (60 mins)
 - Guidance Exercise #1
- » Break (30 mins)



Agenda – 2

- » 2045 Transportation Conditions (No-Build) (10 minutes)
- » 2045 Transportation Conditions (Build) (10 minutes)
- » 2045 Scenario Analysis (No-Build) (75 mins)
 - Guidance Exercise #2
 - Guidance Exercise #3
- » Summary (10 mins)





Welcome and Introductions

- » Moderator: Monica Backmon, NVTA CEO
- » Presenters:
 - Keith Jasper, NVTA Principal, Transportation Planning and Programming
 - Sree Nampoothiri, NVTA Senior Transportation Planner
 - Tom Harrington, Project Manager, Cambridge Systematics Consultant Team



Purpose of the Work Session

- » Work Sessions occur when in-depth information-sharing/discussions are needed in advance of key Authority decisions
- » NVTA Work Sessions are held infrequently;
 - October 2014 – Long Term Benefit
 - April 2016 – Inaugural Five-Year Strategic Plan
 - October 2021 – TransAction Goals, Objectives, Weighted Performance Measures



Purpose of the Work Session

» What information will we share?

- Recap of TransAction update process
- Review of transportation conditions across the region in 2045 based on forecasted growth in population and employment (No-Build)
- Summary of the draft Project List associated with the TransAction update
- Overview of the impact on 2045 transportation conditions of the draft Project List associated with the TransAction update, using the weighted performance measures (Build)
- Initial scenario analysis findings (No-Build) addressing uncertainty in the long-range transportation planning process using three scenarios:
 - New Normal
 - Technology
 - Incentives/Pricing



Purpose of the Work Session

- » Guidance we are seeking – 1
 - Using 2014-2025 Regional Revenues, NVTA has funded 106 projects totaling \$2.5B;
 - There are currently 439 projects in the draft TransAction Project List;
 - The estimated cost (planning level) of the projects currently included in the draft TransAction Project List is \$70B+;
 - The region does not have the funding capacity through 2045 to implement all the projects in the TransAction update.
- » TransAction is a fiscally unconstrained plan that does not make any project funding commitments – such decisions are made during NVTA's Six Year Program updates. However, given the number and cost of projects included in the draft TransAction project List, should TransAction include any data-driven or other prioritization options in order to maximize the likelihood of accomplishing the region's vision through future updates of the Six Year Program?
- » While NVTA has a demonstrated track record of funding multimodal projects across the region, it cannot be the sole funding body for transportation projects in NoVA. Should the TransAction update include high-level funding strategies for mega, 'extra-territorial', and other high-impact projects that require multiple funding sources?



Purpose of the Work Session

» Guidance we are seeking – 2

- Scenarios have been developed to explore plausible alternate futures that are neither predicted nor preferred;
 - Scenario analysis is intended to understand what types of infrastructure investments are most 'future-proof';
 - However, initial scenario analysis findings highlight the potential for region-wide impacts on travel behavior without significant investments in traditional transportation infrastructure.
- » To what extent would you like the TransAction update process to identify transportation policy approaches alongside traditional infrastructure investments in order to address the region's vision? While any such policies could be potentially standalone, they could also complement specific types of project, e.g. incentives/pricing combined with a regional BRT system and HOV Lanes.



Purpose of the Work Session

» Guidance we are seeking – 3

- Travel conditions in 2045 are forecast to be challenging in multiple corridors, even if the TransAction project list is fully implemented.
 - TransAction surveys have consistently highlighted a desire among Northern Virginians for meaningful alternatives to driving alone. Without such alternatives it is difficult to envision how to reduce/reverse dependency on driving alone while maintaining the region's economic vitality.
- ## » Are there cost-effective ways to provide a meaningful alternative to driving alone while reducing traffic congestion and supporting NVTA's three core values, e.g. regional BRT system?



Purpose of the Work Session

- » Today's Work Session may include some polling exercises, intended to stimulate discussion on relevant topics
- » However, there are no action items, and polling responses are not considered binding in any way
- » Related Authority action will be requested at your regular July 2022 meeting

Q&A



NVTA's
TransAction
*Transportation Action Plan
for Northern Virginia*

TransAction Update Process





TransAction Vision Statement

“Northern Virginia will plan for, and invest in, a safe, equitable, sustainable, and integrated multimodal transportation system that enhances quality of life, strengthens the economy, and builds resilience.”



Core Values:

Overarching principles for TransAction that are part of the Vision statement and should be incorporated into the process and resulting plan.

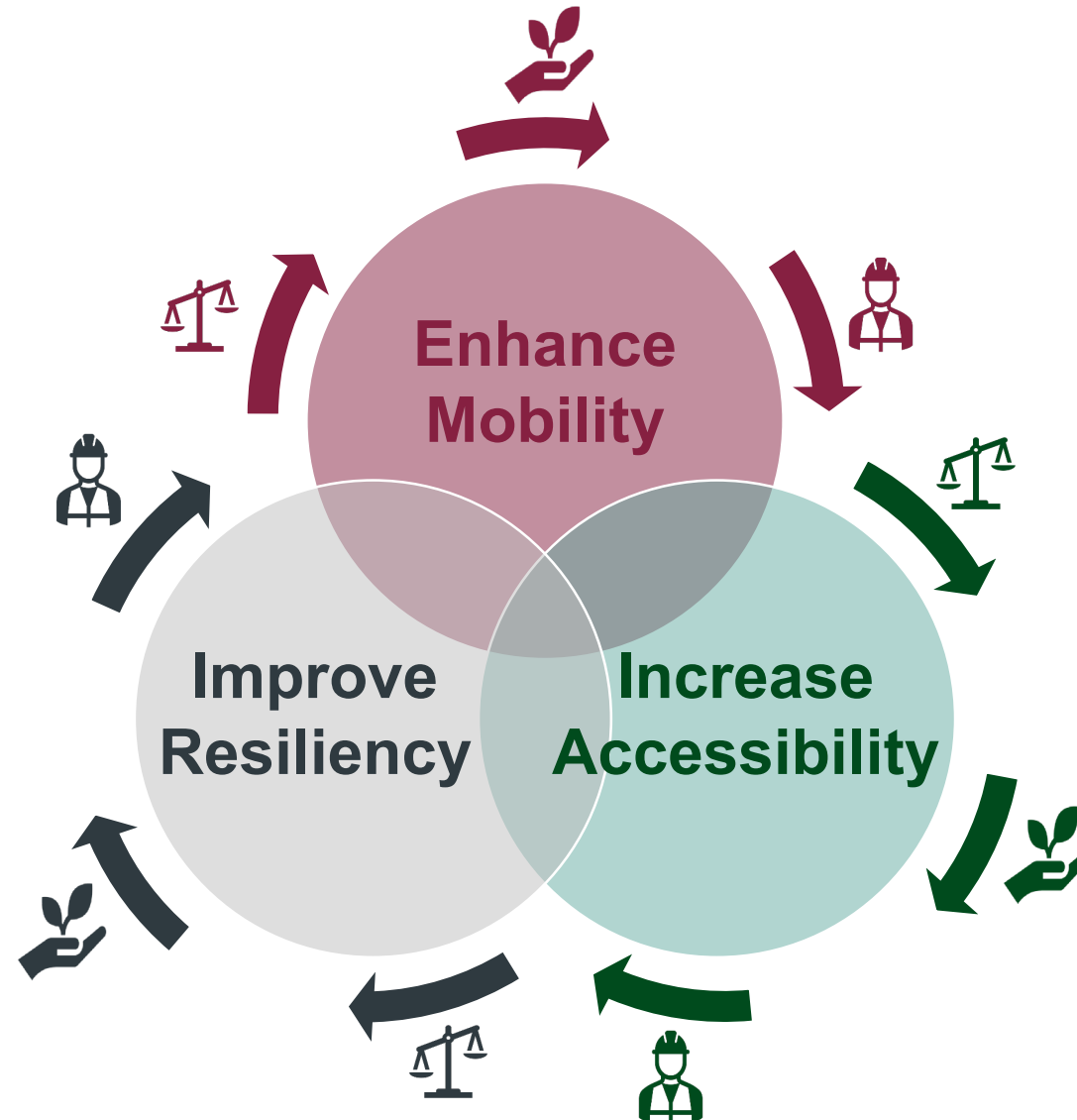
Vision statement approved by NVTA in December 2020.

Goals and Core Values

Goals:




What we want to achieve

- Enhance Mobility
- Increase Accessibility
- Improve Resiliency



Core Values:

How we achieve the goals

-  Equitably
-  Sustainably
-  Safely

Core Values are associated with multiple goals, objectives, and performance measures.

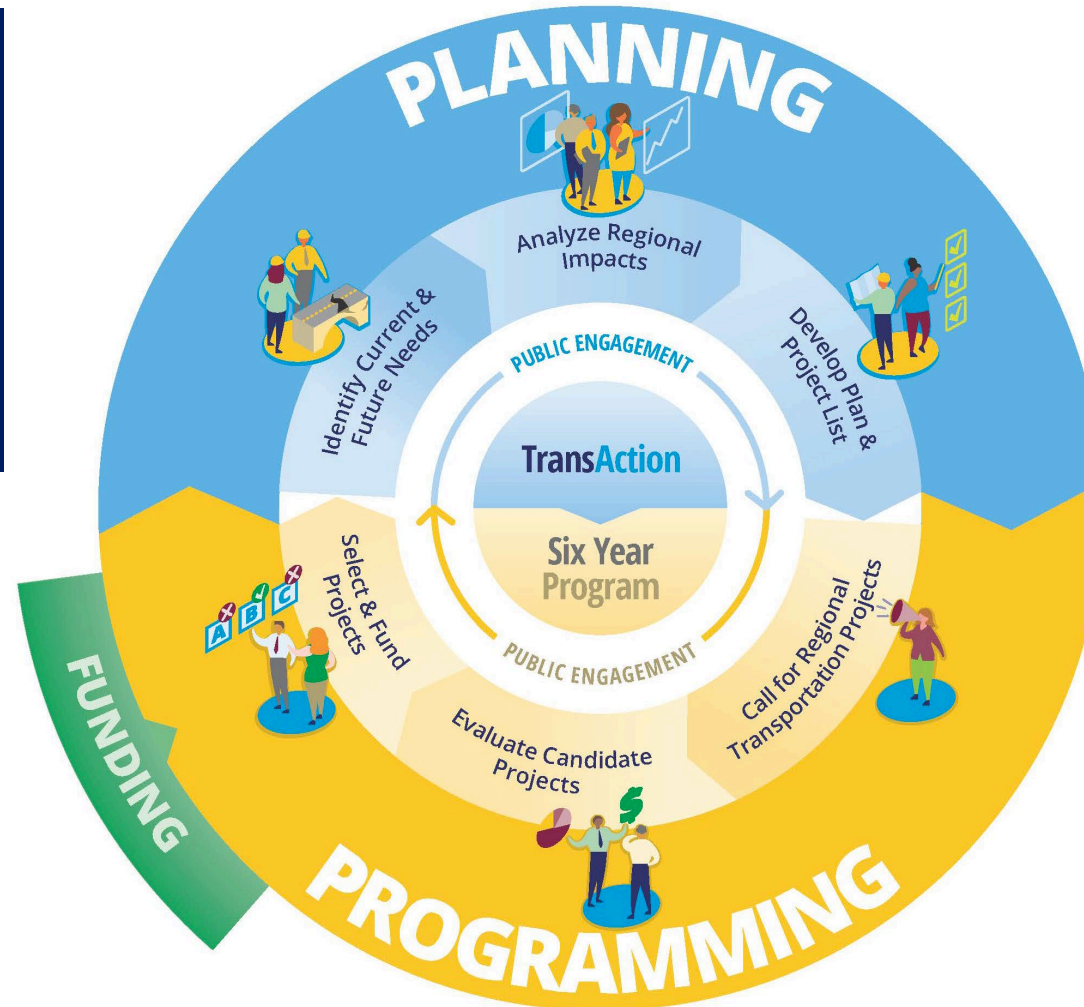
NVTA's Primary Responsibilities

TransAction

Long-Range
Transportation Plan for
NoVA

Updated every five years

Current plan adopted in
October 2017



Six Year Program (SYP)

Allocates NVTA's
Regional Revenues to
regional transportation
projects

Updated every two years

Most recent SYP
adopted in July 2020



Dealing with Uncertainty

- » The TransAction process includes sensitivity analysis to better understand uncertainty:
 - Plausible futures, but not necessarily preferred or predicted
 - Assumptions-based using proxy metrics than can be modeled
 - May identify potential investment obsolescence
- » This sensitivity analysis will develop four specific alternative futures (scenarios):
 - Pandemic-created 'New Normal'
 - Transportation Technology
 - Incentives/Pricing Transportation Policy/Mechanisms
 - Potentially one additional scenario



Land Use

- » Land Use policy and decision-making rests with NVTA's member jurisdictions



Recap – Online Survey Results

- » The top priorities were “more transit, walking, biking options”, “reduce traffic congestion” and “improve travel time predictability”, but the order varied by geographic area
 - Focus groups more typically had cited “reduce traffic congestion” and “improve travel time predictability” as top priorities
- » When allocating hypothetical investment \$ in transportation, roadway and rail improvements were given the highest allocation by survey respondents
 - People who do not drive frequently placed a higher importance on non-roadway investments than regular drivers
 - Regular drivers did allocate the most resources to roadway improvements, but did also allocate significant resources to rail and bus improvements



Development & Approval Process

- » November 2021: NVTA approved TransAction goals, objectives, and performance measures
- » December 2021: NVTA approved weights for performance measures
- » Spring 2022: Data Analysis; information-sharing with Committees and Stakeholder Group
- » May 2022: NVTA Work Session
- » Summer 2022: Public Comment Period
- » September 2022: Public Hearing/Open House
- » November 2022: NVTA adopts TransAction

Q&A



NVTA's
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Draft Project List



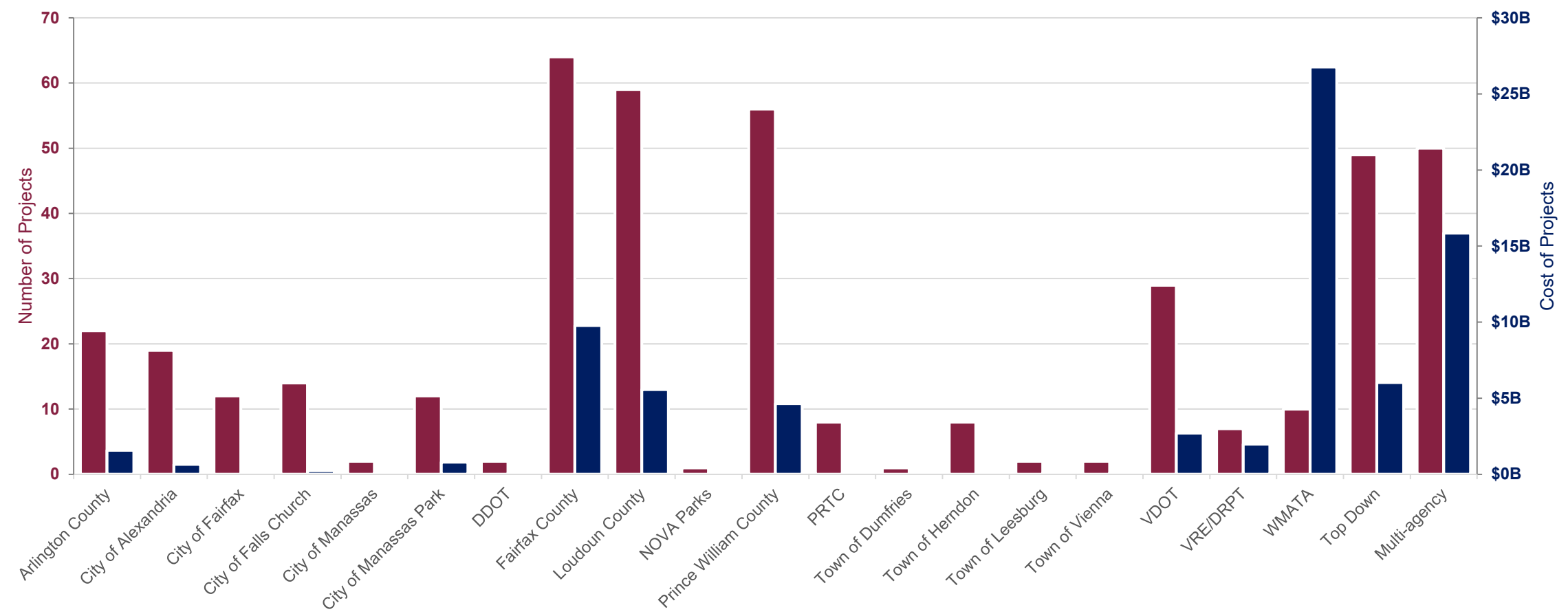


TransAction Project List

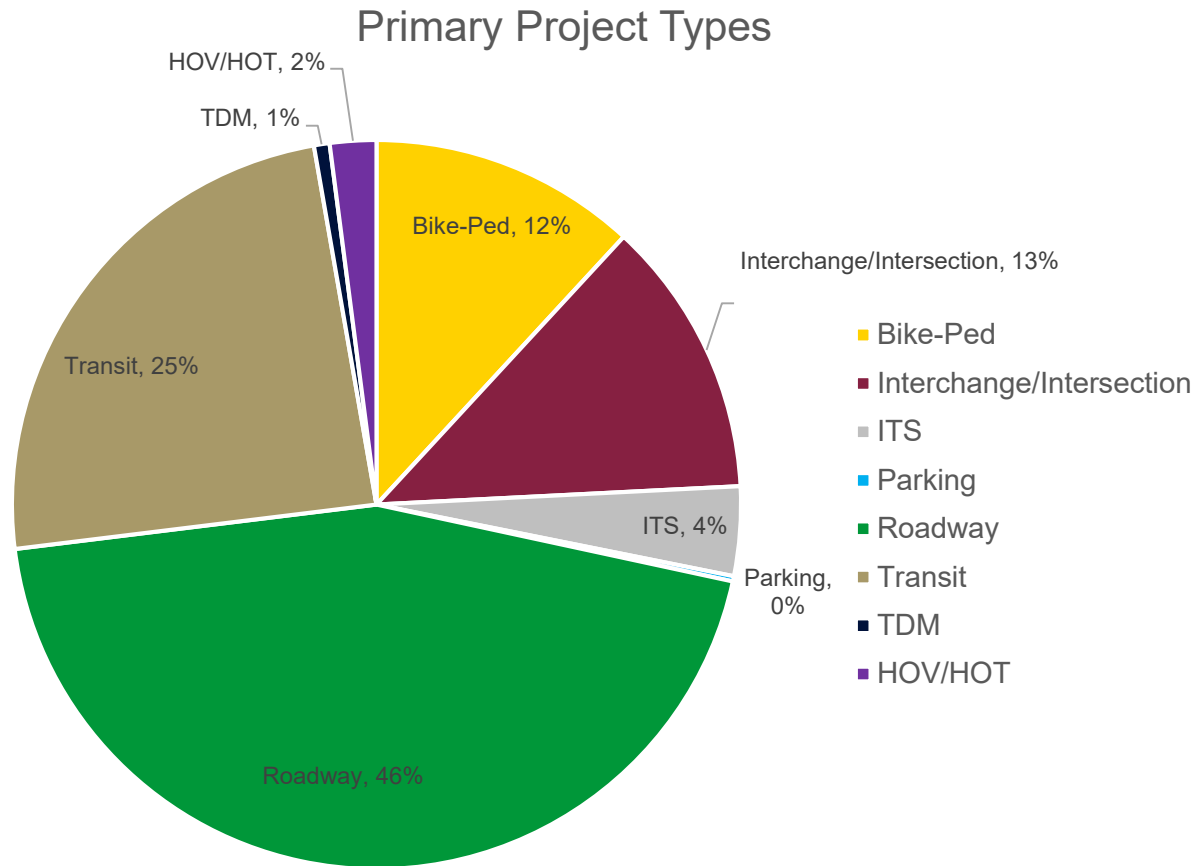
- » 429 Total Projects
 - 380 Bottom-Up Projects
 - 49 Top-Down projects (includes top-down projects from current TransAction)
- » 111 New projects
- » Net increase of 77 projects
- » Total estimated cost: >\$71.1B
- » 26 Projects that include elements outside of NoVA
 - Transit service to neighboring jurisdictions
 - Infrastructure improvements in other jurisdictions
- » Extraterritorial cost: >\$29.2 B



TransAction Project Sponsors



TransAction Projects by Type

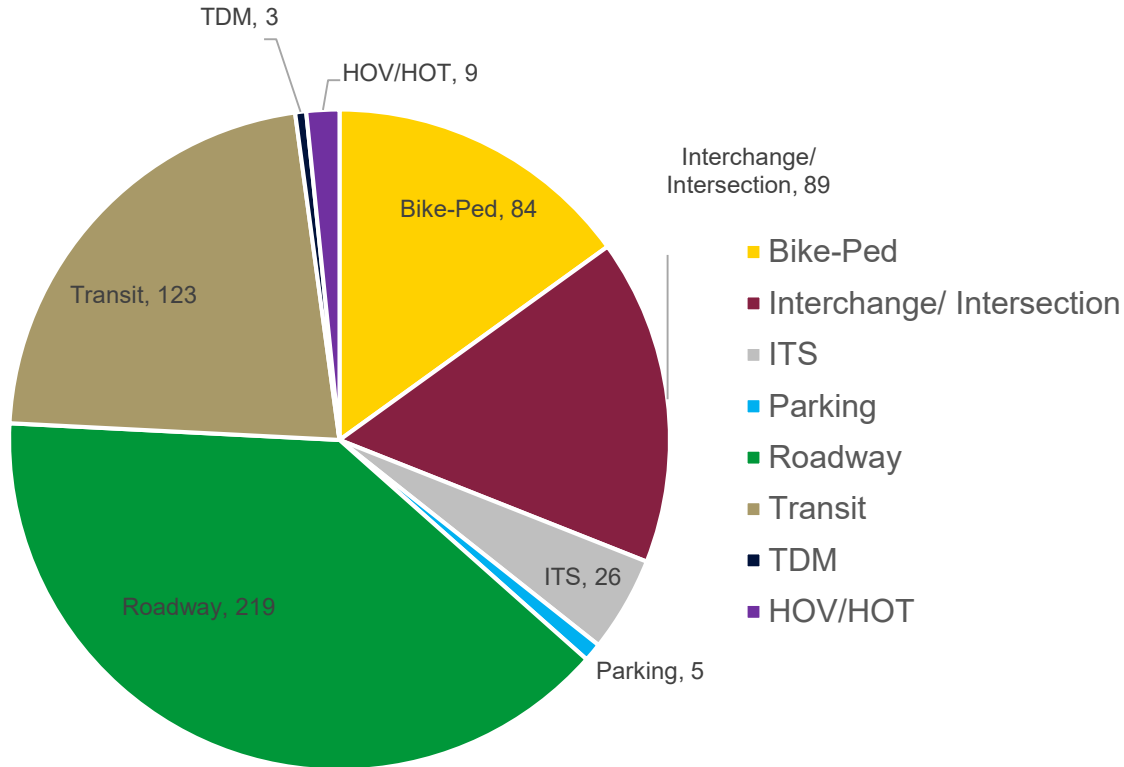


Primary Project Types	Count
Bike-Ped	51
Interchange/Intersection	53
ITS	17
Parking	1
Roadway	192
Transit	104
TDM	3
HOV/HOT	8



TransAction Projects by Type

All Project Types



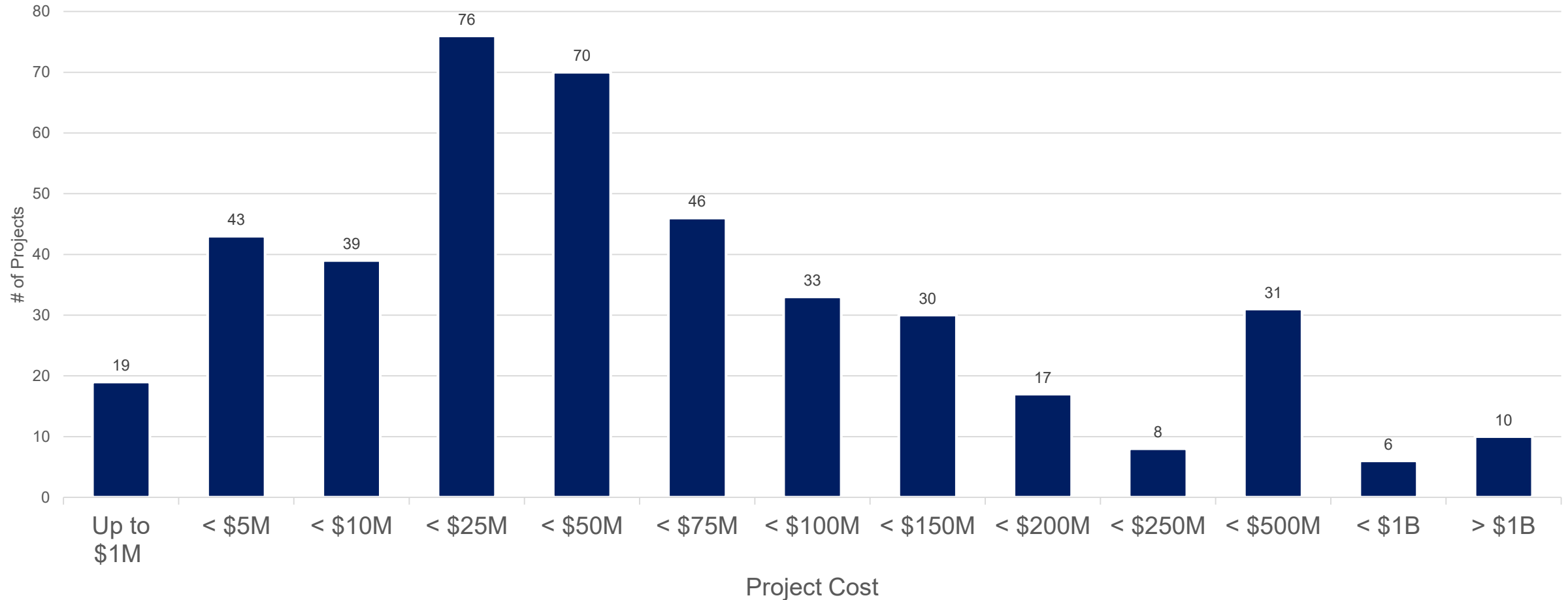
Project Mode Types	Count
Bike-Ped	84
Interchange/Intersection	89
ITS	26
Parking	5
Roadway	219
Transit	123
TDM	3
HOV/HOT	9

Projects can be listed in up to 3 mode categories. The total is therefore greater than 429.



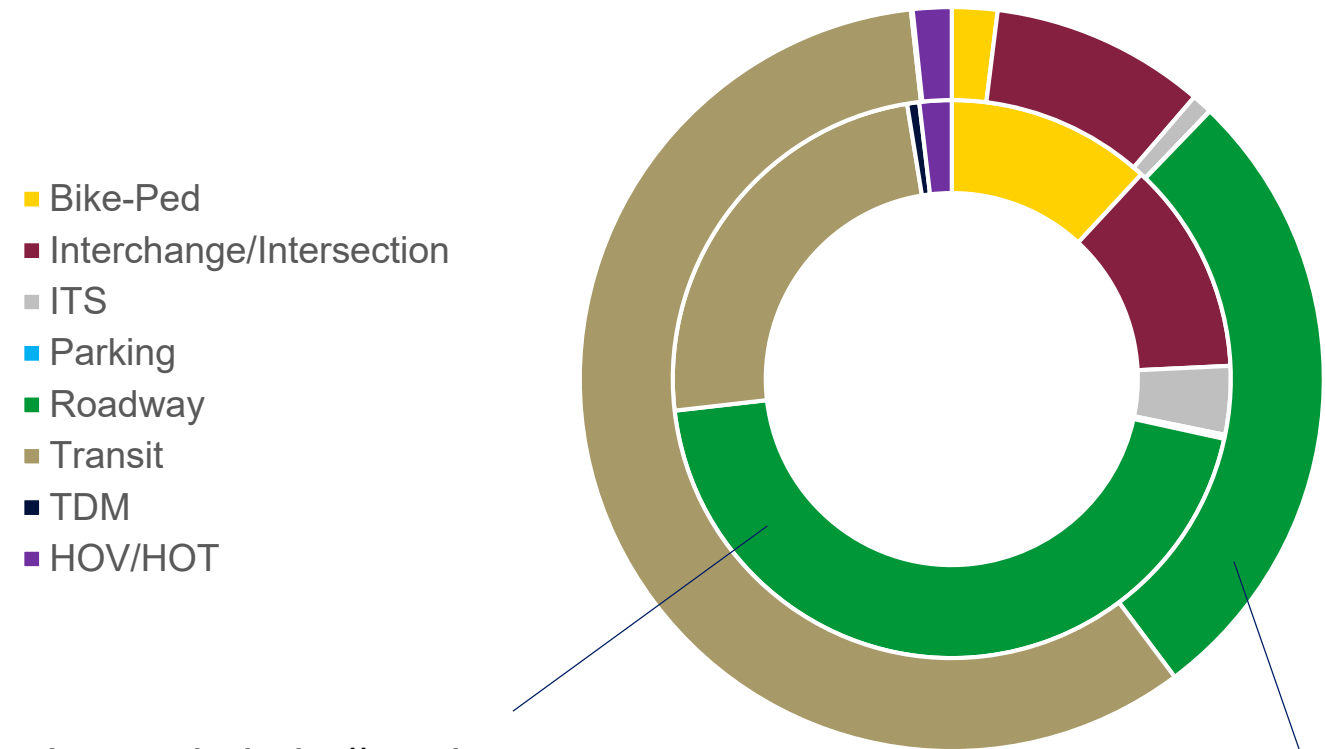
TransAction Project Costs

TransAction Project List - Estimated Planning-Level Project Costs





Project Costs by Project Type



Inner circle is # projects

Outer circle is total cost of projects

Average Cost	
Bike-Ped	\$ 27.9M
Interchange/Intersection	\$125.1M
ITS	\$ 37.3M
Parking	\$ 10.0M
Roadway	\$102.1M
Transit	\$399.8M
TDM	\$ 18.3M
HOV/HOT	\$149.5M



Metrorail Extensions

- » The Project List associated with TransAction includes Metrorail extensions, as well as 'core capacity' enhancements:
 - Metrorail extensions are considered infeasible to implement until core capacity challenges have been fully addressed through significant capacity upgrades:
 - Rosslyn bottleneck
 - Station capacity at selected stations
 - TransAction includes core capacity enhancements
 - WMATA has initiated a preliminary study of enhancements to the Blue/Orange/Silver Lines that, if implemented, would address some core capacity challenges
 - This is the largest project in the draft TransAction Project List
 - While it is appropriate for TransAction to include Metrorail extensions in Northern Virginia for long range transportation planning purposes, cost and feasibility factors suggest implementation of such extensions is highly unlikely before 2045



Regional BRT System

- » In March 2021, NVTa staff established a BRT Planning Working Group to bring together planners across the Washington DC region who were involved in current or potential BRT initiatives
- » The BRT Planning Working Group supported the development of the draft TransAction Project List, which includes a comprehensive regional Bus Rapid Transit (BRT) system covering major corridors in Northern Virginia. If implemented, the regional BRT system would:
 - Link outer jurisdictions, economic emphasis areas, Maryland, and the District of Columbia to the NoVA region's activity centers
 - Incorporate all five NoVA BRT lines, all of which have received NVTa Regional Revenues
 - Include components such as mobility hubs, first/last mile solutions, bus priority measures (infrastructure and technology), maintenance/storage facilities, rolling stock, and electrification
 - Provide a meaningful alternative to driving alone on a much shorter timeframe than Metrorail core capacity and extensions
 - Support all three of NVTa's core values – equity, sustainability, and safety



Guidance Exercise #1

- » Guidance we are seeking – 1
 - Using 2014-2025 Regional Revenues, NVTA has funded 106 projects totaling \$2.5B;
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30-minute Break



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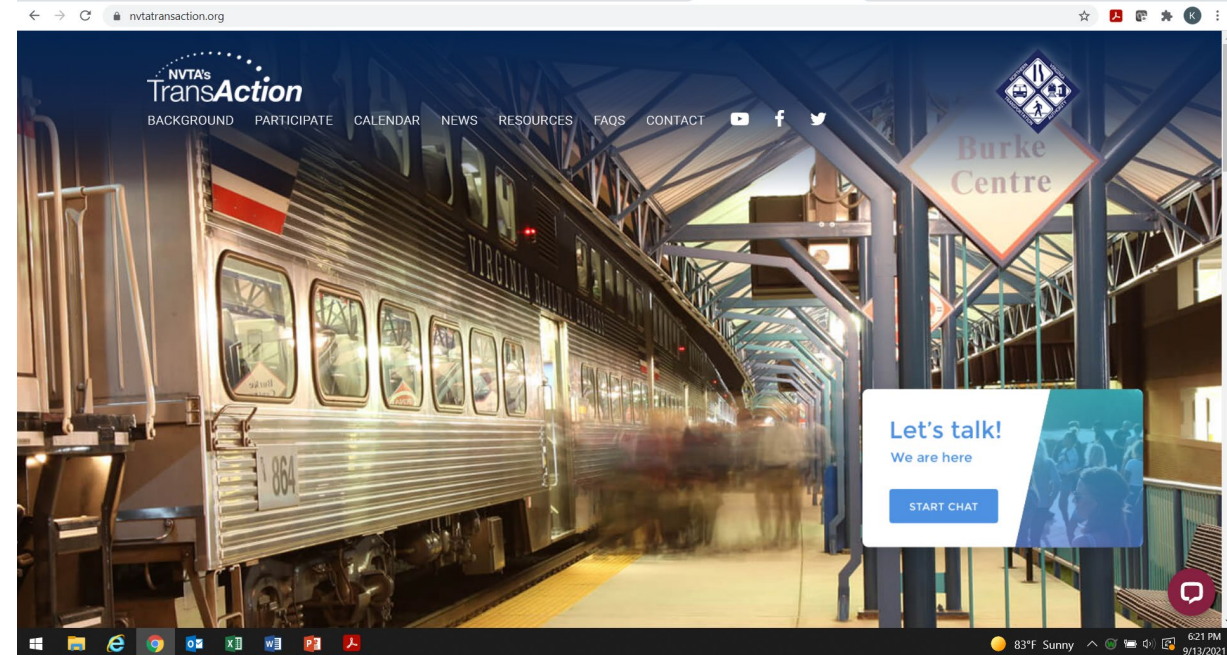
2045 Transportation Conditions (No Build)





Northern Virginia 2020-2045

- » Forecast NoVA growth (per MWCOG/TPB):
 - Population 23.1% (COG region 21.7%)
 - Employment 33.1% (COG region 27.2%)
- » Distribution of population (employment) growth
 - Loudoun/Prince William/Manassas/Manassas Park – 35% (40%)
 - Fairfax/City of Fairfax – 45% (39%)
 - Arlington/Alexandria/Falls Church – 20% (21%)
- » New Transportation Infrastructure includes:
 - Silver Line Phase 2
 - Potomac Yard Metrorail Station
 - I-66 Outside the Beltway
 - Northern Extension to the Capital Beltway Express Lanes
 - Numerous NVTA-funded Multimodal projects





Implications for TransAction

» All TBD:

- Trip lengths and mode choice
- Reverse commutes, including cross-Potomac
- Suburb-to-suburb trip-making
- Could be supportive of transit where it already exists or is planned
- May also present challenges for reversing/reducing dependence on driving alone

Q&A



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2045 Transportation Conditions (Build)



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TransAction 2045 Build Networks for Testing

For discussion today:

- » Full-Build

Additional model runs being conducted:

- » Highway Network

- » Transit Network

- » Other Project Groupings Needed to Identify Project Scores



Full-Build Network Results

Key Outputs:		Change
Auto Trips		-0.3%
Transit Trips		3.9%
PMT		3.2%
VMT		3.3%

Performance Measures		Change
A1/A2	Total Delay Reduction – Autos and Transit (Person-Hours of Delay)	-16%
B1	Congestion Duration (Mile-Hours of Severe Congestion) -- length weighted	-24%
C1	Accessibility (Average number of new jobs accessible)	11%
C2	EEA Accessibility (Average number of new jobs accessible)	16%
F1	Emissions Reduction (kg CO ₂)	1.4%

Full-Build Network Results (-continued)

» Other measures to be added later

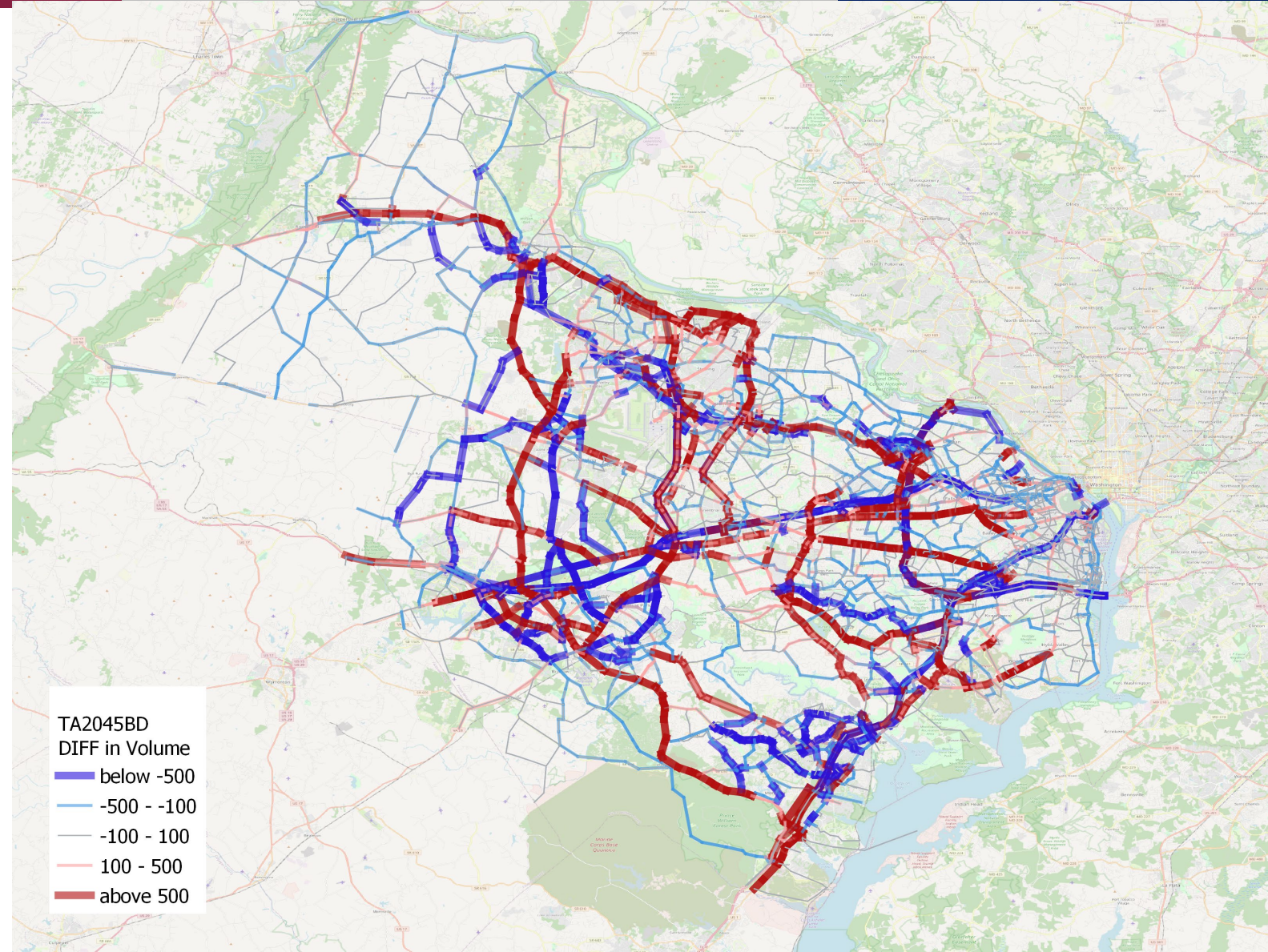
Performance Measures		Status
B2	Transit person-miles in dedicated/priority ROW	To be added
D1	Quality of access to transit and the walk/bike network	Individual project score only
E1	Potential for safety and security improvements	Individual project score only
G1	Transportation System Redundancy	To be added

Full-Build Network Results

Change in Volume
(morning peak)

Volume decrease 

Volume increase 

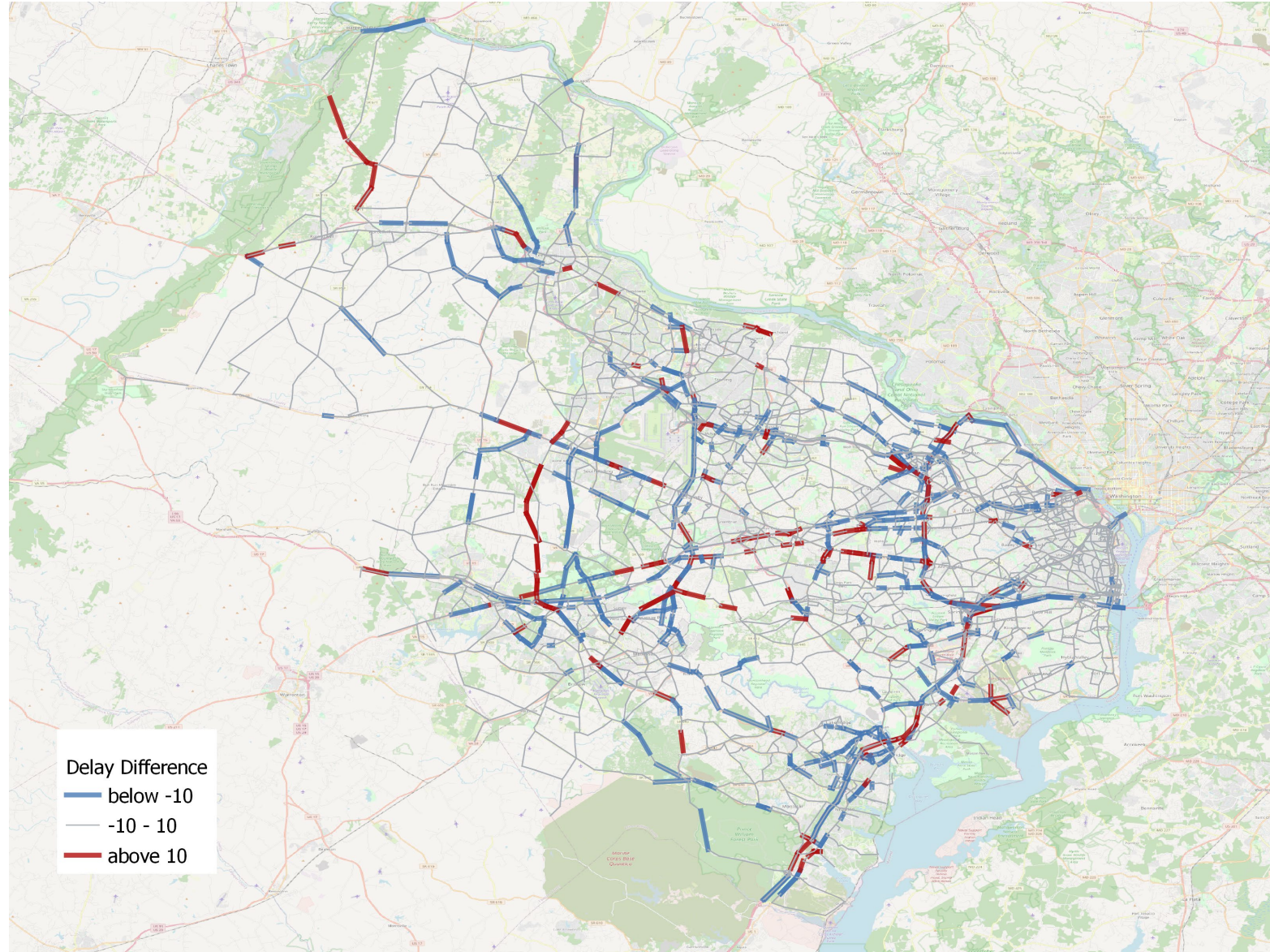


Full-Build Network Results

Change in Delay
(morning peak)

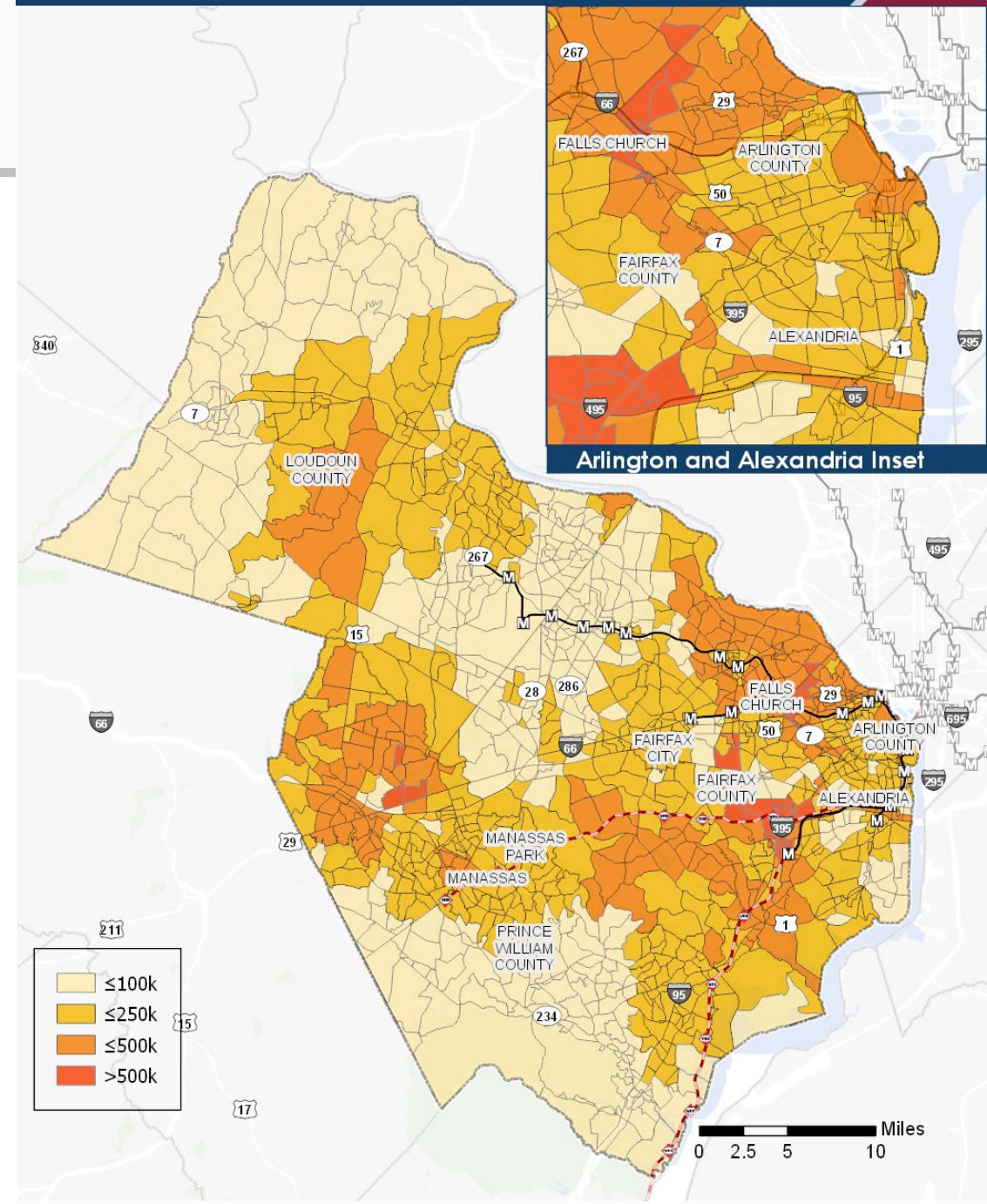
Delay decrease 

Delay increase 



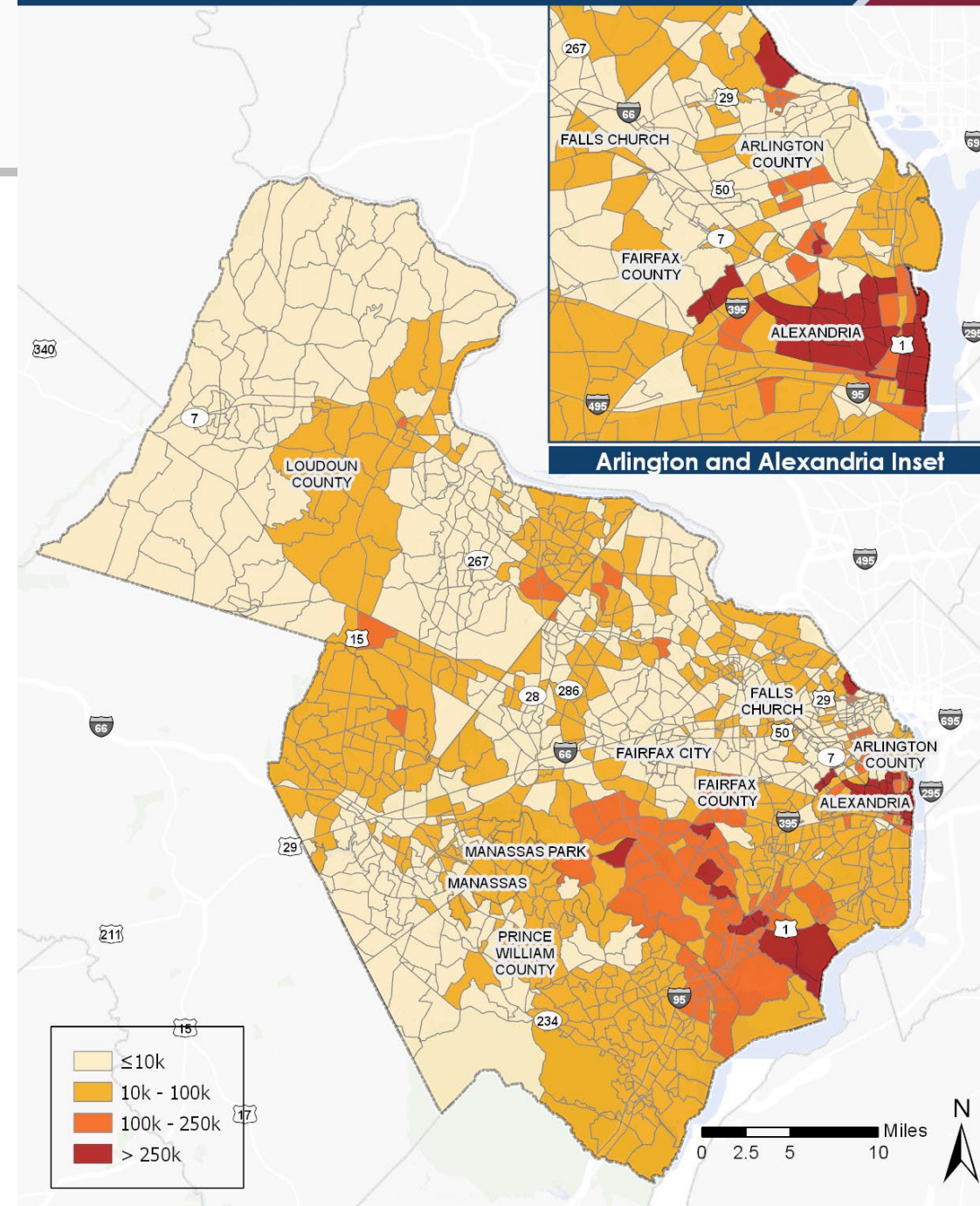
Accessibility: Auto

- » Locations where the number of jobs accessible by auto within 45 minutes increases
 - On average, increases in the region by 179,000 jobs (13%)
 - In EEAs, increases by over 56,000 jobs (13%)
- » Auto access considers all roads available to SOVs, including paid HOT/toll facilities



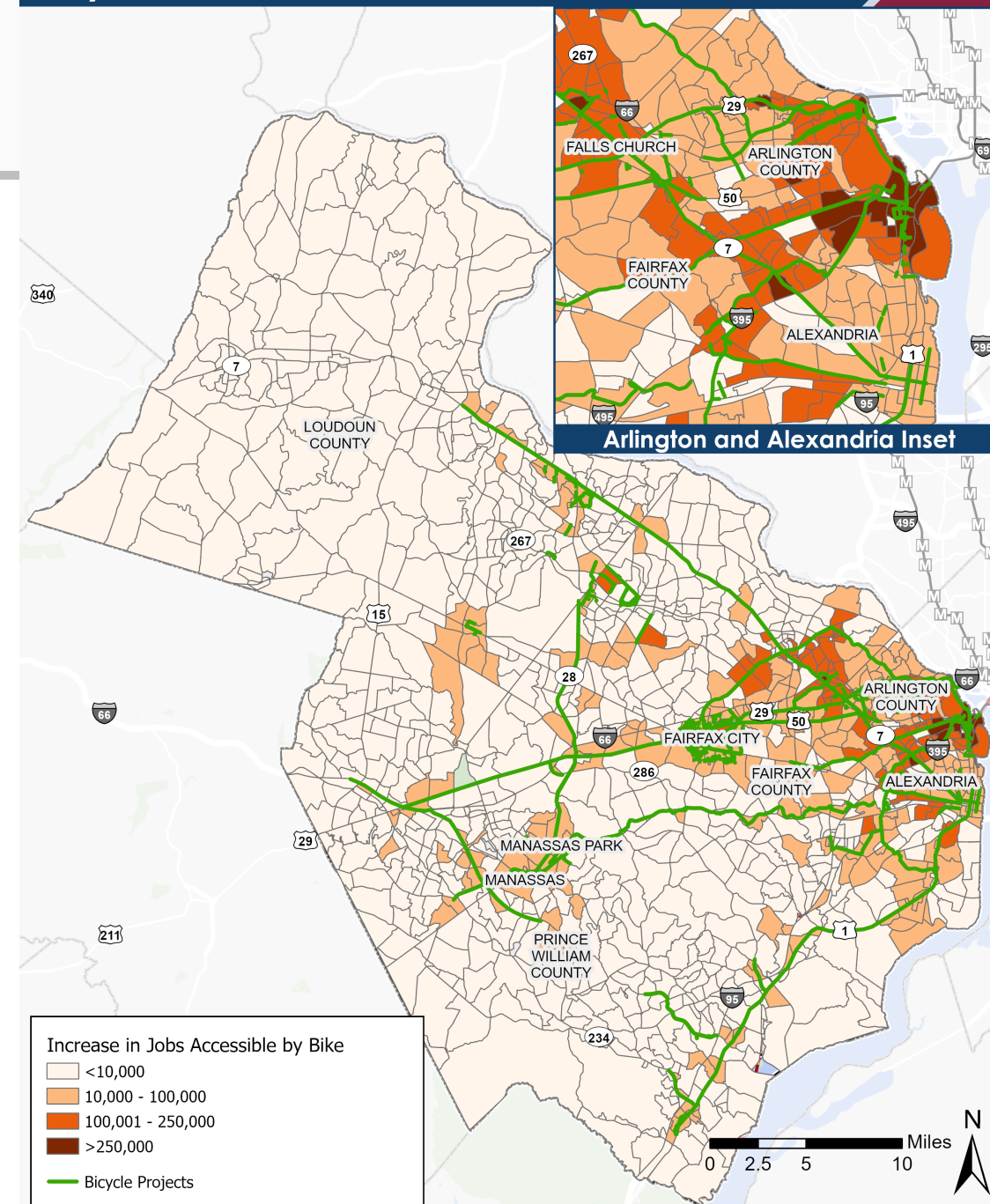
Accessibility: Transit

- » Locations where the number of jobs accessible by transit within 60 minutes increases
 - On average, increases in the region by 44,000 jobs (6%)
 - In EEAs, increases by over 17,000 jobs (7%)
- » Includes all modes of transit, and allows for drive-access to stations



Accessibility: Bike

- » Locations where the number of jobs accessible by bike on the low-stress bike network within 30 minutes increases
 - On average, increases in the region by 37,400 jobs (81%)
 - In EEAs, increases by over 44,500 jobs (112%)
- » Low-stress bike facilities include dedicate bike lanes, grade separated paths & trails



Q&A



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2045 Scenario Analysis (No Build)



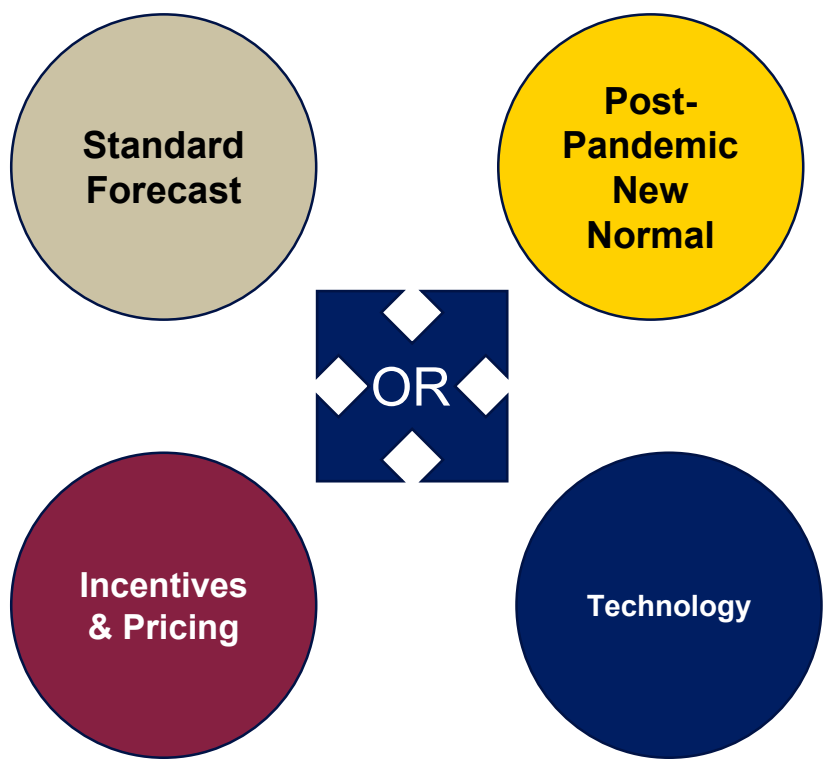
Dealing with Uncertainty

- » The TransAction process includes analysis to better understand uncertainty:
 - Plausible futures, but not necessarily preferred or predicted
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- » Three specific alternative futures (scenarios):
 - Pandemic-created 'New Normal'
 - Transportation Technology
 - Transportation Policy/Mechanisms

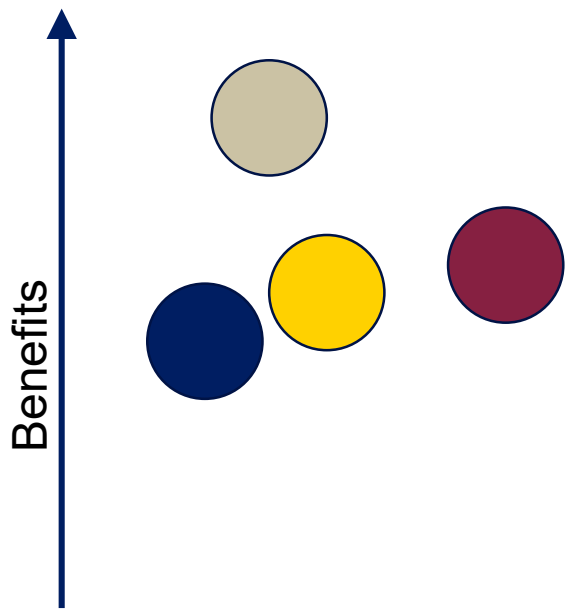
Scenario Analysis



What could happen to transportation in Northern Virginia by 2045?



What are the potential benefits of the TransAction projects?



Post-Pandemic New Normal Scenario

» What if trends observed during the pandemic continue into the long-term future?

» Key Assumptions:

- Reduction of work-related trips (HBW, NHW) by 21%
- Reduction of shopping trips by 5.6%
- Increase in delivery trips (1 delivery for every 3 shopping trips removed)
- Increase in non-motorized trips by 5%
- No Land Use changes assumed



2 Technology Scenario

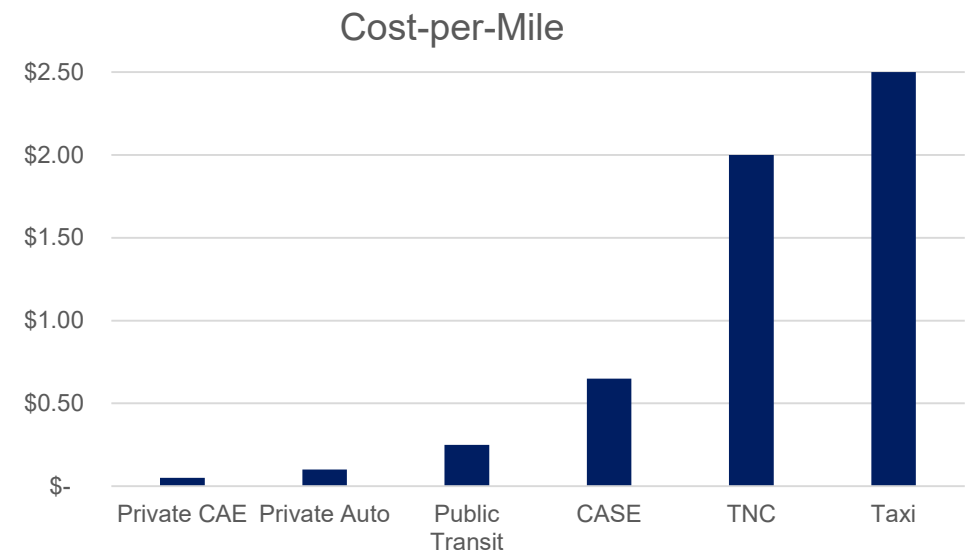
» Focus on implementation of Connected/ Automated/ Shared/ Electric vehicles (CASEs)

» Market Penetration:

- Private Vehicles: 20%
- TNCs: 100% fully automated within Northern Virginia, DC, Montgomery & Prince George's
- Large Trucks: 33%
- Transit Buses: not automated
- Shuttle buses: 100% automated

» All automated vehicles are assumed to also be Connected and Electric

» Lower operating costs



2 Technology Scenario (cont.)

» Focus on implementation of Connected/ Automated/ Shared/ Electric vehicles (CASEs)

» Changes to trip making:

- CAE owners make more trips
- CAE owners make longer trips

» Zero-Occupancy Vehicle (ZOV) trips:

- Remote parking of private vehicles
- CASE relocation between passengers

» Capacity Increase:

- Freeways: 15%
- Major Arterials: 5%

» Automated Shuttles available at all rail stations (FM/LM)

» No Land Use changes assumes



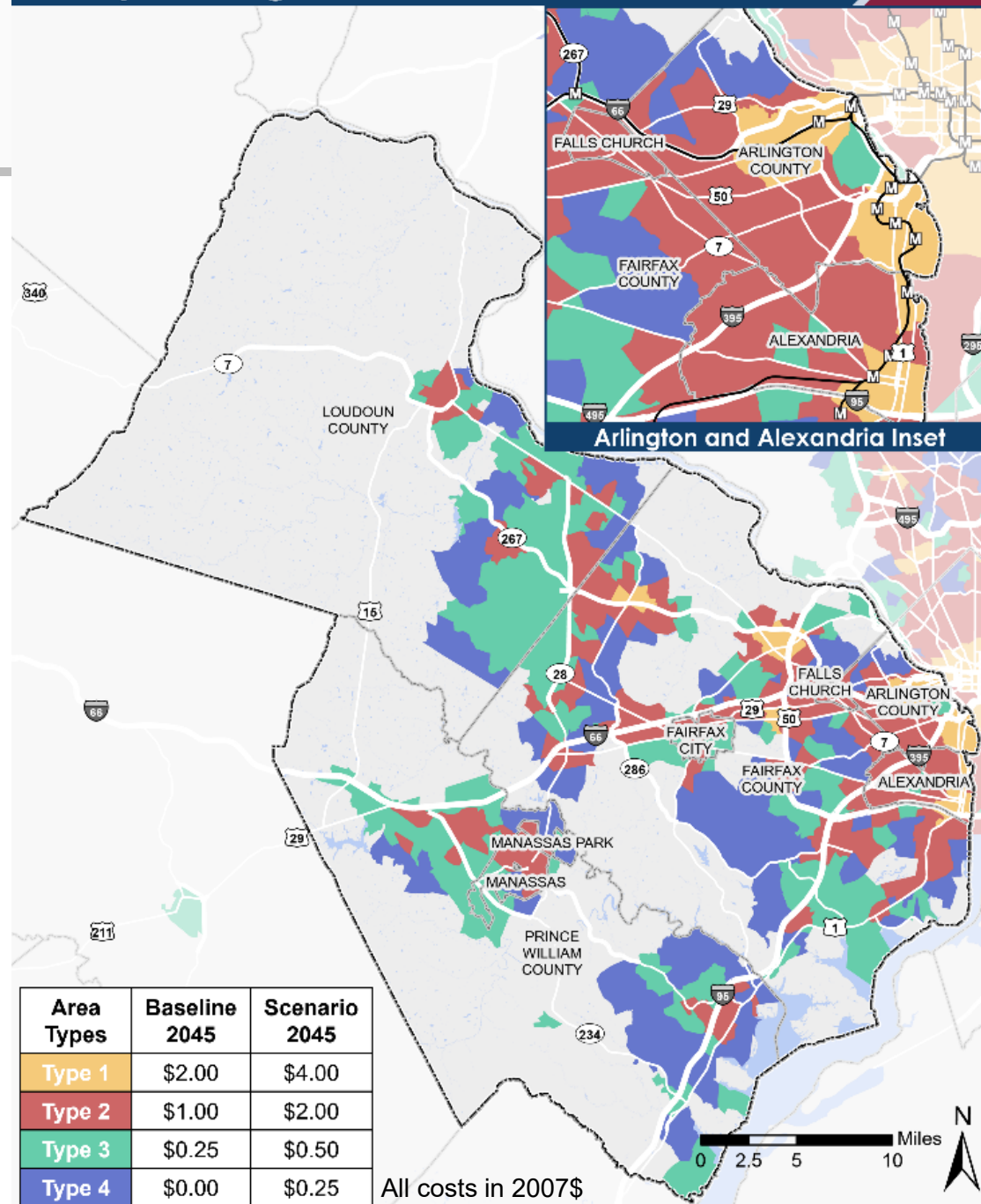
Incentives/Pricing Scenario

3

- » Implementing transportation pricing and incentive mechanisms to manage travel demand
- » Key Assumptions:
 - VMT Pricing on all roads: 25¢ peak, 12¢ off-peak
 - Discounts for lower-income households
 - Increase in parking costs across the region
 - Free transit
 - Shift in travel times from peak hours

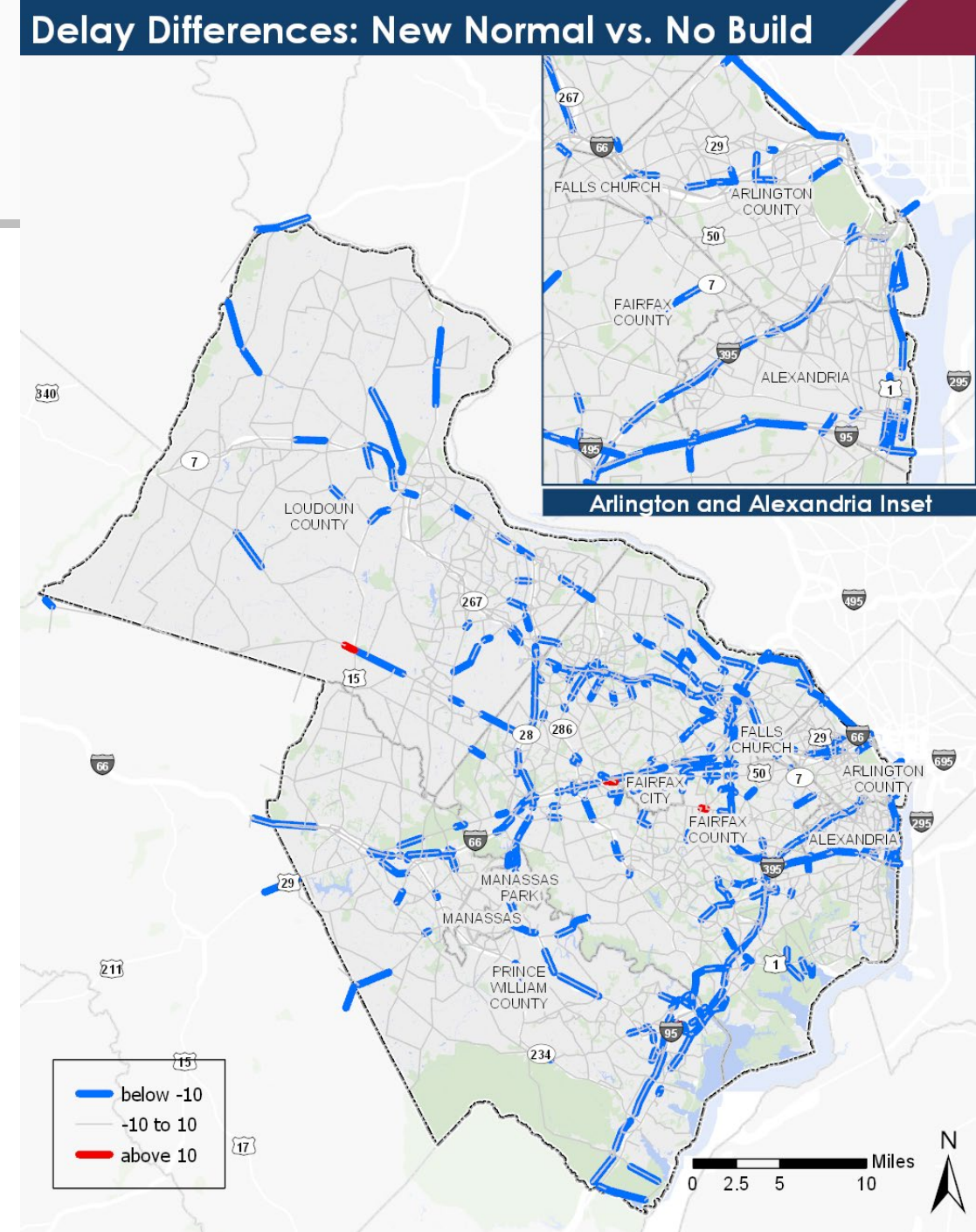


Hourly Parking Costs



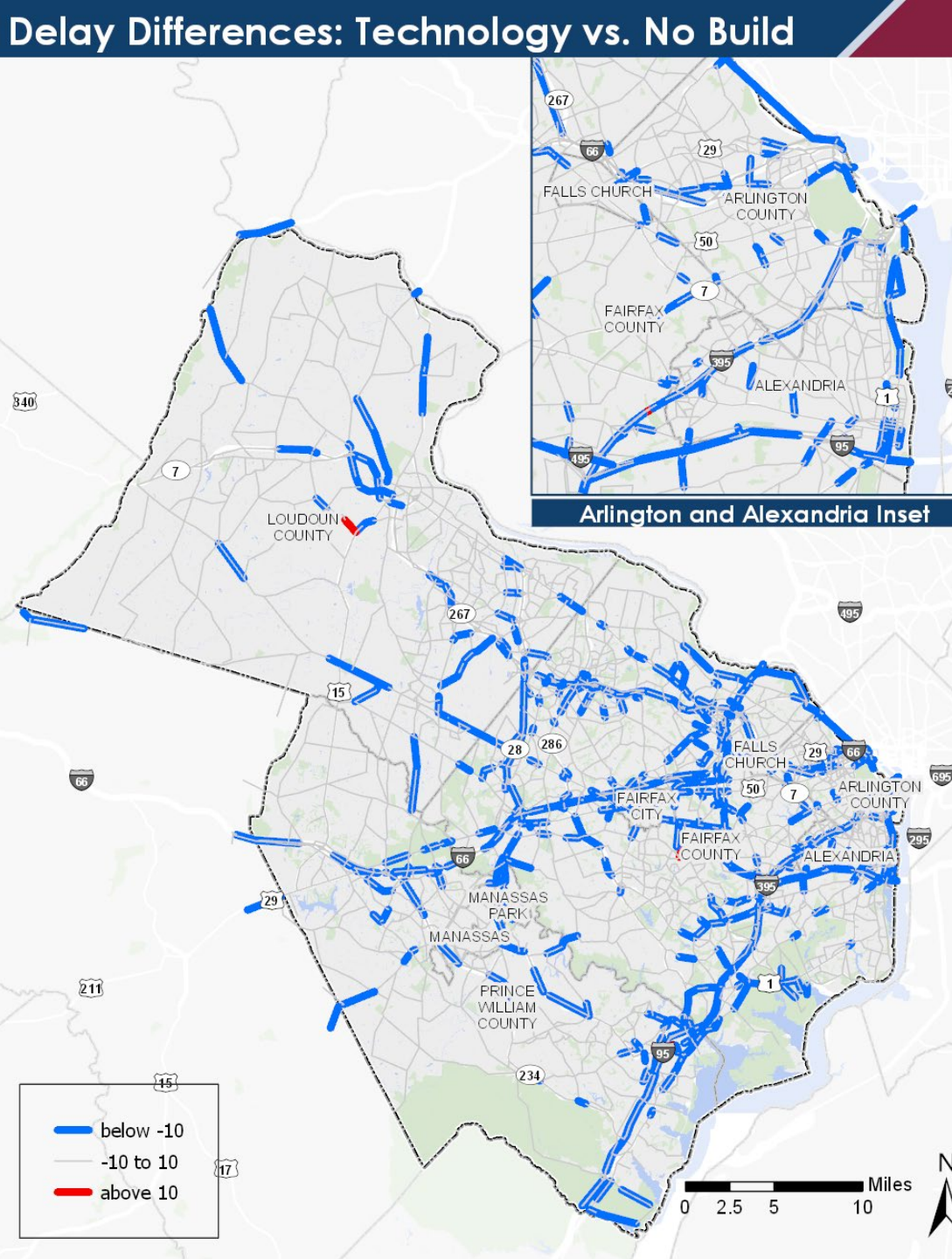
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Measure	Change
Motorized Person Trips	-4.5%
Transit Trips	-11%
VMT	-4%
Person-Hours of Delay	-14%



Technology Scenario: Results

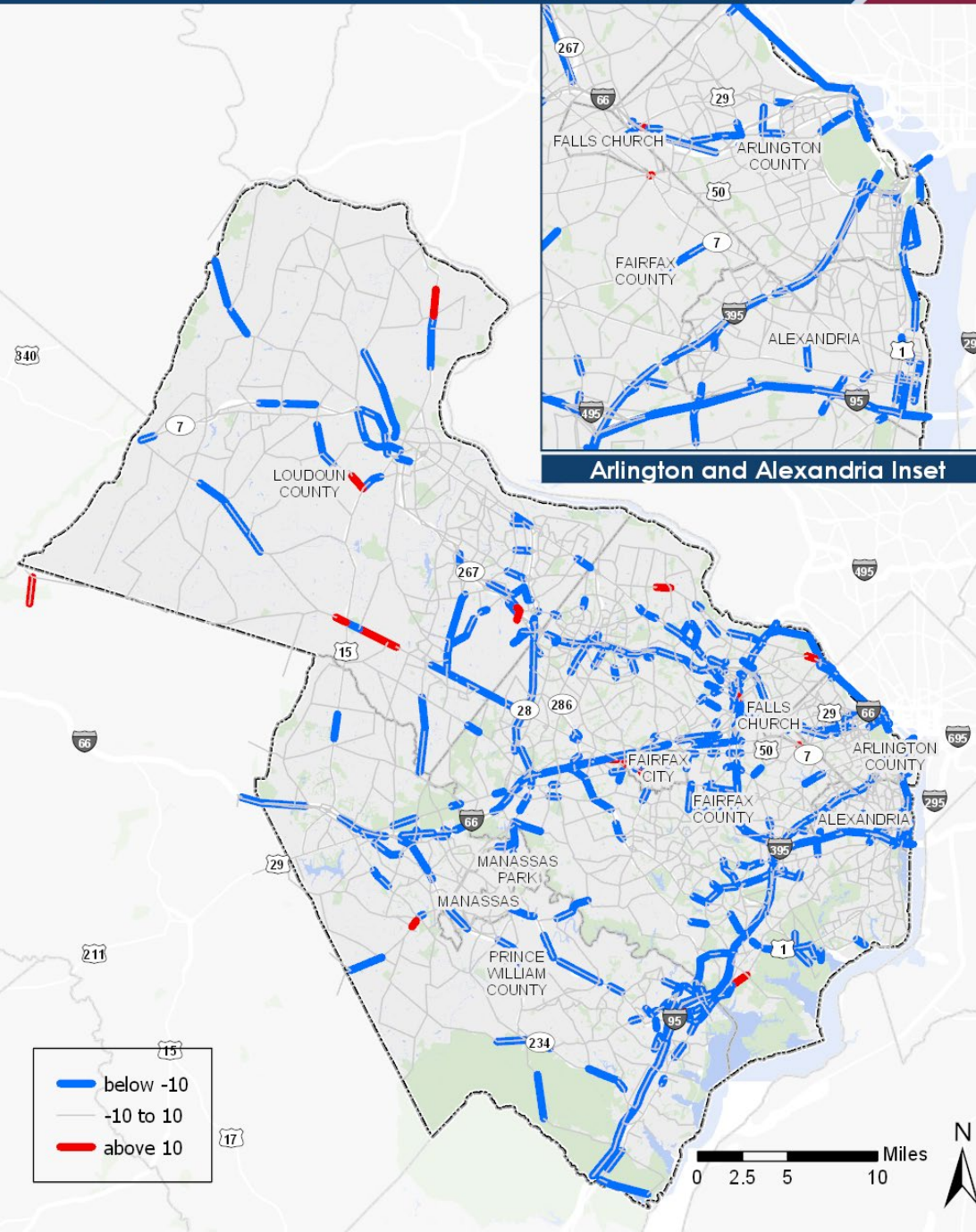
Measure	Change
Motorized Person Trips	-3%
Transit Trips	-13%
VMT	-1.4%
Person-Hours of Delay	-25%



Incentives/Pricing: Results

Measure	Change
Motorized Person Trips	-4.5%
Transit Trips	+12%
VMT	-9%
Person-Hours of Delay	-20%

Delay Differences: Pricing vs. No Build





Initial Scenario Results

What could happen to transportation in Northern Virginia by 2045?

Change in No-Build Results Under Each Scenario

Measure	New Normal	Technology	Incentives/ Pricing
Motorized Person Trips	-4.5%	-3%	-4.5%
Transit Trips	-11%	-13%	+12%
VMT	-4%	-1.4%	-9%
Person-Hours of Delay	-14%	-25%	-20%
Duration of Severe Congestion	-21%	-37%	-25%
Job Accessibility	+8.3%	+6.1%	+6.5%
Emissions	-3.5%	-28%	-7.9%



Guidance Exercise #2

» Guidance we are seeking – 2

- Scenarios have been developed to explore plausible alternate futures that are neither predicted nor preferred;
 - Scenario analysis is intended to understand what types of infrastructure investments are most ‘future-proof’;
 - However, initial scenario analysis findings highlight the potential for region-wide impacts on travel behavior without significant investments in traditional transportation infrastructure.
- » To what extent would you like the TransAction update process to identify transportation policy approaches alongside traditional infrastructure investments in order to address the region’s vision? While any such policies could be potentially standalone, they could also complement specific types of project, e.g. incentives/pricing combined with a regional BRT system and HOV Lanes.



Guidance Exercise #3

» Guidance we are seeking – 3

- Travel conditions in 2045 are forecast to be challenging in multiple corridors, even if the TransAction project list is fully implemented.
 - TransAction surveys have consistently highlighted a desire among Northern Virginians for meaningful alternatives to driving alone. Without such alternatives it is difficult to envision how to reduce/reverse dependency on driving alone while maintaining the region's economic vitality.
- ## » Are there cost-effective ways to provide a meaningful alternative to driving alone while reducing traffic congestion and supporting NVTA's three core values, e.g. regional BRT system?

Summary



NVTA's
TransAction
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Reference Slides





Current TransAction (October 2017)

» Vision Statement:

“In the 21st century, Northern Virginia will develop and sustain a multimodal transportation system that enhances quality of life and supports economic growth.

Investments in the system will provide effective transportation benefits, promote areas of concentrated growth, manage both demand and capacity, and employ the best technology, joining rail, roadway, bus, air, water, pedestrian, and bicycle facilities into an interconnected network that is fiscally sustainable.”

Goal	Objective	Performance Measure	Weight
Goal 1: Enhance quality of life and economic strength of Northern Virginia through transportation	Reduce congestion and crowding experienced by travelers in the region	Total person hours of delay*	10%
		Transit crowding*	5%
		Person hours of congested travel in automobiles*	5%
		Person hours of congested travel in transit vehicles*	5%
	Improve travel time reliability	Congestion severity: maximum travel time ratio	5%
		Congestion duration*	10%
	Increase access to jobs, employees, markets, and destinations	Percent of jobs/population within 1/2 mile of high frequency and/or high performance transit	5%
		Access to jobs within 45 minutes by auto or within 60 minutes by transit*	5%
	Improve connections among and within areas of concentrated growth	Average travel time per motorized trip between Regional Activity Centers	5%
		Walkable/bikeable environment within a Regional Activity Center	5%
Goal 2: Enable optimal use of the transportation network and leverage the existing network	Improve the safety of transportation network	Safety of the transportation system	5%
	Increase integration between modes and systems	First and last mile connections	10%
	Provide more route and mode options to expand travel choices and improve resiliency of the system	Share of travel by non-SOV modes	10%
	Sustain and improve operation of the regional system	Person hours of travel caused by 10% increase in PM peak hour demand*	5%
Goal 3: Reduce negative impacts of transportation on communities and the environment	Reduce transportation related emissions	Vehicle miles traveled (VMT) by speed	10%

* Measure included in HB 599 rating process.

Approved Goals, Objectives and Performance Measures (Nov/Dec 2021)



Goal	Objective	Performance Measure	Weight	Alignment with Core Values
Mobility: Enhance quality of life of Northern Virginians by improving performance of the multimodal transportation system	A. Reduce congestion and delay*	A1. Total Person-Hours of Delay in autos	10	
		A2. Total Person-Hours of Delay on Transit	10	
	B. Improve travel time reliability*	B1. Duration of Severe Congestion	10	
		B2. Transit person-miles in dedicated/priority ROW	10	
Accessibility: Strengthen the region's economy by increasing access to jobs, employees, markets, and destinations for all communities	C. Improve access to jobs*	C1. Access to jobs by car, transit, and bike	10	
		C2. Access to jobs by car, transit, and bike for EEA populations	10	
	D. Reduce dependence on driving alone by improving conditions for people accessing transit and using other modes	D1. Quality of access to transit and the walk/bike network	15	
Resiliency: Improve the transportation system's ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions.	E. Improve safety and security of the multimodal transportation system	E1. Potential for safety and security improvements	10	
	F. Reduce transportation related emissions	F1. Vehicle Emissions	10	
	G. Maintain operations of the regional transportation system during extreme conditions*	G1. Transportation System Redundancy	5	

TransAction and NVTA's Six Year Program: Similarities and Differences



Similarities

- » Share the same modeling platform/approach
- » TransAction and the SYP use the MWCOG region's cooperative planning forecasts but NVTA has no role in their development
- » TransAction uses weighted performance measures to generate TransAction Ratings, which are used (with other quantitative) and qualitative components as part of NVTA's SYP process
- » Projects must be included in the current TransAction Project List to be eligible for funding with NVTA's Regional Revenues in NVTA's SYP

Differences

- » TA is fiscally and geographical unconstrained, while the SYP is funded (using NVTA's Regional Revenues)
- » Each project submitted for SYP funding consideration requires a Governing Body resolution, while the TransAction Project List is approved in its entirety by NVTA as part of the TransAction adoption process
- » NVTA has no direct influence over the choice of projects that are submitted for SYP funding consideration
- » Model horizon year for both TransAction and the SYP is typically several decades into the future, but the funding horizon year for the SYP is generally six years or less

Linkage between TransAction and NVTA's Funding Programs



TransAction Version (Horizon Year)	Adopted	NVTA Funding Programs	Adopted	Funding Amount (after adjustments)
TransAction 2030 (2030)	November 2006	None	N/A	N/A
TransAction 2040 (2040)	November 2012	FY2014 FY2015-2016 FY2017	July 2013 April 2015 July 2016	\$ 178,784,455 \$ 326,983,482 \$ 166,043,951
TransAction (2040)	October 2017	FY2018-2023 FY2020-2025 FY2022-2027	June 2018 July 2020 July 2022 (expected)	\$1,285,273,281 \$ 539,110,783 \$ 626,290,870
TransAction (2045)	November 2022 (expected)	FY2024-2029 FY2026-2031	July 2024 (expected) July 2026 (expected)	TBD TBD

Note: 'Funding Amount' indicates Regional (70%) Revenues directly allocated by NVTA to regional transportation projects, and does not include Local (30%) Revenues distributed by NVTA to NVTA's Member Jurisdictions for allocation to local or regional projects of their choosing



New TransAction Modeling Process

» Two-part integrated model:

- Macroscopic modeling using an enhanced version of the TPB regional model (in Cube)
- Mesoscopic modeling leverage dynamic traffic assignment techniques in DTALite

» Off-model analysis:

- Bicycle accessibility
- Qualitative assessment of D1 and E1 measures



TransAction 2045 No-Build Network

» CLRP Transportation Network

- Air Quality Conformity (AQC) Analysis of the 2020 Amendment to Visualize 2045 and FY 2021-2024 Transportation Improvement Program (TIP)

» For Northern Virginia,

- Keeps projects fully-funded by NVTA and other agencies
- Removes projects on the TA Build list

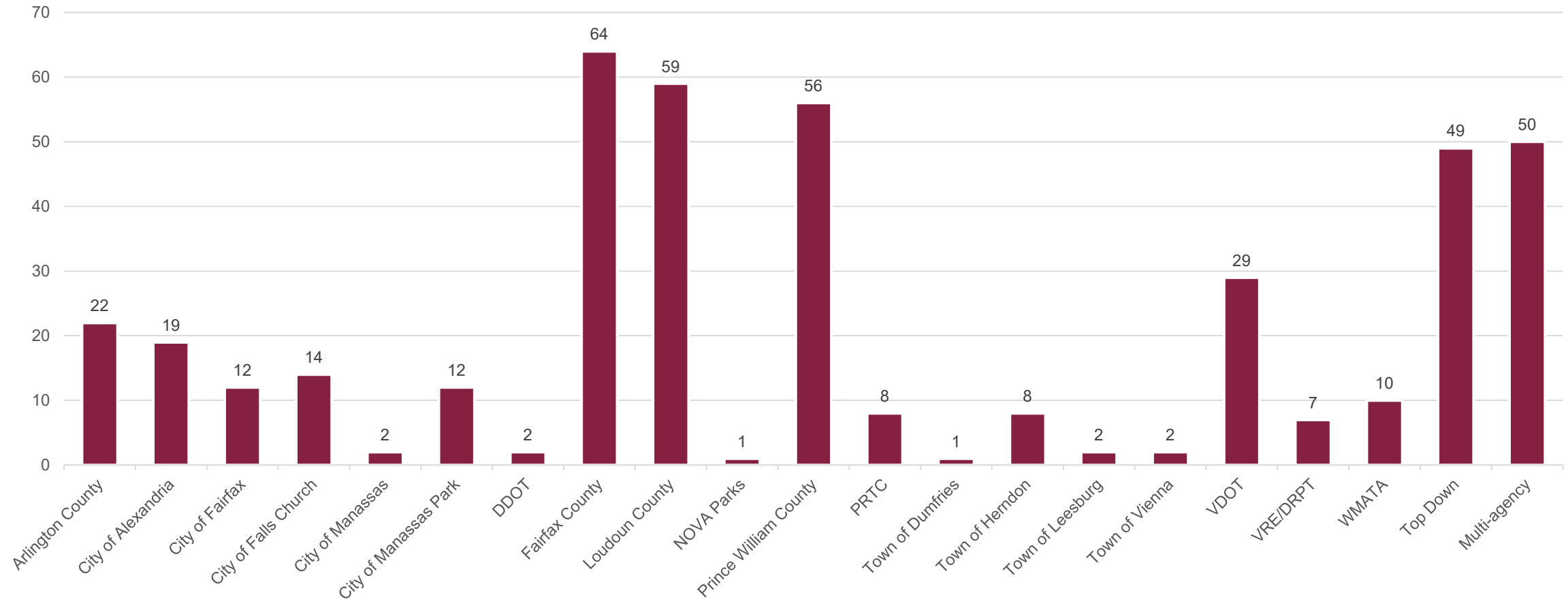
» Outside of Northern Virginia

- Keeps CLRP network



TransAction Project Sponsors

Number of Projects





TransAction Project Sponsors

Estimated Planning-Level Project Costs

