

CONTEXT FOR THE ANALYSIS OF TRANSPORTATION INEQUITIES IN DISADVANTAGED COMMUNITIES

Sergio Ritacco
Senior Transportation Planner

TPB Technical Committee
September 6, 2024



National Capital Region
Transportation Planning Board

Background

- TPB Resolution R1-2021 affirms equity as a foundational principal and commits staff to “...advance equity including every debate we have, and every decision we make as the region’s MPO;...”
- TPB staff have been individually weaving equity throughout all TPB work programs to understand the needs of all users of the regional transportation system
- This activity, conceived within the Long-Range Transportation Planning and Research and Data Programs, looks to expand the scope of how we view and consider equity beyond the more narrowly focused, federally-required environmental justice analysis of the long-range plan and explore many of the transportation-focused data inquiries received during that work



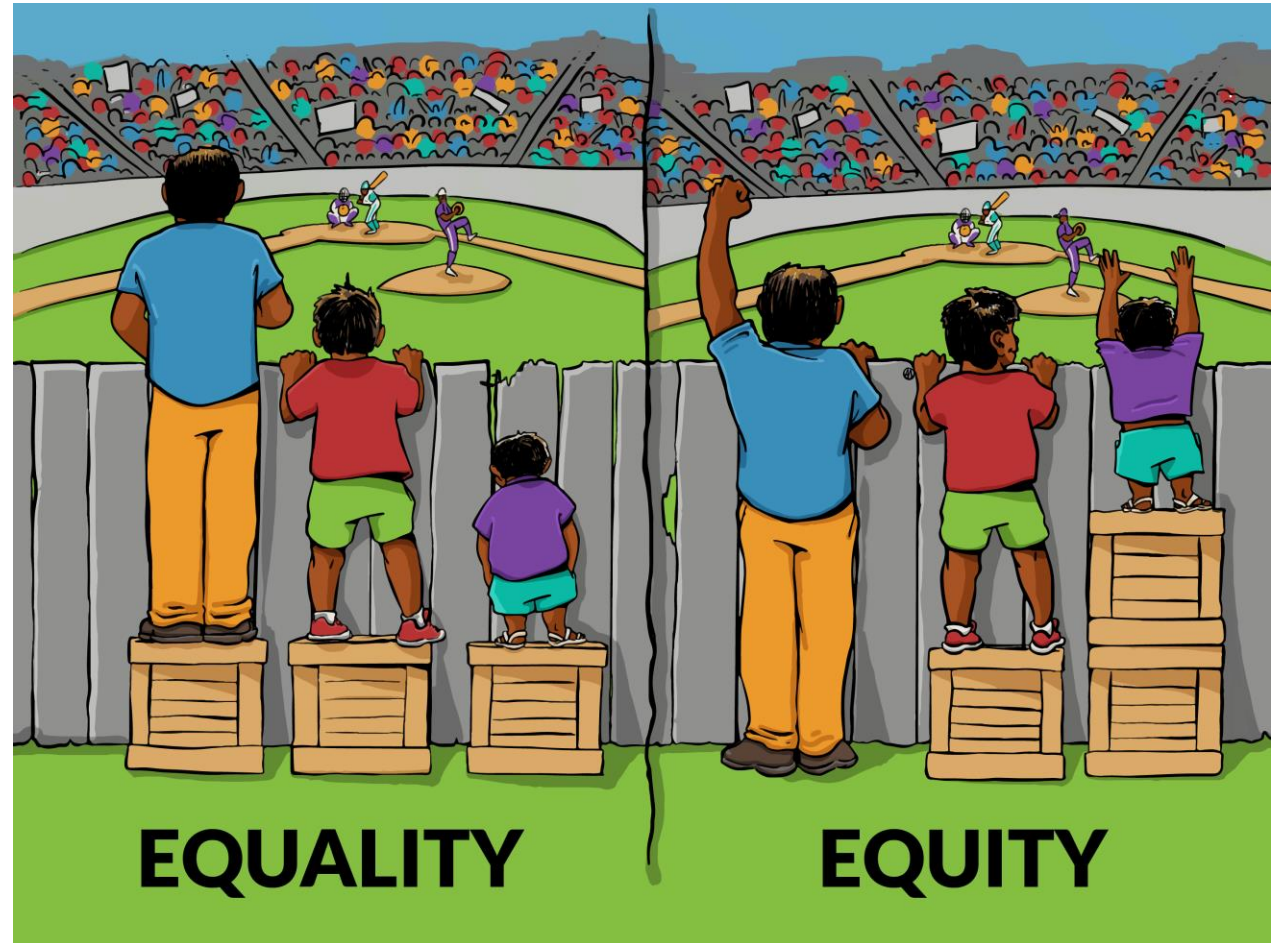
Objective

1. Understand where Disadvantaged Communities are, including Equity Emphasis Areas and federal Justice40, and how they travel **today**,
2. Understand if, where, and how inequities may exist on measures of accessibility, mobility and affordability, and congestion, and
3. Support our members with data, tools, and analysis to Think Regionally and Act Locally



Objective

- We are looking to better understand all the elements in and outside of the picture:
 - How high is the fence? Is it lower in other places?
 - Are we actually close to the field but just can't tell because of our equipment
 - Would they rather be watching another sport entirely?



Objective

Analysis is:

- Another step of many to better understand transportation accessibility and mobility issues from a regional to community-level perspective
- A novel analytical approach using “location-based” data
- Findings that increase our understanding of travel in the region

Analysis is not:

- Intended to support prescriptive and specific regional or local policy solutions within transportation and other fields
- The single authoritative source and methodology for exploring this topic

Sergio Ritacco

Senior Transportation Planner

(202) 962-3232

sritacco@mwkog.org

mwkog.org/tpb

Metropolitan Washington Council of Governments

777 North Capitol Street NE, Suite 300

Washington, DC 20002



National Capital Region
Transportation Planning Board

ANALYSIS OF TRANSPORTATION INEQUITIES IN DISADVANTAGED COMMUNITIES

Accessibility, Mobility, & Congestion

TPB Technical Committee
September 6, 2024



Agenda

- Overview
- Accessibility Analysis
- Mobility Analysis
- Congestion Analysis
- Website Overview
- Discussion/Questions



Significance + Implications

Significance of This Analysis

- There's a need to better understand how longstanding inequities manifest in the region's transportation landscape
- Identifying and quantifying inequities is the first step in addressing challenges related to accessibility and mobility

Implications for the TPB region

- Disadvantaged communities experience greater traffic congestion impacts than the region at-large
- Accounting for geographic differences, disadvantaged communities also have less access to jobs and points of interest (POIs)



Disadvantaged Communities

Equity Emphasis Areas (EEAs)

“Disadvantaged” if:

- High concentration of low-income individuals ($\geq 1.5x$ average) OR
- High concentrations of multiple disadvantaged racial/ethnic groups OR
- High concentration of disadvantaged racial/ethnic groups ($\geq 1x$ average) AND low-income individuals



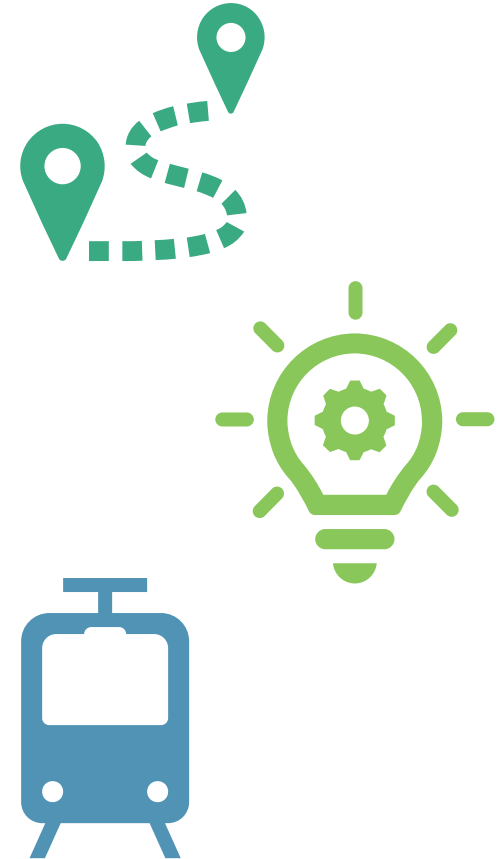
Justice40 Areas

- Climate & Economic Justice Screening Tool
- Eight burden categories: Climate Change, Energy, Health, Housing, Legacy Pollution, Transportation, Water/Wastewater, & Workforce Development
- “Disadvantaged” if burdened in one category AND related socioeconomic indicator (e.g., low income)

Analysis Overview

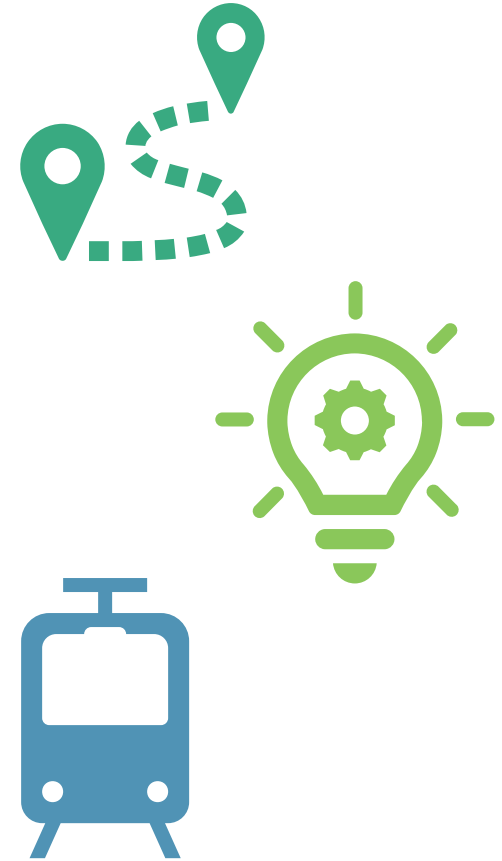
Examines regional transportation inequities based on:

- **Accessibility** of jobs and other points of interest (POIs), including healthcare, education, grocery stores, and childcare
- **Mobility**, or the degree to which transportation networks facilitate affordable travel, in terms of the percentage of household income spent on transportation
- **Congestion**, or the reduction in travel speeds



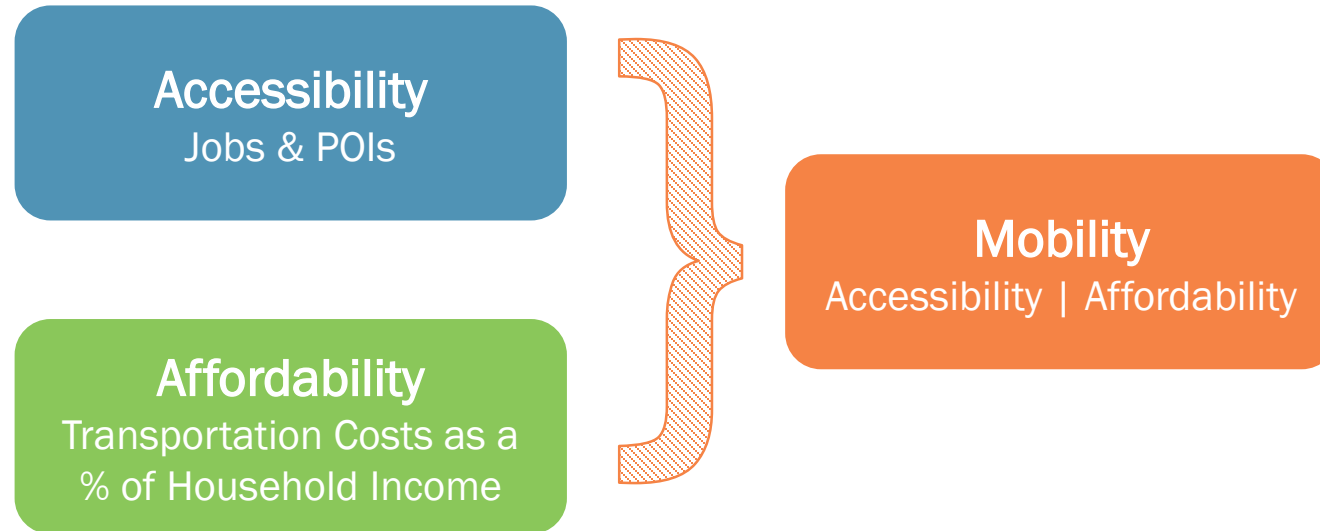
Analysis Overview

- Leverages novel tools to provide greater insight on longstanding inequities
- Results provide context for regional planning and prioritization efforts
- **This is a point in time analysis of conditions experienced now, not planned or future conditions like in the Visualize 2045 performance analysis**



Accessibility & Mobility

How do accessibility and mobility measures differ for residents of disadvantaged communities?



Traffic Congestion

Where is congestion most likely to negatively impact residents?

Traffic congestion limits accessibility and creates substantial costs to the region in the form of reduced opportunities, increased pollution, and other costs.

Slower travel limits residents' access to important destinations like jobs and points of interest.



Tools Used

Replica

- Spring 2023 weekday travel model for the Mid-Atlantic region
 - Reflects location-based services (mobile device) data
 - Distinct from the TPB's regional travel demand model
 - Informs congestion analysis with travel speed and volume data for streets throughout the region

Replica simulates travel activity based on mobile device, demographic, built environment, economic, and ground truth data



Tools Used

R5 Routing Engine

- Uses OpenStreetMap data
- Model destinations reachable in 30 minutes of:
 - Walking
 - Biking
 - Transit (includes walk time)
 - Driving

R5 provides travel-time matrices describing potential trips on:

- Streets, trails, and sidewalks in OpenStreetMap
- Transit, using GTFS data



Key Findings

Accessibility

In general, residents of disadvantaged communities have less access to jobs and points of interest.

Mobility

Areas of low-mobility generally exist outside of urban areas.

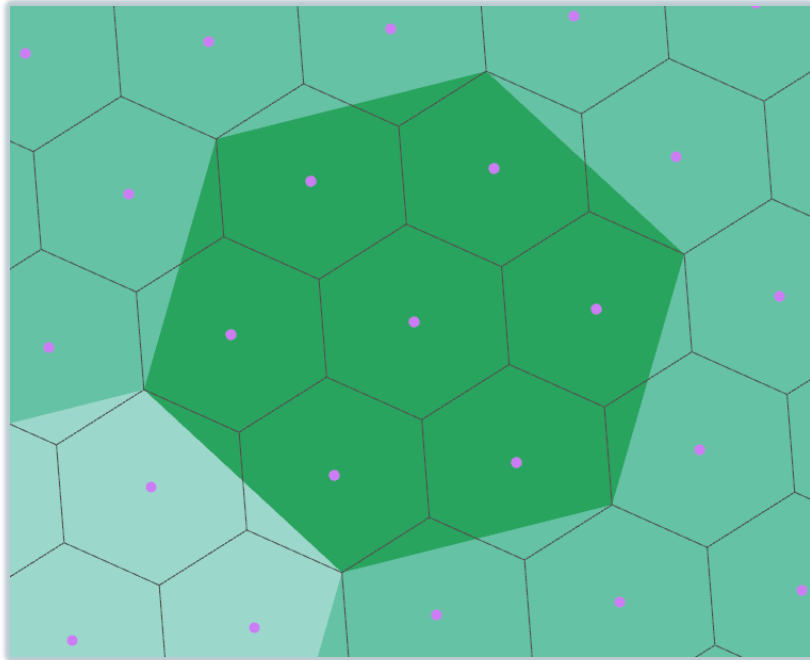
Congestion

Roadways in and around disadvantaged communities experience greater congestion.



Accessibility

Does access to jobs and points of interest differ between disadvantaged communities and the rest of the region?



- Jobs (raw count):
 - Longitudinal Employer-Household Dynamics data
- Points of interest (indexed):
 - Healthcare facilities
 - Schools
 - Grocery stores
 - Childcare



Accessibility

Jobs accessible in 30 minutes

- Disadvantaged communities have lower access to jobs walking, biking, and taking transit
 - Access is lowest amongst Justice40 Areas

	Mean Number of Jobs Accessible Higher Figures Indicate Better Job Access		
Mode	TPB Region	Disadvantaged Communities	
		EEAs	Justice40 Areas
Walk	9,682	8,811	4,865
Bike	48,907	47,598	37,033
Transit	20,516	19,303	13,384
Car	1,139,303	1,245,915	1,289,994



Accessibility

POI Index score, based on POIs accessible within 30 minutes

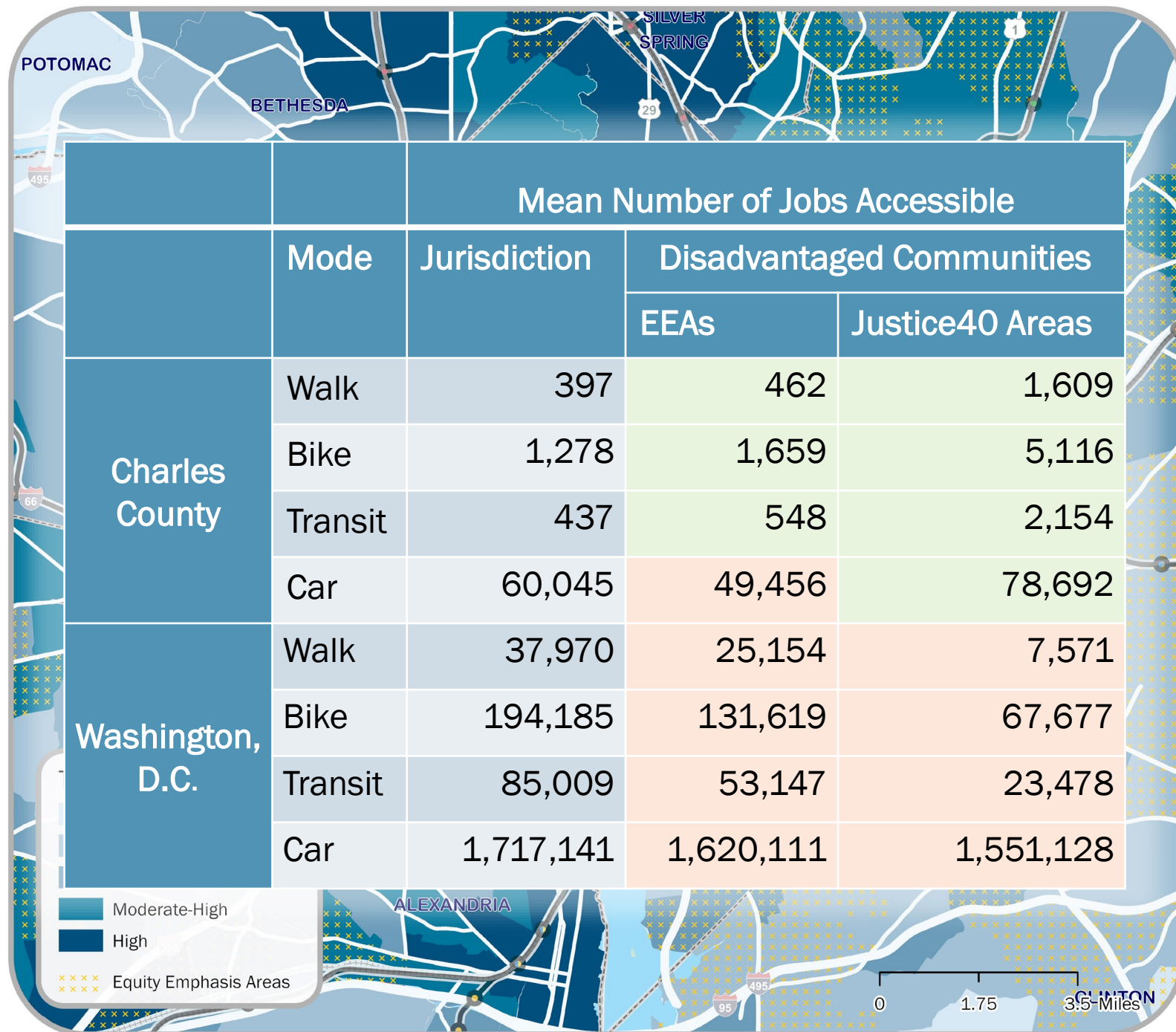
- Disadvantaged communities appear to be similarly or better connected than the region overall

	Mean POI Index Score Higher Figures Indicate Better POI Access		
Mode	TPB Region	Disadvantaged Communities	
		EEAs	Justice40 Areas
Walk	0.12	0.15	0.16
Bike	0.18	0.20	0.21
Transit	0.13	0.17	0.18
Car	0.55	0.62	0.64



Accessibility

Accessibility heavily reflects context; measures should be compared to similar geographies



Mobility

Where do disadvantaged communities have limited access to jobs and POIs and high transportation costs?

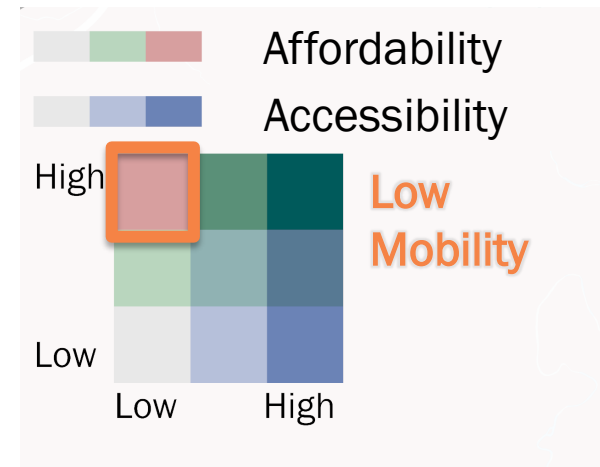
Accessibility
POI Index Scores
Jobs Accessible

Affordability
Transportation Costs as a
Percentage of Household Income*

*To learn more, please refer to Center for Neighborhood Technology [Housing + Transportation Affordability Index](#)



Mobility
Bivariate Classification of
Accessibility and Affordability



Affordability

In high-cost tracts, residents spend more than 15 percent of household income on transportation

- The percentage of income spent on transportation increases as income increases in the TPB region

Regional classification results in zero low-mobility tracts in Washington, D.C.

Percentage of High-Cost Tracts Higher Percentages Indicate Worse Affordability			
	TPB Member Jurisdictions	Disadvantaged Communities	
		EEAs	Justice40 Areas
TPB Region	22.8%	7.1%	4.7%
Maryland	30.6%	11.4%	3.7%
Virginia	22.9%	6.3%	10.8%
Washington, D.C.	0.0%	0.0%	0.0%



Mobility

Fewer disadvantaged communities are low-mobility relative to the rest of the TPB region

- Reflects denser development in these geographies

Percentage of Low Mobility Tracts				
Lower Percentages Indicate Better Mobility				
	Mode	TPB Region	Disadvantaged Communities	
			EEAs	Justice40 Areas
POIs	Walk	18.4%	3.8%	1.4%
	Bike	18.1%	4.1%	1.0%
	Transit	19.0%	4.4%	1.4%
	Car	17.9%	4.1%	1.9%
Jobs	Walk	18.8%	3.6%	1.9%
	Bike	18.5%	5.2%	1.9%
	Transit	18.5%	3.6%	2.4%
	Car	18.7%	4.1%	1.4%

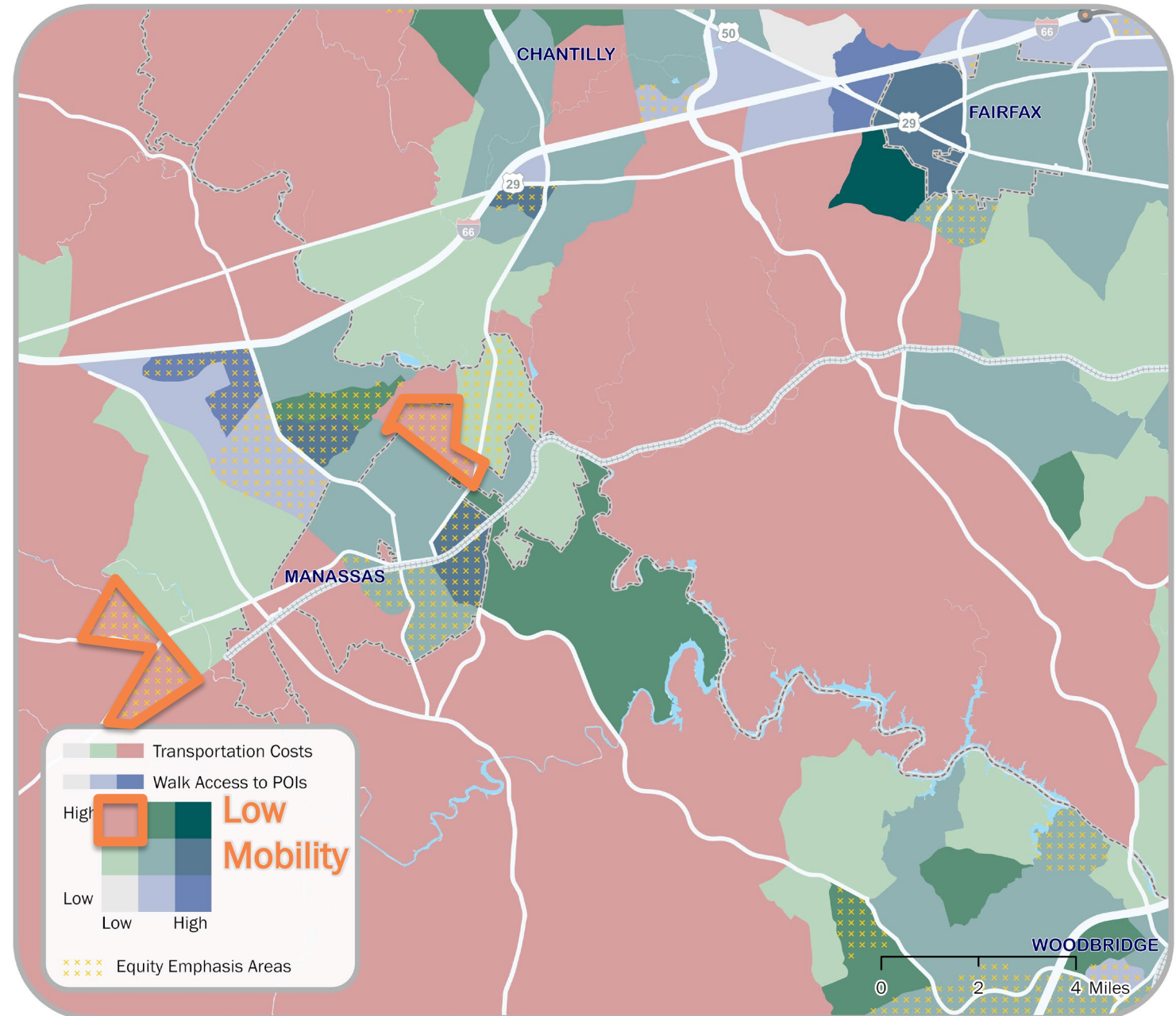


Mobility

Low-mobility disadvantaged areas constitute geographies for the prioritization of accessibility improvements

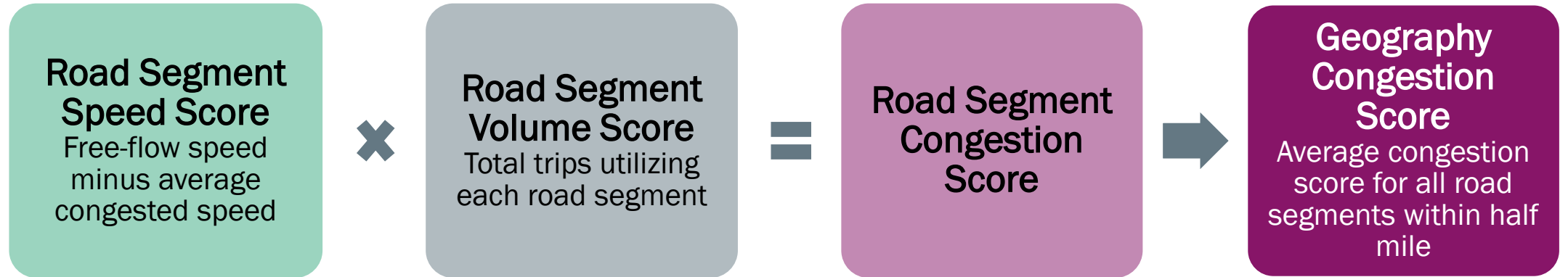
- Residents in these areas likely face substantial transportation challenges, including difficulty affording car ownership and limited transit/active transportation options

Throughout the TPB region, there are 54 high-cost EEAs



Traffic Congestion

Does the impact of traffic congestion differ between disadvantaged communities and the rest of the region?



Period of analysis: 3:00-5:00 p.m.; Thursday, Spring 2023

Traffic Congestion

- Disadvantaged communities experience greater congestion than non-disadvantaged communities
 - This effect is largest in Maryland and Virginia, reflecting greater variation in land use and development patterns
- Washington, D.C., tracts score higher than the rest of the region on average

Traffic Congestion			
Higher Scores Indicate Greater Traffic Congestion			
	TPB Member Jurisdictions	Disadvantaged Communities	
		EEAs	Justice40 Areas
TBP Region	54.9	61.6	64.3
Maryland	51.0	57.9	62.5
Virginia	53.2	59.3	60.3
Washington, D.C.	70.2	71.0	70.4



QUESTIONS?

Accessibility, Mobility, & Congestion



Explore the Results: bit.ly/3YJWFdq



National Capital Region
Transportation Planning Board

Kyle Hearing

Project Manager & Senior Transportation Planner

(301) 637-0248

khearing@foursquareitp.com

FoursquareITP.com

777 North Capitol Street NE, Suite 300

Washington, DC 20002



National Capital Region
Transportation Planning Board