

**ITEM 9 – Information**  
January 18, 2023

Environmental Justice Analysis

**Background:**

The committee will be briefed on the results of the federally required environmental justice analysis of the 2022 update of Visualize 2045. Using the TPB-approved Equity Emphasis Areas, the plan does not have a disproportionately high or significantly adverse impact on low-income and racial and ethnic minority population groups.



## **MEMORANDUM**

**TO:** Transportation Planning Board  
**FROM:** Sergio Ritacco, Transportation Planner  
**SUBJECT:** Results of the Environmental Justice analysis of Visualize 2045 (2022)  
**DATE:** January 12, 2023

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The 2022 update to Visualize 2045 (Visualize 2045) must be analyzed at the regional level for compliance with federal Environmental Justice (EJ) requirements. The EJ analysis is conducted to examine if the impact of Visualize 2045 and the projects in it would have a disproportionately high and adverse impact on two required demographics: individuals with income reported as “low-income” or racial and ethnic “minority” populations. After examining thirty-five measures on mobility and accessibility, this analysis determined that Visualize 2045 would not have a disproportionately high and adverse impact on “low-income” and racial and ethnic “minority” populations. Further, after examining the impact of the two primary elements within Visualize 2045 (the planned projects and forecast change in land use), this analysis finds that the project themselves have a positive impact on mobility and accessibility that would otherwise not exist.

The determination of this analysis is based on the TPB-approved EJ Analysis phase 2 methodology (see enclosed “Visualize 2045: Appendix N Environmental Justice Analysis” for methodology and full technical documentation) which found that the identified benefits and burdens in Equity Emphasis Areas (EEAs) would not be predominately borne nor appreciably more severe or greater in magnitude than the burdens experienced by persons in the rest of the region. When examining the impact of the planned projects and land use changes, twelve measures had results identified as marginal or within the travel demand models margin of error (defined as +/- 1% change between Today and 2045), seventeen measures identified benefits for both EEAs and the rest of the region (a positive plan impact), and six identified similar burdens for EEAs and the rest of the region (a negative plan impact).

This analysis does identify notable equity findings, particularly on the interrelationship of land use changes and the transportation investments, for the TPB to consider as it prepares for the next long-range metropolitan transportation plan, Visualize 2050. More of the new jobs we be in western portions of the region, further away from our larger EEA clusters, and the share of jobs in Activity Centers are more likely to be in the western side of the region and in non-EEAs rather than the eastern side or in EEAs. These changes in the location of people and jobs lead to a condition where job accessibility and mobility measures decline due to needing longer commutes through more congested roadways, even after accounting for the benefits associated from new transportation projects. For auto-based travel, plan forecasts of more people and jobs locating in the region increases congestion and delay and impacts EEAs ability to access and travel to where jobs are increasing. For transit-based travel, accessibility and mobility improve as the region maximizes the use of the existing system and benefits from new transit projects.

Consistent with its commitment to establish equity as a fundamental value and integral part of all its work activities, the TPB will continue to provide a forum to further explore the findings of this analysis, through ongoing consultation with member jurisdictions, to enhance the equitable distribution of benefits and elimination of any burdens to “low-income” and racial and ethnic “minority” populations groups.

**visualize**  
**2045** A long-range  
transportation plan  
for the National  
Capital Region

## APPENDIX N

### Environmental Justice Analysis

January 19, 2023



National Capital Region  
**Transportation Planning Board**

**ENVIRONMENTAL JUSTICE ANALYSIS  
FOR THE 2022 UPDATE TO VISUALIZE 2045 LONG-RANGE TRANSPORTATION PLAN  
FOR THE NATIONAL CAPITAL REGION**

January 2023

**ABOUT VISUALIZE 2045 & THE TPB**

Visualize 2045 is the federally required long-range transportation plan for the National Capital Region. It identifies and analyzes all regionally significant transportation investments planned through 2045 to help decision makers and the public “visualize” the region’s future.

Visualize 2045 is developed by the National Capital Region Transportation Planning Board (TPB), the federally designated metropolitan planning organization (MPO) for metropolitan Washington. It is responsible for developing and carrying out a continuing, cooperative, and comprehensive transportation planning process in the metropolitan area. Members of the TPB include representatives of the transportation agencies of the states of Maryland and Virginia and the District of Columbia, 24 local governments, the Washington Metropolitan Area Transit Authority, the Maryland and Virginia General Assemblies, and nonvoting members from the Metropolitan Washington Airports Authority and federal agencies. The TPB is staffed by the Department of Transportation Planning at the Metropolitan Washington Council of Governments (COG).

**CREDITS**

Editor: Sergio Ritacco, Department of Transportation Planning (DTP)

Contributing Editors:

Kanti Srikanth, Director, DTP

Lyn Erickson, Director of Plan Development and Coordination, DTP

Tim Canaan, Director of Planning Data and Research, DTP

Mark Moran, Director of Travel Forecasting and Emissions Analysis, DTP

Stacy Cook, DTP

Dusan Vuksan, DTP

Nazneen Ferdous, DTP

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TPB’s Access for All Advisory Committee

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# INTRODUCTION AND SUMMARY

## Introduction

The 2022 update to Visualize 2045 (herein Visualize 2045), the long-range transportation plan for the National Capital Region Transportation Planning Board (TPB), must be analyzed at the regional level for compliance with federal Environmental Justice (EJ) order. EJ analysis examines if Visualize 2045 would have a disproportionately high and adverse impact on “low-income” or “minority” populations. The TPB analysis of Visualize 2045 determined that the planned projects in the 2022 update of the plan would not have a disproportionately high and adverse impact on “low-income” and “minority” populations. This determination is based on the finding that the identified benefits and burdens in Equity Emphasis Areas (EEAs) would not be predominately borne nor appreciably more severe or greater in magnitude than the burdens experienced by persons in the rest of the region.

The results of this analysis meet applicable Environmental Justice guidance, policies, and regulations that the TPB is responsible for implementing as an agent of government that receives federal funding. Consistent with its commitment to establish equity as a fundamental value and integral part of all its work activities, the TPB will continue to provide a forum to further explore the findings of this analysis, through ongoing consultation with member jurisdictions, to enhance the equitable distribution of benefits and elimination of any burdens to “minority” and “low-income” populations groups.

## Purpose and Requirements

### FEDERAL REQUIREMENTS

In 1994, President Clinton signed Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” that further amplifies the requirements of Title VI and states that federal agencies must identify and address “disproportionately high and adverse human health and environmental effects, including social and economic effects, of their programs, policies, and activities on “minority” populations and “low-income” populations.”<sup>1</sup> Similar Orders from the U.S. Department of Transportation (DOT) in 1997 and the Federal Highway Administration in 1998 called upon those agencies to consider Environmental Justice in their programs, policies, and procedures.<sup>2</sup>

In August 2011, a Memorandum of Understanding signed by 17 federal agencies reinforced and renewed the federal government’s efforts in Environmental Justice.<sup>3</sup> As a result, DOT, FHWA, and FTA, communicated additional guidance reinforcing their programs and policies related to Environmental Justice and improved requirements for engaging “low-income” and “minority”

<sup>1</sup> Executive Order 12898. February 11, 1994. “Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations.” Federal Register, Vol. 59, No. 32.

<sup>2</sup> U.S. Department of Transportation. April 1997. “Environmental Justice in Minority Populations and Low-Income Populations.” Order 5610.2.

United States Federal Highway Administration. 1998. “FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” Order 6640.23.

<sup>3</sup> United States Environmental Protection Agency. August 4, 2011. “Memorandum of Understanding on Environmental Justice and Executive Order 12898.”



populations.<sup>4</sup> The guidance defines three fundamental Environmental Justice principles that are consistent with the Executive and DOT Orders:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

The DOT Orders further defines “disproportionately high and adverse effect on minority and “low-income” populations” as an effect that:

1. Is predominately borne by a minority population and/or a low-income population, or
2. will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

For MPOs to meet EJ requirements, DOT guidelines suggest the following elements be included. This Appendix complete elements #3 through #5. The TPB’s Title VI Program provides a regional demographic profile of “low-income” populations and “minority” populations (see Title VI Program page 26). The TPB’s Participation Plan identifies and describes the TPB’s policies and procedures under element #2 to provide public access and involvement under a true collaborative planning process:<sup>5</sup>

1. A regional demographic profile of low-income populations and minority populations,
2. Documentation of public involvement activity as it relates to low-income and minority populations,
3. An analytical process and mapping,
4. Determination of any disproportionate and adverse impact on low-income and minority populations based on benefits and burdens identified in the analytical process, and
5. If present, a demonstration for how plans, programs, and projects can avoid or minimize disproportionately high and adverse effects.

## Title VI Plan and Program

The Metropolitan Washington Council of Government (COG) and its Department of Transportation, as the administrative agent of the TPB (the region’s MPO): must meet a variety of Title VI requirements.

<sup>4</sup> U.S. Department of Transportation. May 2, 2012. “Department of Transportation Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” Order 5610.2(a).

United States Federal Highway Administration. June 14, 2012. “FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” Order 6640.23A.

United States Federal Transit Administration. August 12, 2012. “Environmental Justice Policy Guidance for Federal Transit Administration Recipients.” FTA C 4703.1. Docket No. FTA-2011-0055.

<sup>5</sup> United States Federal Highway Administration. April 1, 2015. “Environmental Justice Reference Guide.” Pg. 26.

Through its Title VI Plan and Program, COG and the TPB outline the nondiscrimination assurances and policies for all its programs and activities. COG's Title VI Plan, which encompasses the TPB, provides necessary policies and practices to ensure non-discrimination and compliance with FHWA and FTA Title VI requirements. These are available at [mwcog.org/TitleVI](http://mwcog.org/TitleVI).

DOT's Federal Transit Administration (FTA) requires COG, as a Designated Recipient of the FTA Section 5310 Enhanced Mobility program, to submit a Title VI Program to "document compliance with DOT's Title VI regulations by submitting a Title VI Program to its FTA regional civil rights officer once every three years or as otherwise directed by FTA".<sup>6</sup> The Title VI Program is specific to the FTA requirements and includes general requirements for an MPO. These are available at [mwcog.org/TitleVI](http://mwcog.org/TitleVI).

## TPB POLICY FRAMEWORK

The TPB Vision and the Regional Transportation Priorities Plan make up the regional policy framework meant to help guide transportation planning and decision-making in the Washington region, including considerations for fairness and accessibility.<sup>7</sup> The TPB Vision states that "The Washington metropolitan region's transportation system will provide reasonable access at reasonable cost to everyone in the region." In addition, one of the three priorities in the TPB's Regional Transportation Priorities Plan is "Strengthen Public Confidence and Ensure Fairness" by pursuing greater accountability, efficiency, and accessibility for all people, with particular attention to accessibility for persons with disabilities, low incomes, and limited English proficiency.

Further, in July 2020, the TPB unanimously passed a resolution to codify TPB's sentiments on equity so that equity considerations are always a part of the conversation. The resolution resolves:

*The TPB and its staff commit that our work together will be anti-racist and will advance equity including every debate we have, and every decision we make as the region's MPO; and*

*The TPB affirms that equity, as a foundational principle, will be woven throughout TPB's analyses, operations, procurement, programs, and priorities to ensure a more prosperous, accessible, livable, sustainable, and equitable future for all residents; and*

*We recognize past actions that have been exclusionary or had disparate negative impacts on people of color and marginalized communities, including institutionalized policies and practices that continue to have inequitable impacts today, and we commit to act to correct such inequities in all our programs and policies.*

Several other TPB and COG policy documents and studies provide additional policy context. The TPB strongly encourages agencies to consider this regional policy framework as they develop and select projects and implement policies.

### Public participation

The TPB's Participation Plan identifies and describes the TPB's policies and procedures to provide public access and involvement under a true collaborative planning process in which the interests of

<sup>6</sup> Title Vi Requirements And Guidelines For Federal Transit Administration Recipients. FTA C 4702.1B. October 1, 2012. Page III-1.

<sup>7</sup> TPB Policy Framework. October 2019. <https://www.mwcog.org/documents/2019/10/16/tpb-policy-framework/>

all of the stakeholders - public and private - are reflected and considered. Accordingly, it is the TPB's intent to make both its policy and technical process inclusive of and accessible to all of its stakeholders. The Participation Plan was last updated in 2020. The plan is available at [mwkog.org/tpb-participation-plan/](http://mwkog.org/tpb-participation-plan/).

Two citizen committees regularly advise the TPB: The Citizens Advisory Committee (CAC) and the Access for All Advisory Committee (AFA). The CAC is a group of 15 people from throughout the Washington metropolitan region who represent diverse viewpoints on long-term transportation policy. The mission of the CAC is to promote public involvement in transportation planning for the region, and to provide independent, region-oriented citizen advice to the TPB on transportation plans and issues. The AFA is made up of community leaders from around the region and advises the TPB on issues and services that are important to "low-income" communities, "minority" communities, people with limited English skills, individuals with disabilities, and older adults.

## Methodology

TPB staff developed an Environmental Justice analysis methodology which reflects two key elements:

**Phase 1:** Identifying small geographic areas with higher-than-average concentrations of "low-income" populations, "minority" populations, or both. Labelled as Equity Emphasis Areas (EEA) to denote an emphasis to place on these areas while making transportation investment decisions. The TPB approved this methodology in March 2017 and the EEAs for this analysis were identified using this methodology in July 2022.

**Phase 2:** Examining the projects in Visualize 2045 for changes in accessibility and mobility, using several different measures; determining if the changes were benefits or burdens; comparing benefits and burdens within EEAs relative to the rest of the region and determine if a disproportionately high and adverse impact on "low-income" and "minority" populations exists.

### PHASE 1: EQUITY EMPHASIS AREAS

The TPB methodology to identify EEAs, approved by the TPB at its March 2017 meeting, relies on the most recently available U.S. Census Bureau data on income, race, and ethnicity to determine which Census tracts are considered Equity Emphasis Areas. For this analysis, tract-level data from the 2016-2020 5-year American Community Survey estimates for each of the following four population groups are used to identify areas that have above average concentrations of "low-income" populations, "minority" populations, or both, compared to the TPB planning area (see Figure 1).

- "Low-Income": Individuals with household income less than one-and-a-half times the federal government's official poverty threshold, depending on household size.<sup>8</sup>
- Black or African American: A person having origins in any of the Black racial groups of Africa.
- Asian: A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent.
- Hispanic or Latino: A person of Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin regardless of race.

<sup>8</sup> For example, income less than \$36,509 for a family of four would be considered low-income. For more info see: <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html>

Racial and ethnic “minority” populations identified by the U.S. Census includes American Indian and Alaska Native, Native Hawaiian and Pacific Islander, Some Other Race, and Two or More Races, that were not used for identifying Equity Emphasis Areas. Black or African American, Asian, and Hispanic or Latino were used as they represent the largest racial and ethnic “minority” populations in the study area.<sup>9</sup> Further, statistical margin of errors for tract-level population estimates of these groups provided high levels of uncertainty for this regional analysis and were omitted for this reason, as well.

To identify tracts with above average concentrations of “low-income” or “minority” population groups, as well as to normalize and compare results across the four groups and the region, an Index Score was calculated for every tract in the region based on each group’s regional concentration in each tract. Index Scores for each population group were aggregated to reach an uncapped Total Index Score for each tract (see Table 1 and Table 2). Areas with Total Index Scores greater than or equal to 4.00 are considered Equity Emphasis Areas. A map of the identified areas is presented in Figure 1. An online interactive map is available with detailed data information at <https://gis.mwcog.org/webmaps/tpb/clrp/ej>.

**Table 1: Scoring for Criteria 1 - “Low-Income” Population Concentration**

RATIO OF CONCENTRATION (ROC or times the regional average)	INDEX SCORE
	“Low-Income” <sup>10</sup>
Between 1.5 and 3.0	4.5 to 9.0
Greater than 3.0	9.0
Index Score	4.5 to 9.0
<input checked="" type="checkbox"/> Equity Emphasis Area (Total Index ≥ 4.00) <input type="checkbox"/> Not an Equity Emphasis Area (Total Index < 4.00)	

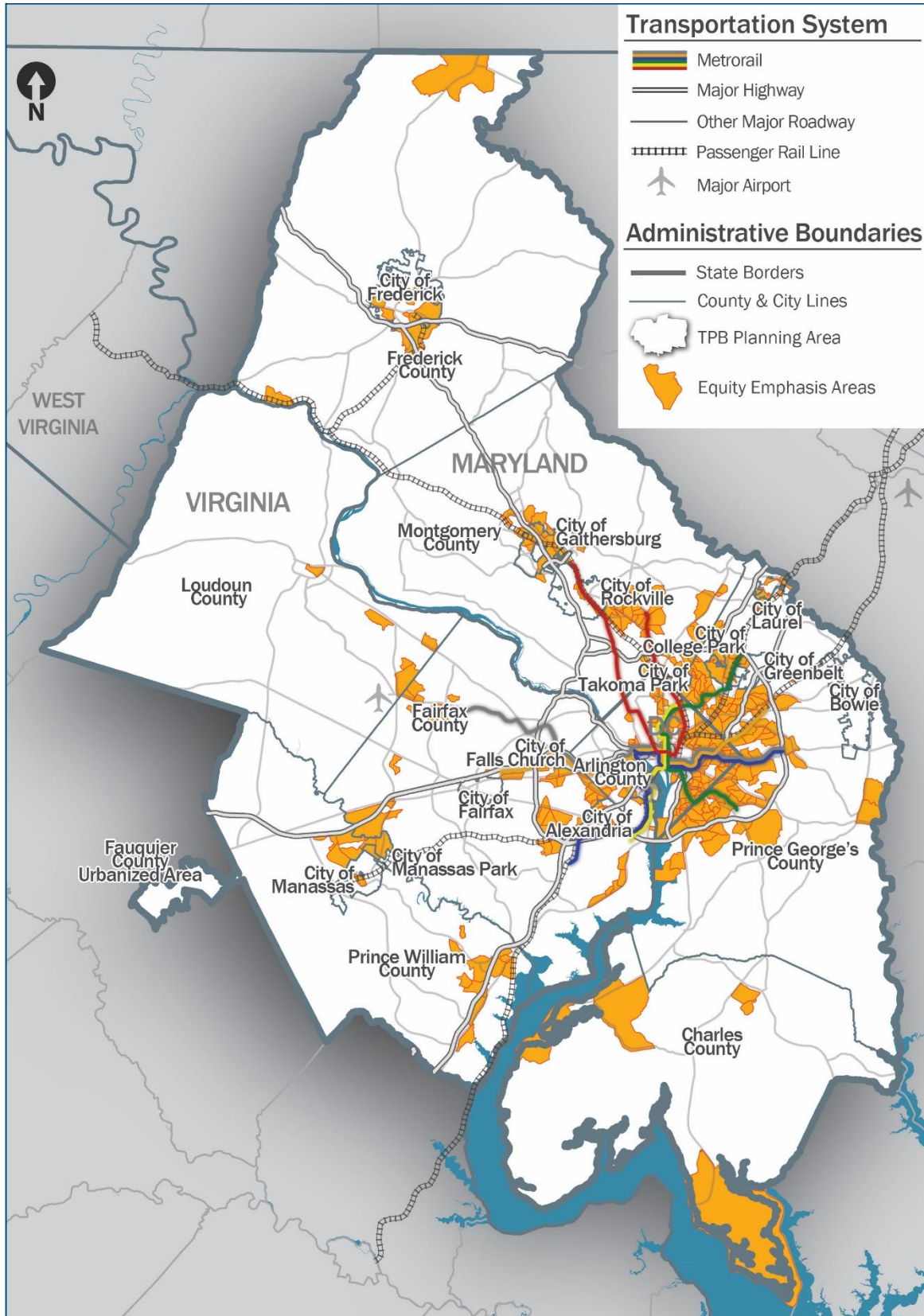
**Table 2: Scoring for Criteria 2 - “Minority” Population Concentration and Secondary “Low-Income” Thresholds**

RATIO OF CONCENTRATION (ROC or times the regional average)	INDEX SCORE			
	“Low-Income” <sup>3</sup>	African American	Asian	Hispanic or Latino
Less than 1.0	0			
Between 1.0 and 1.49	1.0 to 1.49	0	0	0
Between 1.5 and 3.0	See Criteria 1 (4.5 to 9.0)	1.5 to 3.0	1.5 to 3.0	1.5 to 3.0
Greater than 3.0	See Criteria 1 (9.0)	3.0	3.0	3.0
Total Index Score	Index scores are totaled			
<input checked="" type="checkbox"/> Equity Emphasis Area (EEA) (Total Index ≥ 4.00) <input type="checkbox"/> Not an Equity Emphasis Areas (EEA) (Total Index < 4.00)				

<sup>9</sup> Region is defined as the TPB Planning Area: <http://www.mwcog.org/transportation/tpb/jurisdictions.asp>.

<sup>10</sup> The ROC for low-income is multiplied by three to determine the index score but capped at 9.0.

Figure 1: Equity Emphasis Areas and the TPB Planning Area





## PHASE 2: ANALYSIS OF VISUALIZE 2045

Phase 2 of the Environmental Justice 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 throughout the future years covered by the Visualize 2045. To make its predictions, the model relies on the latest regional population, household, and job growth forecasts prepared by COG, information on existing travel patterns from the TPB's 2017/2018 Regional Household Travel Survey, and the future transportation system laid out in Visualize 2045.<sup>11</sup>

This analysis primarily compares changes in transportation system performance from 2023 (Today) to a future, labelled "2045 Plan-Build" scenario, using a variety of accessibility and mobility measures. The changes in mobility and accessibility are attributable to the planned transportation projects included under the plan's financially constrained element and the forecasts change in population and employment. The analysis also includes "2045 No-Build" scenario data, which represents a future in which no new transportation projects would be constructed, but anticipated population and job growth would still occur. This additional scenario allows the analysis team to better understand if the changes in accessibility and mobility measures are due to the impact of the transportation projects in Visualize 2045 or if they result from anticipated population and job growth.

The first step is to identify Transportation Analysis Zone-equivalencies for the U.S. Census tract-level Equity Emphasis Areas identified in Phase 1. Transportation Analysis Zone (TAZ) is the level of analysis used by the TPB for conducting the classic, "four-step" regional travel demand model.<sup>12</sup> Using a geographic information system, a TAZ is identified as an Equity Emphasis Area tract-level equivalent when its centroid is located within an Equity Emphasis Area tract. Additional staff review was completed to confirm these locations and make technical adjustments, when necessary.

Next, the TPB Planning Area as-a-whole, the aggregated TAZ-level EEA equivalents, and the aggregated rest of the region are used as unique geographies to calculate average accessibility and average mobility measures for the three identified scenarios. For accessibility measures, the average for an origin zone is calculated by averaging the number of opportunities (e.g., jobs) for all destination zones weighted by the household population of each zone. This "weighted-average accessibility" approach is consistent with the methodology used in the performance analysis of Visualize 2045.

Mobility measures are the average model-estimated commute travel times for the residents of Equity Emphasis Areas and for the rest of the region. This measure is based on the mode choice output and evaluates travel times for the specific EEA-based and non-EEA-based (rest of the region) commute trip origins and destinations generated by the model. All residents of Equity Emphasis Areas are included in calculations regardless of their income and race and ethnicity since model-generated output cannot be disaggregated to that level.

The analysis developed quantitative estimates for the above measures for three geographic areas: (1) the entire TPB planning area, (2) the Equity Emphasis Areas as a whole and for (3) the rest of the region (excluding the EEAs). These estimates were then examined to identify benefits and burdens in

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<sup>11</sup> The results of this analysis use the following input data: MWCOC's Round 9.2 Cooperative Land-Use Forecasts and TPB's Version 2.4 Travel Demand Model. These findings are based on regional model estimates that come with a degree of uncertainty.

<sup>12</sup> Additional detail: <https://www.mwcog.org/transportation/data-and-tools/modeling/model-documentation/>

all three areas. For accessibility measures, a benefit is identified as an increase in average accessibility or an increase in the population with access to transit services between today and 2045. Conversely, a burden is identified when a decrease in average accessibility or a decrease in the population with access to transit services between today and 2045 is identified. For mobility measures, a benefit is identified when the average commute time or average travel time declines between today and 2045. A burden is identified when the average commute time or average travel time increases between today and 2045. Finally, results are considered marginal or within travel demand model margin of error if the “Plan Build” and/or “No-Build” results fall within +/- 1% from their base, “Today” scenario.

Using the results and established benefits and burdens, the final step is to determine if any of the estimated impacts, due to planned projects in Visualize 2045, results in a disproportionately high and significantly adverse impact on “low-income” and “minority” populations. The impact would be considered disproportionately high and significantly adverse when the adverse effect, or burden, is predominately borne by the Equity Emphasis Areas or will be suffered by the Equity Emphasis Areas and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the rest of the region.

## LIMITATIONS

The methodology of this analysis is limited by available tools and data. Racial and ethnic groups tend to be undercounted in the U.S. Census surveying, relative to the general population. The number of individuals with disabilities may also be underestimated, because the Census relies on self-reports of disability status and some individuals may be reluctant to identify themselves as having a disability.

The analysis assumes that the areas identified as Equity Emphasis Areas today will remain unchanged in 2045. However, the location of these areas will most likely change by 2045 as changes in land uses, housing prices, and migration patterns alter the demographic profile of the region over the next 23 years. Given the multiple variables and the difficulties in predicting how these variables will change in this region in the future, the current geographic distributions are assumed to remain constant through 2045.

Finally, the measures used in the analysis are limited. To measure benefits and burdens of Visualize 2045, the analysis considers quantifiable aspects of the regional transportation system, such as the location of major highways and transit routes. The analysis does not consider more qualitative aspects of the system that affect the accessibility of the transportation system to “low-income” and “minority” populations. These may include:

- Safety and comfort
- Reliability
- Availability of off-peak service
- Availability of information and ease of use
- Language barriers

In addition, the analysis focuses specifically on the impact of the transportation system and the forecasted impact of Visualize 2045 on various accessibility and mobility measures. It does not consider non-transportation-related benefits and burdens, such as air, water, or noise pollution.

## Environmental Justice Analysis Results

This analysis finds that implementing the projects in Visualize 2045 would not have a disproportionate and adverse impact on “low-income” and “minority” populations. This determination is based on the findings from the analysis documented in the Phase 2 methodology. Of the thirty-five measures analyzed, twelve measures had results marginal or within the travel demand models margin of error, seventeen measures identified benefits for both EEAs and the rest of the region, and six identified similar burdens for EEAs and the rest of the region (see Table 3). No measure identified a disparate impact that is predominately borne by a “minority” population and/or a “low-income” population or suffered by the “minority” population and/or “low-income” population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the “non-minority” population and/or “non-low-income” population.

Beyond the “disparate impact” requirement this analysis does identify notable findings for the TPB to consider in its long-range metropolitan transportation planning process. For auto-based travel, plan forecasts of more people and jobs locating in the region increases congestion and delay and impacts EEAs ability to access and travel to where jobs are increasing. For transit-based travel, accessibility and mobility are improving as the region maximizes the use of the existing system as well as adding more transit projects.

This analysis examines the impact of the projects in the constrained element along with the expected job and population growth in the region. When analyzing the impact of these two elements on the region’s transportation network together, on auto-based figures beyond the model’s margin of error, we find that EEAs often benefit slightly less and, if burdened, do so slightly greater. This is due to the limited positive impact of the planned roadway projects’ ability to accommodate expected increase in people and jobs, particularly as they locate to western portion of the regions. For transit-based figures, they improve for EEAs and the rest of the region as the region continues to add people and jobs near existing transit while also adding more transit to this region.

The region expects large growth of people and jobs by 2045, placing greater demand on the transportation system, adding 19 and 22 percent more by 2045, respectively. Activity Centers will contain 67% of all jobs and 35% of the population and more than a quarter of all people and half of all jobs will be close to High-Capacity Transit. Further, more of the new jobs we be in western portions of the region, further away from our larger EEA clusters, and the share of jobs in Activity Centers are more likely to be in the western side of the region and in non-EEAs rather than the eastern side or in EEAs. These changes in the location of people and jobs lead to a condition where job accessibility and mobility measures decline due to needing longer commutes through more congested roadways, even after accounting for the benefits associated from new transportation projects.

Examining the role of the transportation projects, the region’s financial obligations to maintain and operate the existing system limit the availability of funds for system expansions and enhancements. Funding available to expand the roadways systems leads to an additional five percent in roadway miles. As a result, the increase in people and jobs increases demand at rates greater than the improvements associated with the new roadway projects can accommodate, increasing delay and congestion for EEAs and non-EEAs and limiting benefits (improve accessibility or mobility) or identifying burdens on some roadway measures (decreases in accessibility or mobility).

For the transit network, a 27 percent increase in high-capacity transit miles compared to 2023 improves mobility and accessibility measure across most transit measures for EEAs and the rest of the region. The region is bringing online various transit projects and forecasting more people and jobs near existing high-capacity transit stations. As a result, both EEAs and the rest of the region are expected to see benefits to accessibility and mobility associated with various forms of transit travel.



**Table 3: List of Environmental Justice Measures**

<i>Measure</i>	<i>Geography</i>	<i>Time Period</i>	<i>Plan Impact</i>
<i>Access to All Jobs, Auto</i>	EEAs	AM Peak	<b>Marginal or within Margin of Error</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>Access to Retail Jobs, Auto</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>Access to Medical Care Facilities, Auto</i>	EEAs	AM Peak	<b>Burden</b>
	Non-EEAs	AM Peak	<b>Burden</b>
<i>Access to Higher Education, Auto</i>	EEAs	AM Peak	<b>Burden</b>
	Non-EEAs	AM Peak	<b>Burden</b>
<i>Access to All Jobs, Transit</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>Access to Retail Jobs, Transit</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>Access to Medical Care Facilities, Transit</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Marginal or within Margin of Error</b>
<i>Access to Higher Education, Transit</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>Access to All Jobs, Walk to Bus</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>Access to Retail Jobs, Walk to Bus</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>Access to Medical Care Facilities, Walk to Bus</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Marginal or within Margin of Error</b>
<i>Access to Higher Education, Walk to Bus</i>	EEAs	AM Peak	<b>Marginal or within Margin of Error</b>
	Non-EEAs	AM Peak	<b>Marginal or within Margin of Error</b>
<i>Access to All Jobs, Walk to Transit</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>Access to Retail Jobs, Walk to Transit</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>Access to Medical Care Facilities, Walk to Transit</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>Access to Higher Education, Walk to Transit</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>Access to All Jobs, Walk to Bus</i>	EEAs	OFF Peak	<b>Benefit</b>
	Non-EEAs	OFF Peak	<b>Benefit</b>
<i>Access to Retail Jobs, Walk to Bus</i>	EEAs	OFF Peak	<b>Benefit</b>
	Non-EEAs	OFF Peak	<b>Benefit</b>
<i>Access to Medical Care Facilities, Walk to Bus</i>	EEAs	OFF Peak	<b>Marginal or within Margin of Error</b>
	Non-EEAs	OFF Peak	<b>Marginal or within Margin of Error</b>
<i>Access to Higher Education, Walk to Bus</i>	EEAs	OFF Peak	<b>Marginal or within Margin of Error</b>
	Non-EEAs	OFF Peak	<b>Marginal or within Margin of Error</b>

<b>Measure</b>	<b>Geography</b>	<b>Time Period</b>	<b>Plan Impact</b>
<i>Access to All Jobs, Walk to Transit</i>	EEAs	OFF Peak	<b>Benefit</b>
	Non-EEAs	OFF Peak	<b>Benefit</b>
<i>Access to Retail Jobs, Walk to Transit</i>	EEAs	OFF Peak	<b>Benefit</b>
	Non-EEAs	OFF Peak	<b>Benefit</b>
<i>Access to Medical Care Facilities, Walk to Transit</i>	EEAs	OFF Peak	<b>Benefit</b>
	Non-EEAs	OFF Peak	<b>Marginal or within Margin of Error</b>
<i>Access to Higher Education, Walk to Transit</i>	EEAs	OFF Peak	<b>Marginal or within Margin of Error</b>
	Non-EEAs	OFF Peak	<b>Benefit</b>
<i>Change in Share of Population with Access to HCT</i>	EEAs	n/a	<b>Benefit</b>
	Non-EEAs	n/a	<b>Benefit</b>
<i>Change in Share of Pop. With Bus Service</i>	EEAs	AM Peak	<b>Marginal or within Margin of Error</b>
	Non-EEAs	AM Peak	<b>Marginal or within Margin of Error</b>
<i>Change in Share of Pop. With Bus Service</i>	EEAs	OFF Peak	<b>Marginal or within Margin of Error</b>
	Non-EEAs	OFF Peak	<b>Marginal or within Margin of Error</b>
<i>% Change in Avg. Commute Time, Auto</i>	EEAs	AM Peak	<b>Burden</b>
	Non-EEAs	AM Peak	<b>Burden</b>
<i>% Change in Avg. Commute Time, Transit</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Marginal or within Margin of Error</b>
<i>% Change in Avg. Access Time to Closest Med Facility, Auto</i>	EEAs	AM Peak	<b>Burden</b>
	Non-EEAs	AM Peak	<b>Burden</b>
<i>% Change in Avg. Access Time to Closest Med Facility, Auto</i>	EEAs	OFF Peak	<b>Burden</b>
	Non-EEAs	OFF Peak	<b>Burden</b>
<i>% Change in Avg. Access Time to Closest Med Facility, Transit</i>	EEAs	AM Peak	<b>Burden</b>
	Non-EEAs	AM Peak	<b>Burden</b>
<i>% Change in Avg. Access Time to Closest Med Facility, Transit</i>	EEAs	OFF Peak	<b>Marginal or within Margin of Error</b>
	Non-EEAs	OFF Peak	<b>Burden</b>
<i>% Change in Avg. Access Time to Closest Med Facility, Walk to Transit</i>	EEAs	AM Peak	<b>Benefit</b>
	Non-EEAs	AM Peak	<b>Benefit</b>
<i>% Change in Avg. Access Time to Closest Med Facility, Walk to Transit</i>	EEAs	OFF Peak	<b>Benefit</b>
	Non-EEAs	OFF Peak	<b>Benefit</b>

## Conclusion

While this Environmental Justice analysis was conducted to meet federal requirements on transportation equity for “low-income” and “minority” populations, it can also contribute to important and ongoing transportation policy discussions for promoting the fair and equitable treatment of all individuals, including “low-income” population, racial and ethnic “minorities,” people with disabilities, and older adults. Equity Emphasis Areas will most likely change by 2045 as land-use, housing prices, and migration patterns alter the demographic profile of the region. As it is difficult to predict where changes will occur, the current geographic distributions are assumed to remain constant through 2045. As a result, it will be important for policy makers and future analysis to monitor how accessibility and mobility measures shift based on these assumptions.

# Environmental Justice Analysis

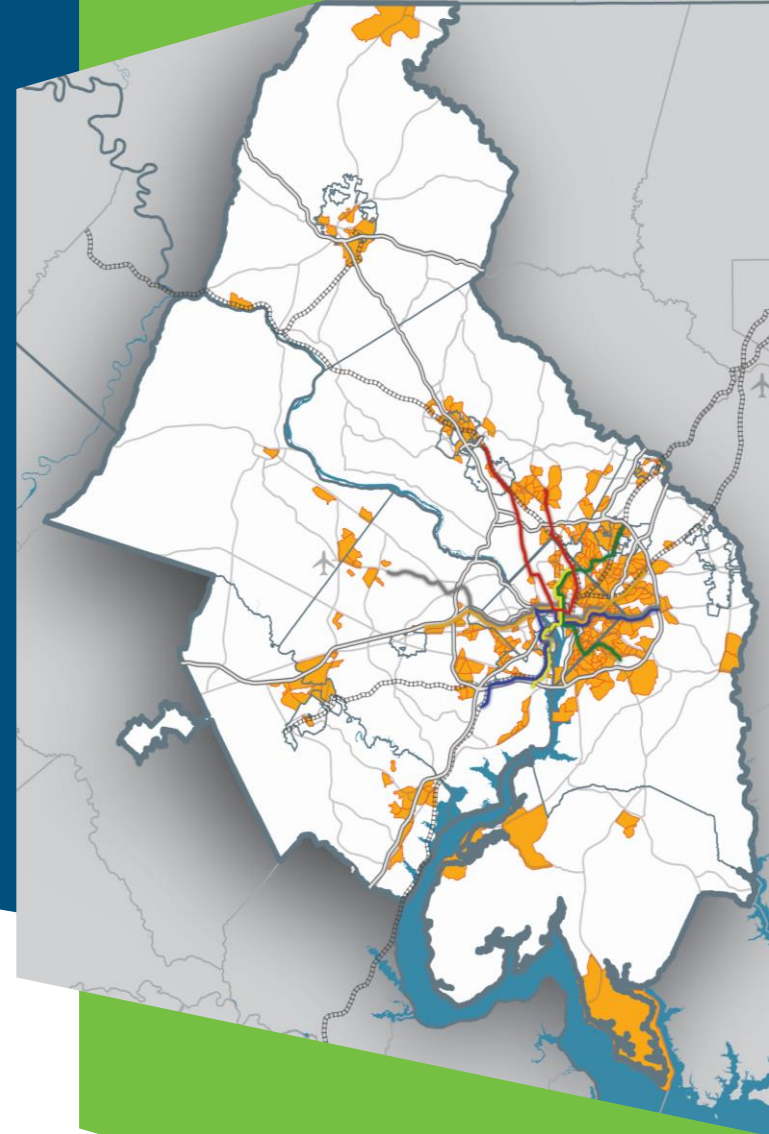
**Sergio Ritacco**  
Transportation Planner

**Transportation Planning Board**  
January 18, 2023

**Agenda Item #9**

**visualize**  
**2045**

**A long-range  
transportation plan  
for the National  
Capital Region**



# Environmental Justice (EJ) Analysis Requirements

- **What is the federal requirement?**  
Analyze the impact of the LRTP (Visualize 2045) on “minority” populations and “low-income” populations (EJ population) to identify and address adverse ‘**disparate impact**’
- **What is a ‘disparate impact’?**  
An adverse plan impact that will be predominately borne or suffered by EJ populations and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-EJ population
- **How does this fit with the TPB’s policy priorities?**  
“...The TPB affirms that equity, as a foundational principle, will be woven throughout TPB’s analyses, operations, procurement, programs, and priorities...”

# How does the TPB comply with its Environmental Justice requirements?

**Today!**

## Phase I

- Identify small geographic areas in the region with high concentration of EJ populations called Equity Emphasis Areas (EEAs)
  - Methodology adopted in 2017
  - Latest mapping update July 2022

## Phase II

- Use TPB's model to examine changes between today and 2045 in mobility and accessibility within EEA and non-EEA areas
- Determine if Visualize 2045 imposes a disparate impact on EEAs in comparison to Non-EEAs

# EJ Analysis Phase II Methodology

- Use land use changes and transportation projects from our current LRTP (Visualize 2045 approved in July 2022)
- Analyze 35 accessibility and mobility measures to examine the impact of those land use changes and transportation projects
- Analysis assumes static location of EEAs, Medical facilities, and Higher-Ed institutions through 2045
- Analysis is limited to regional-level findings (EEAs as a whole vs non-EEAs) and not to any individual/subset of EEAs
- Typical uncertainties associated with forecast-like analyses

# EJ Analysis Phase II Measures

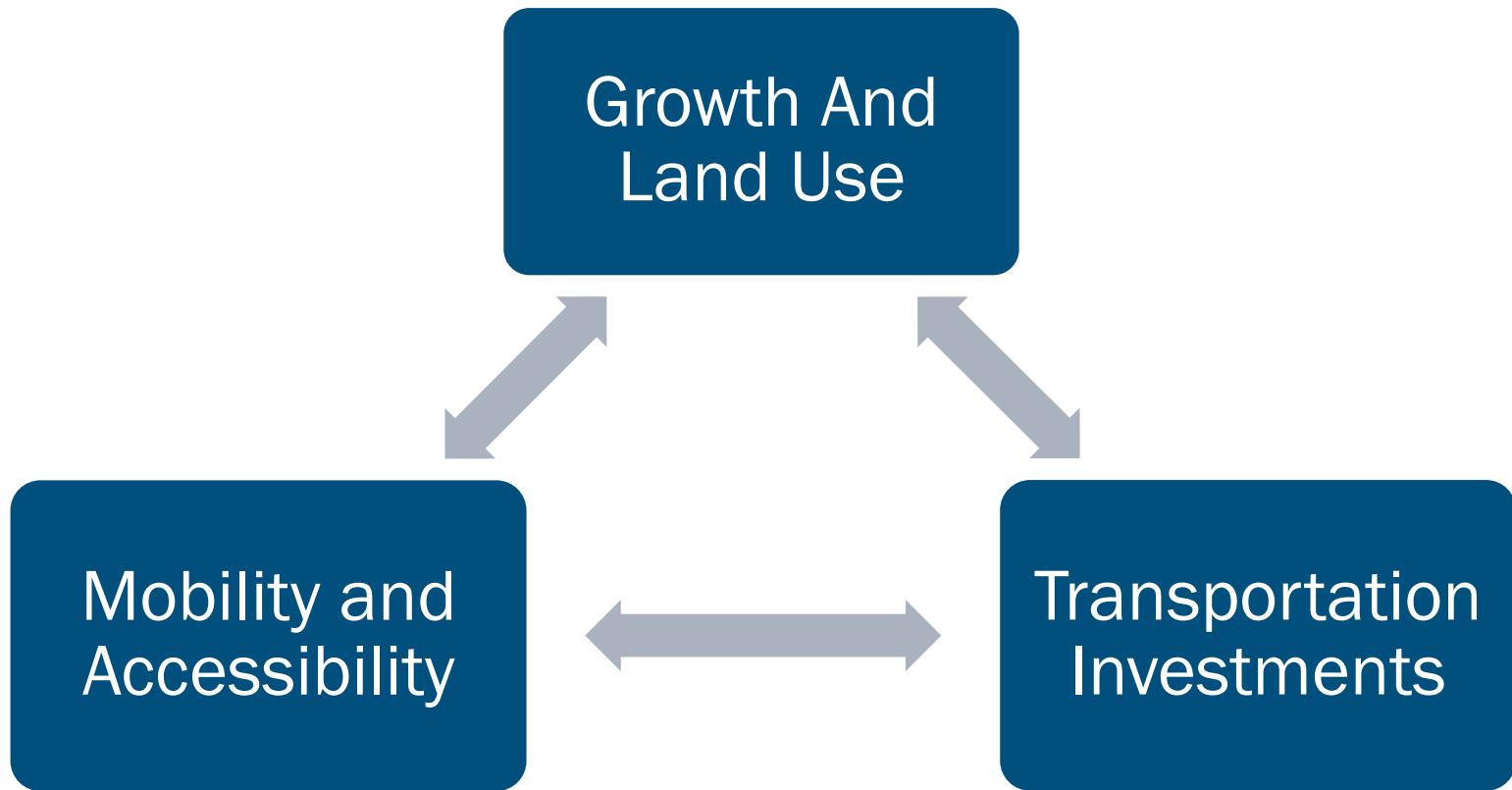
- 35 measures in total examining the impact of land use changes and transportation projects in various ways:
  - Access to All Jobs, Retail Jobs, Medical Facilities, & Higher Education institutions using various modal options and times of day
  - Commute times to work and travel times to Medical Facilities and Higher Education institutions using various modal options and times of day
  - Percent of Population with access to High-Capacity Transit and access to Bus service



# Environmental Justice Determination Visualize 2045 (2022 LRTP update)

- **Determination:** The 2022 LRTP, Visualize 2045, does not have an adverse disparate impact on “low-income” and “minority” populations
- The planned transportation projects of Visualize 2045 will have a positive impact on mobility and accessibility that would otherwise not take place
- Depending on the measure, the magnitude of change in burden or benefit are different between EEAs and Non-EEAs

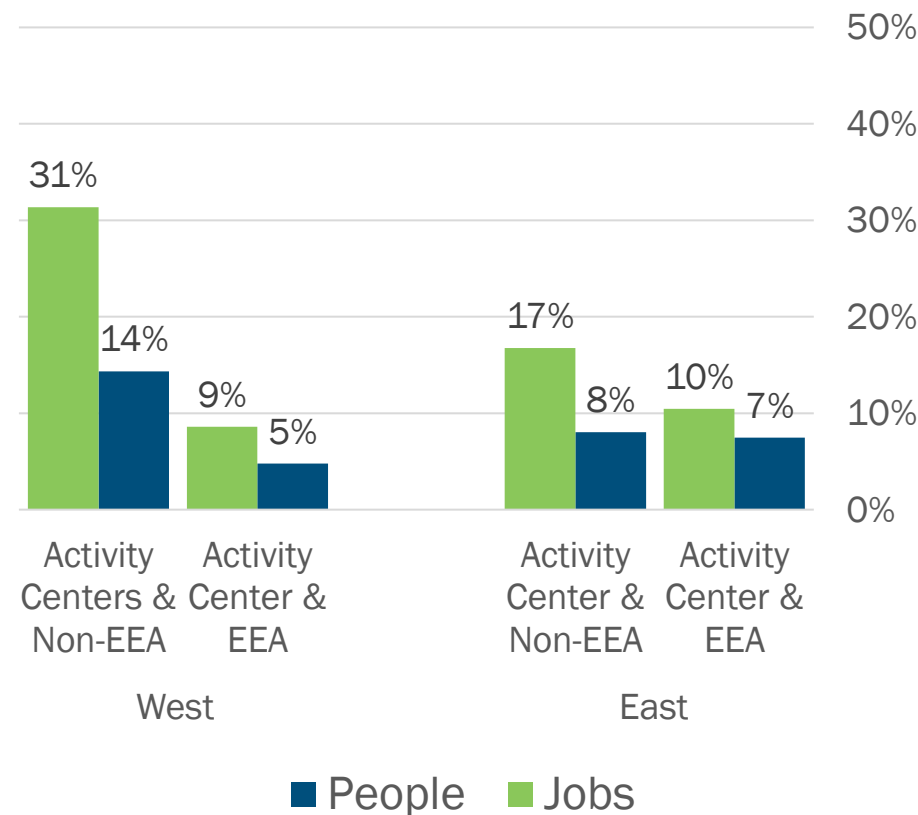
# L RTP Elements and EJ Analysis



# Land Use and Growth in LRTP

- Present: 5.7M people, 3.4M jobs, and 141 Regional Activity Centers (RAC)
- By 2045: Additional 1.3M people and 0.9M jobs
- By 2045: 67% of all jobs and only 35% of the population will be in RACs
- By 2045: 50% of all jobs and only 25% of people will be within ½ mile of a High-Capacity Transit stations
- Additionally, the distribution of this growth is uneven between the eastern and western parts of this region.

Share of Region's People and Jobs located within geography (2045)



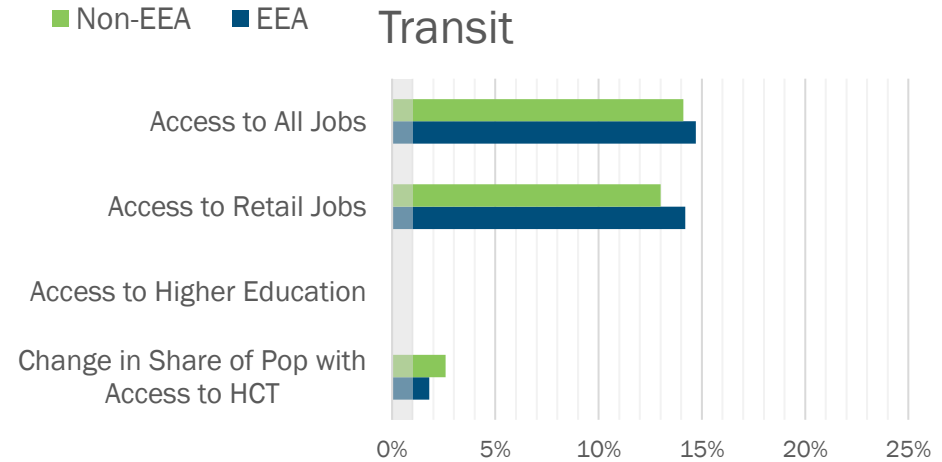
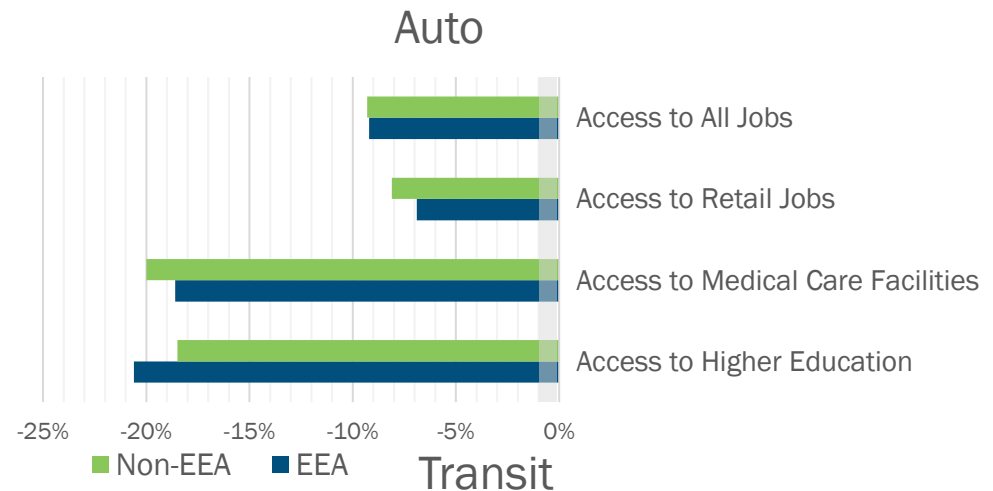
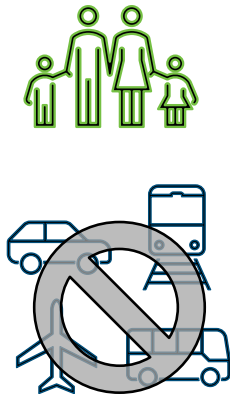
# Environmental Justice Analysis Results

## Growth Impact, Accessibility

### Growth Impact Only

Burdens across all Auto measures

Transit measures see benefits as jobs & people are added close to existing transit



Decrease = **Burden**      Increase = **Benefit**

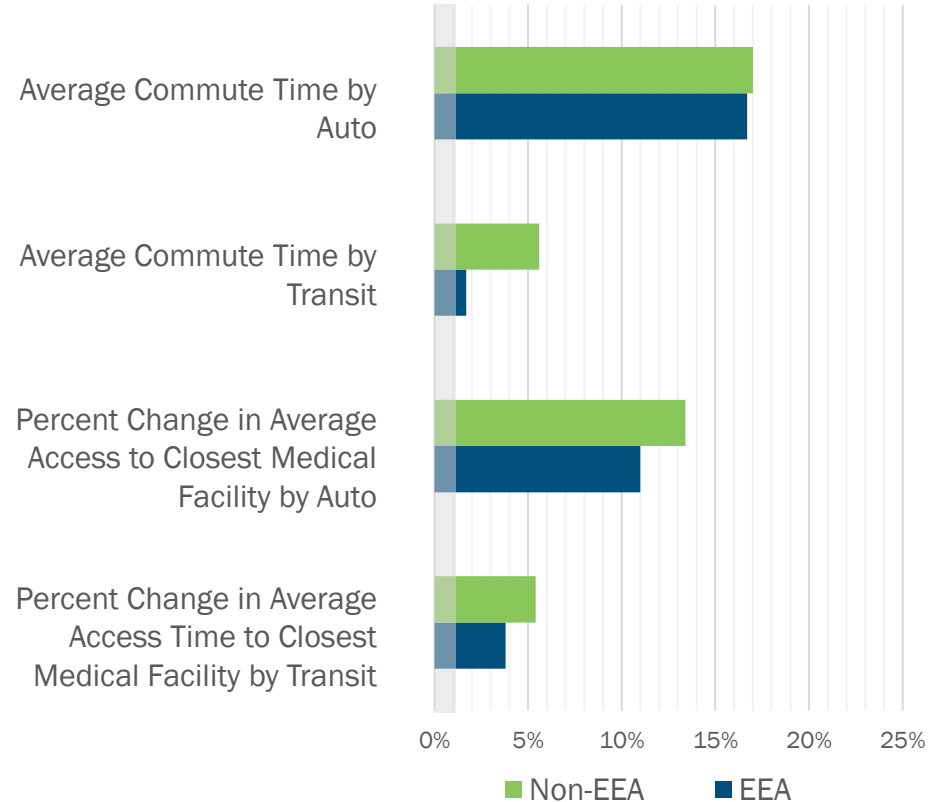
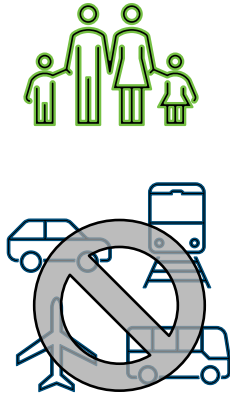
# Environmental Justice Analysis Results

## Growth Impact, Mobility

### Growth Impact Only

Burdens across all Auto measures

Transit experiences crowding & delay as more jobs & people use existing transit



Decrease = Benefit

Increase = **Burden**

# Environmental Justice Analysis Results

## Transportation Investments

- In Visualize 2045, only 19% of expenditures are available for system expansion and enhancement, providing a 5% and 27% increase in roadway and high-capacity transit miles, respectively

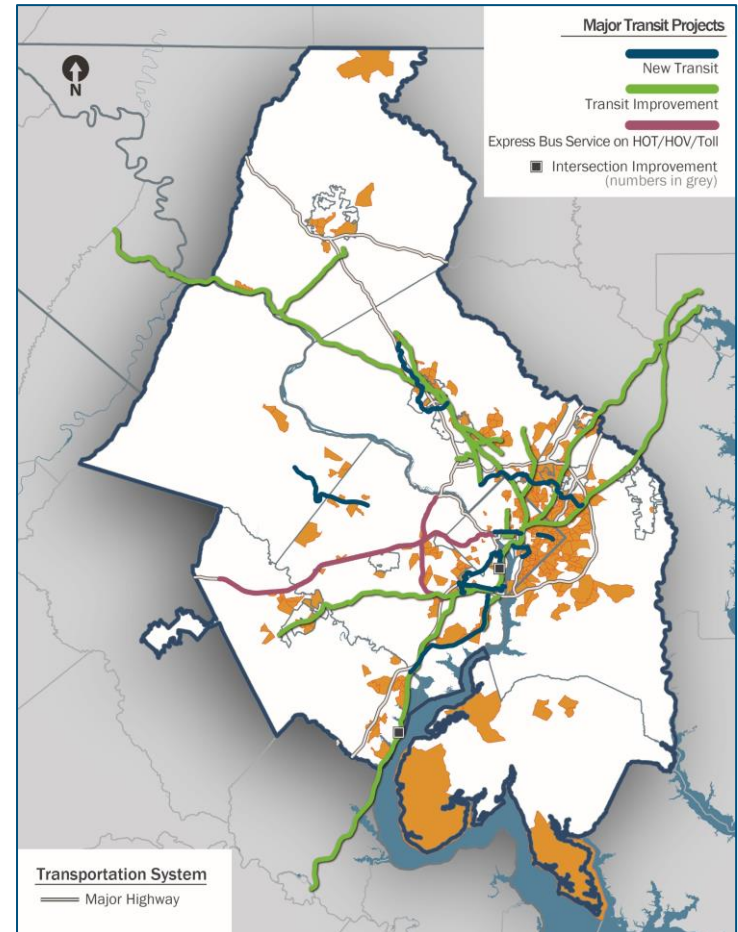
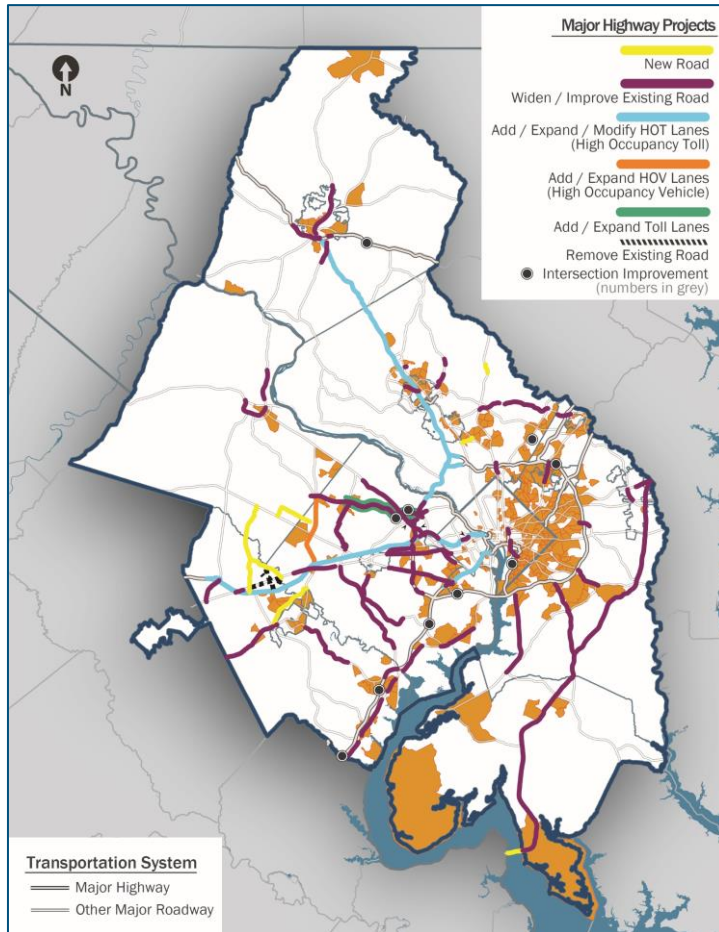
	System	Existing (2023)	Added by Visualize 2045 update	Total 2045
Roadway (Lane Miles)	Freeways/Expressways	3,802	682	4,484
	Arterials	13,479	211	13,690
	<b>Total</b>	<b>17,281</b>	<b>893</b>	<b>18,174</b>
<b>Tolled Lanes (Lane Miles)*</b>	<b>Total</b>	<b>532</b>	<b>221</b>	<b>753</b>
High-Capacity Transit (Miles)	Metrorail	129	0	129
	Light Rail/Streetcar	18	5	23
	Bus Rapid Transit	19	87	106
	Commuter/Regional Rail	173	**	173
	<b>Total</b>	<b>339</b>	<b>92</b>	<b>431</b>

\* Tolled lanes are a subset of freeways/expressways

\*\* An approximate additional 16 miles of rail are included in the plan, not presented in the table as they are not reflected in the model outputs.

# Environmental Justice Analysis Results

## Transportation Investments

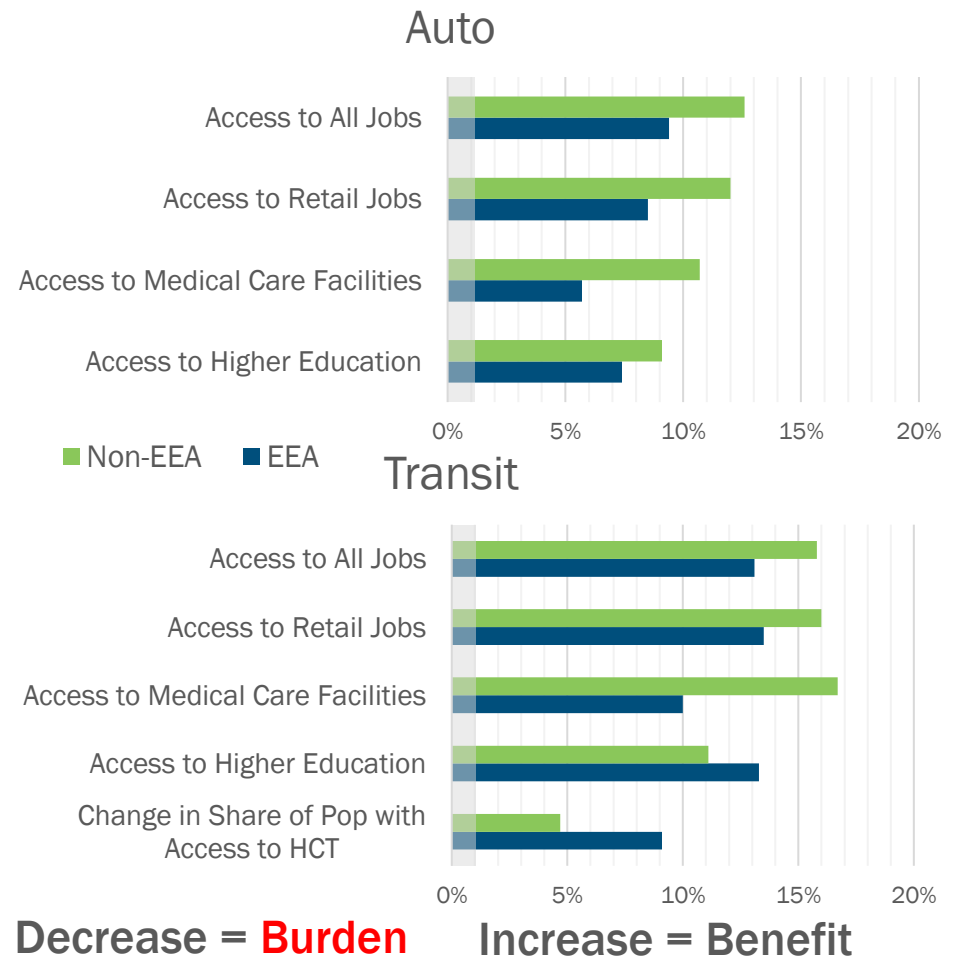
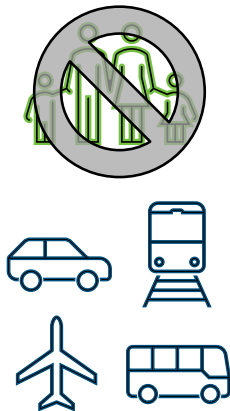


# Environmental Justice Analysis Results

## Projects Impact, Accessibility

### Project Impact Only

Benefits across all Auto and Transit measures  
Improved accessibility to jobs, medical care facilities, and post-secondary education





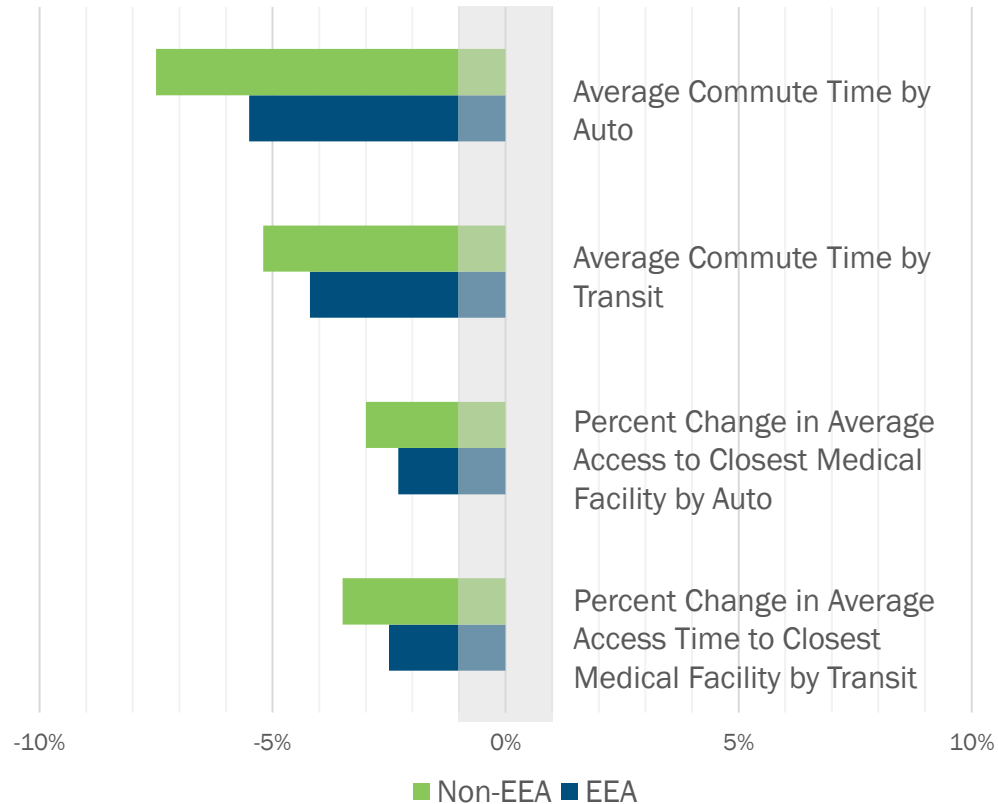
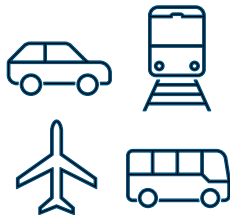
# Environmental Justice Analysis Results

## Projects Impact, Mobility

### Project Impact Only

Benefits across all Auto and Transit measures

Help provide shorter travel times to commutes and nearest medical care



Decrease = Benefit

Increase = **Burden**

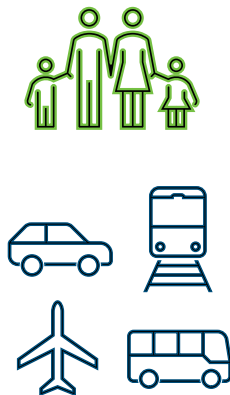
# Environmental Justice Analysis Results

## Visualize 2045 Impact, Accessibility

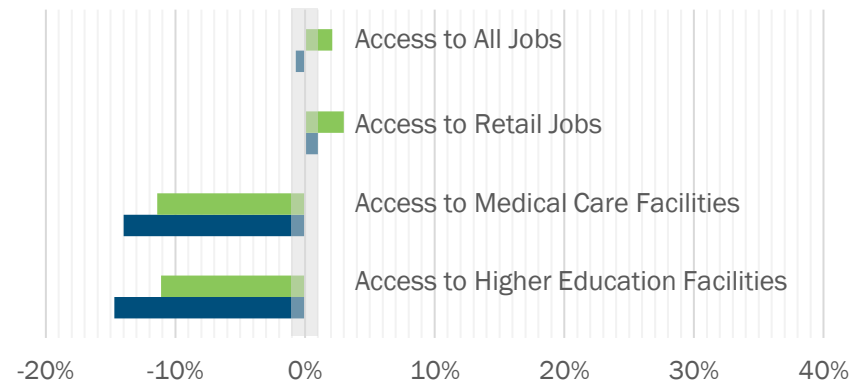
### Visualize 2045 Impact

Congestion and delay negatively impact auto-based measures

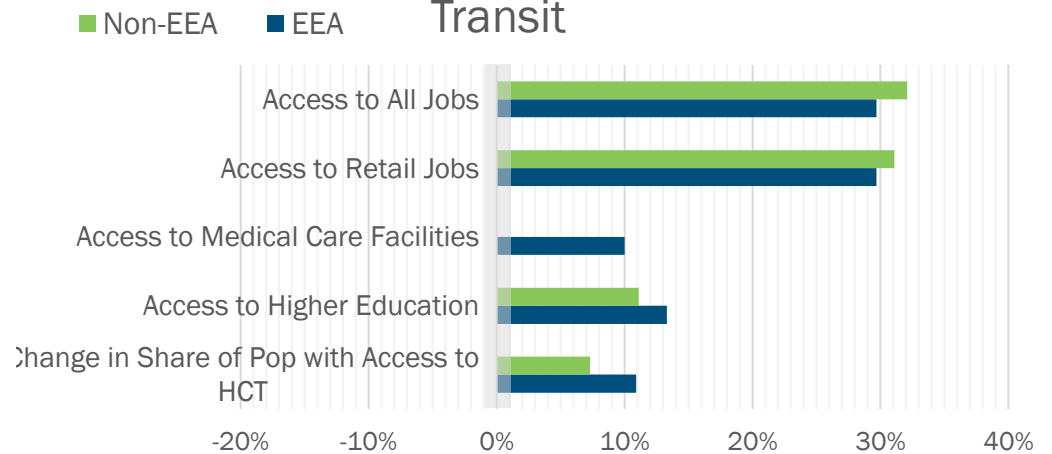
EEAs and Non-EEAs track similarly though EEAs often benefit slightly less and burden slightly more



Auto



Transit



Decrease = **Burden**      Increase = **Benefit**

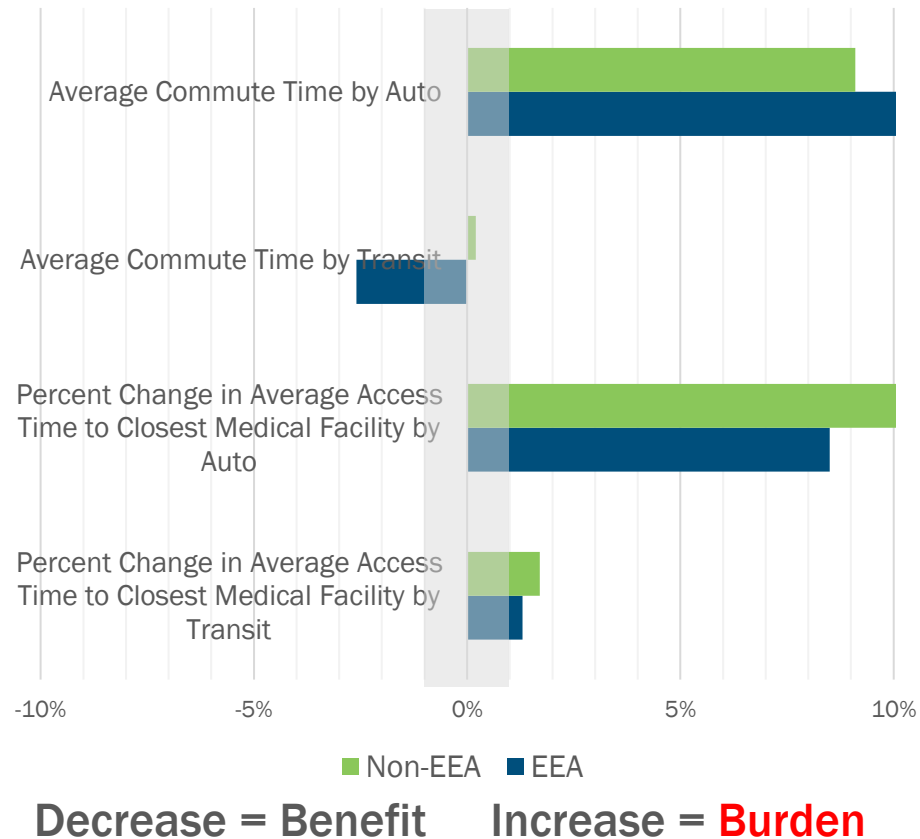
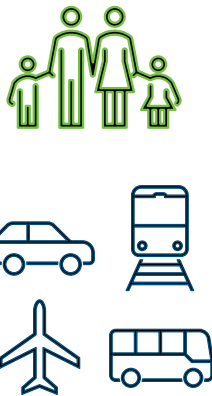
# Environmental Justice Analysis Results

## Visualize 2045 Impact, Mobility

### Visualize 2045 Impact

Congestion and delay negatively impact auto-based measures

EEAs and Non-EEAs track similarly though EEAs often benefit slightly less and burden slightly more



# Environmental Justice Analysis Summary

- Visualize 2045 complies with the federal EJ requirement for disparate impact on “minority” and “low-income” populations and the impact of its transportation projects are positive
- For auto-based travel, more people and jobs increases congestion and delay impacting EEAs ability to access and travel to where jobs are increasing
- For transit-based travel, accessibility and mobility are improving as the region maximizes the use of the existing system as well as adding more transit projects
- The interrelationship between land use changes and the transportation projects it aims to serve can lead to implicit regional equity challenges
- Assumptions used to conduct this analysis (future location of EEAs and confidence levels of model results) provide important context to results.

## **Sergio Ritacco**

Transportation Planner

(540) 533-2330

sritacco@mwkog.org

**[mwkog.org/TPB](http://mwkog.org/TPB)**

Metropolitan Washington  
Council of Governments

777 North Capitol Street NE,  
Suite 300

Washington, DC 20002

visualize  
**2045**