MEMORANDUM

TO: TPB Technical Committee

FROM: Sergio Ritacco and Stacy Cook, TPB Transportation Planners

SUBJECT: Update of Performance Measures in Long-Range Transportation Plan Analyses

DATE: December 30, 2021

This memo provides an overview of staff's efforts to refresh the TPB performance measures. The purpose of this activity is to:

- Review current measures used to evaluate system performance against TPB policy framework;
- Present consultant and staff working group recommended additional measures; and
- Review current status, performance analysis constraints and technical limitations, and next steps.

Please direct questions and comments to Sergio Ritacco, (202) 962-3232, sritacco@mwcog.org, or Stacy Cook, Principal Transportation Planner, (202) 962-3335, scook@mwcog.org.

BACKGROUND

Staff, aided by consultant support (herein study team), examined the various analyses evaluating aspect(s) of system performance on the long-range transportation plan and the region's transportation system. This examination assessed if these various analyses were collectively describing the multi-modal, multi-disciplinary performance of the transportation system the planned investments is anticipated to provide. The work recommended a collection of ten measures, and methods of developing them, which addresses these planning policy focus areas. A high-level of focus was on being responsive to and guided by the TPB policy framework and touch-on transportation issues of importance to our region.

REVIEW OF EXISTING PERFORMANCE ANALYSIS MEASURES

Starting in 2020, the study team conducted a review of existing, regional long-range planning analyses to compare how their performance measures compare against "planning policy focus areas" (ie., singular terms for themes and topics from the TPB's policy documents). The analyses and measures reviewed are for the current long-range transportation plan, Visualize 2045, and are the Performance Assessment of Visualize 2045, the Regional Air Quality Conformity Analysis, the Environmental Justice Analysis, the Performance-Based Planning and Programming target areas, the Congestion Management Planning reporting requirements, and measures in the Long-Range Plan Task Force Final Report.

Listing of the Long-Range Plan analyses and their measures

- **Performance Assessment of Visualize 2045 (approved 2018)** (16 measures)
  - GHG - total emissions & per capita
  - Daily Mode Share - SOV, HOV, Transit, Walk/Bike – Reg
  - Daily Mode Share - SOV, HOV, Transit, Walk/Bike - Sub-Reg
  - VMT Per Capita
  - Travel on Reliable Modes (HOV & Transit)
  - Work Mode Share - SOV, HOV, Transit, Walk/Bike – Reg
  - Work Mode Share - SOV, HOV, Transit, Walk/Bike - Sub-Reg
  - % Lane Miles Congested
  - Vehicle Hours of Delay
  - Change in Jobs Accessible by Transit
  - Change in Jobs Accessible by Auto
  - RAC Proximity to HCT
  - POP Proximity of HCT - Reg & Sub-Reg
  - EMP Proximity to HCT - Reg & Sub-Reg
  - EMP Growth within RAC
  - POP Growth within RAC
- **Regional Air Quality Conformity Analysis** (2 measures)
  - VOC Emissions - tons/day
  - NOx emissions - tons/day
- **Environmental Justice Analysis** (10 measures)
  - Avg. number of jobs accessible by auto
  - Avg. number of jobs accessible by transit
  - Avg. number of jobs accessible by HCT
  - Avg. number of jobs accessible by bus
  - POP with walkable access to HCT
  - POP with walkable access to bus service
  - Avg. commute time by auto
  - Avg. commute time by transit
  - Avg. travel time to closest hospital by auto
  - Avg. travel time to closest hospital by transit
- **Performance-Based Planning and Programming target areas** (18 measures)
  - Number of fatalities
  - Fatality rate (per 100 million VMT)
  - Number of serious injuries
  - Serious injury rate (per 100 million VMT)
  - No. of non-motorized fatalities & serious injuries
  - No. of reportable fatalities and rate per total VRM by mode
  - No. of reportable injuries and rate per total VRM by mode
  - No. of reportable events and rate per total VRM by mode
  - Mean distance between major mechanical failures by mode
  - % of IS pavements in Good & Poor conditions
  - % of Non IS NHS pavements in Good & Poor conditions
  - % of NHS bridges in Good & Poor conditions
  - %of PMT on the IS System that are reliable
  - % of PMT on the non-IS NHS that are reliable
  - Truck Travel Time Reliability Index
  - Annual hours of peak-hour excessive delay per capita
  - Percent of non-single-occupant vehicle travel
  - Total emissions reduction (Criteria pollutants)
- **Congestion Management Planning reporting requirements** (6 measures)
  - Travel Time Index (TTI) (annual, monthly, time of day and day of week, peak periods)
  - Planning Time Index
  - (annual)
  - Percent of Congested Miles (annual)
  - TTI * Miles
  - TTI * Miles * AADT
  - Travel Time on selected commute routes
  - (peak hours and time of day, both in annually)
- **Measures in the Long-Range Plan Task Force Final Report** (18 measures)
  - Travel Time (SOV)
  - Travel Time (HOV)
  - Travel Time (Transit)
  - Daily Vehicle Hours of Delay
  - Jobs Accessible by Transit
  - Jobs Accessible by Auto
  - Mode Share: SOV
  - Mode Share: HOV
  - Mode Share: Transit
  - Mode Share: Non-Motorized
  - Travel on Reliable Modes**
  - VMT daily
  - VMT daily per capita
  - Share of Households in Zones with High-Capacity Transit
  - Share of Jobs in Zones with High-Capacity Transit
  - VOC Emissions
  - NOx Emissions
  - CO2 Emissions

The study team reviewed the TPB policy framework to identify common themes and topics that arose from the documents. The TPB policy framework includes the TPB Vision, COG Region Forward, TPB Regional Transportation Priorities Plan (RTPP), and Visualize 2045's Aspirational Initiatives.

Listing of the identified planning policy focus areas from TPB policy documents

- Accessibility
- Affordability
- Air Quality
- Comprehensive Multimodal System
- Connectivity
- Economy
- Emerging Mobility and Tech
- Environmental / Resiliency Sustainability
- Equity
- Land Use
- Mobility/ Reliability
- Operational Efficiency
- Public Health
- Safety
- State of Good Repair

The study team assessed if and to what extent the various performance analyses the TPB conducts were collectively evaluating the multi-modal, multi-disciplinary performance of the transportation system and the planned investments the plan is anticipated to provide through the identified planning policy focus areas. This effort recommended a comprehensive set of ten performance measures for staff to consider advancing that would better inform regional policymaking, provide information and insights to help TPB members target investments, better address system deficiencies, and improve overall transportation system performance tools.

RECOMMENDED ADDITIONAL PERFORMANCE ANALYSIS MEASURES

After an internal process of evaluating and testing the recommended additional performance measures, including engaging key staff in COG's DEP and DCPS departments, nine measures are either being considered for inclusion into the Visualize 2045 update, in other TPB study or long-range transportation plan analysis, or long-term development for future use as staff addresses technical limitations and timing.

Inclusion in Visualize 2045 documentation

- Accessibility: Access to Travel Options
- Multimodal Accessibility Index
- Exposure to Localized Transportation Pollution
- Density and Open Space: Population-Weighted Density

Inclusion in other TPB study or analysis

- Infrastructure Exposed to Flooding
- Number of Projects that Improve Resiliency*

Development for future use

- Accessibility: 15-Minute Neighborhoods
- Cost of Travel
- Green Infrastructure: Percent Green Land Cover

*The count of projects in the constrained element that consider each of the federal planning factors will be included in the Visualize 2045 update.

The proposed measures broadly fall into two timeframe examination categories: current conditions or forecast. Current condition measures use latest available data to examine how the existing transportation system, land use, and demography interact in their current form. These measures can provide further insight into how we are doing now and where we need to go. Forecast-based measures use current data and model-based results to predict the impact of the transportation plan on future conditions.

CONSTRAINTS OF PERFORMANCE IMPACT AND TECHNICAL LIMITATIONS

Challenges and constraints with previous performance analysis remain true for the upcoming analysis.

PERFORMANCE IMPACT

All measures recommended and considered for advancement seek to examine the role of the entire multi-modal, multi-disciplinary transportation system to the degree that the methodologies allow. Some measures present data and findings at small geographic scales that are dependent on how it interacts with the complete transportation network. However, the TPB does not evaluate individual project impact or performance. Further, the combined impact of all projects in the constrained project list on transportation system performance is expected to be at the margins. This is in part due to the new enhancement projects being a relatively small set of projects in the transportation plan compared to the extent of the existing transportation system. While these projects are regionally important and intended to improve mobility and accessibility, expectations on how much 'the needle is moved' on any particular performance measure should be measured, especially given that these projects are not only addressing transportation demand of today, but that demand with an additional 1.3 million people and another 900 thousand jobs.

TECHNICAL LIMITATIONS

Performance Measure requirements

A subset of the total performance measures that TPB produces are necessary to be compliant with federal requirements, such as air quality/mobile budget targets and performance-base planning and programming. The selected performance measures and analysis need to inform regional policymaking, providing information and insights that might help TPB members target investments, policies and programs that address system deficiencies, mitigate negative externalities, and improve transportation system performance. The measures must also be completed within a reasonable period and level of effort for staff to implement as part of its normal LRTP development scope.

Data Availability

Methods and their findings are only reliable if the data they are based on are reliable and accurate as well. Input data must be feasible, available, and repeatable within a timeframe reasonable for the major update timeframe for the LRTP (every 4 years). Data must also be capable of producing valid results at the required geographic level of detail for the entire TPB planning area.

Tools

Examination of the study team's recommended measures identified various technical limitations and constraints. Three measures use a Network Dataset to identify travelsheds for accessibility or mobility analysis by time and by mode. Various constraints exist on a region-wide network dataset that may influence staff's level of confidence with output results associated with this method. Particularly, limitations exist on the fidelity, veracity, and inter-jurisdiction comparability on a region-wide network dataset. In addition, one measure uses a novel approach to combine accessibility results for different modes with different calculation methods (Multimodal Accessibility Index) and two measures use methods and results proprietary to other organizations (Center for Neighborhood Technology Housing and Transportation Cost Index, U.S. EJScreen).

The table on page 6 present summaries of the proposed measures and identifies development status.

NEXT STEPS

Staff will continue to accept and consider additional TPB Technical Committee comments and feedback. Following the December presentation, staff will continue to advance development and evaluation of these measures, details on next steps for each measure is included in the table on page 6.

Please reach out to Sergio Ritacco, Transportation Planner, at (202) 962-3232, sritacco@mwcog.org, or Stacy Cook, Principal Transportation Planner, (202) 962-3335, scook@mwcog.org, for any questions or comments.

National Capital Region
Transportation Planning Board

ADDITIONAL PERFORMANCE MEASURES RECOMMENDED

#	Measure Name	What would it measure or question to answer?	Current or Forecast	Goals	Staff Target and Level of Effort
1	**Accessibility: Route Directness Index**	How directly (straight-line vs. street network) can you get to a point within a given distance.	Current	Strong connections to accessibility, affordability, comprehensive multimodal system, equity, and land use and TOCs.	Do not advance due to existing analysis exploring similar topic within Transit Access Focus Areas.
2	**Accessibility: 15-Minute Neighborhoods**	Can you get to key destinations within 15-minute travel sheds for various modes within a small geography?	Current	Strong connections to accessibility, affordability, comprehensive multimodal system, equity, and land use and TOCs.	Advancing for additional evaluation as part of future LRTP. Network Dataset usage needs further examination.
3	**Accessibility: Access to Travel Options**	Assesses access to existing (or planned and committed) transportation options and seek to identify opportunities for improving access to various travel options.	Current or Forecast	Strong connections to accessibility, affordability, comprehensive multimodal system, equity, and land use and TOCs.	Advancing for inclusion in Visualize 2045 update. Network Dataset usage needs further examination.
4	**Multimodal Accessibility Index**	Index measuring both the diversity of transportation modes available and the number of destinations accessible by those modes within a given travel time or distance.	Current or Forecast	Strong connections to accessibility, comprehensive multimodal system, equity, and land use	Advancing for inclusion in Visualize 2045 update. Network Dataset usage needs further examination.
5	**Cost of Travel**	Using the Center for Neighborhood Technology "Housing + Transportation Affordability Cost Index," how can the TPB learn more about the costs of transportation as a potential tool for offsetting other costs that contribute to the region's cost of living?	Current	Strong connections to affordability, equity, land use and TOCs, and public health	Advancing for additional evaluation as part of future LRTP. Low effort, though stuck with proprietary method for calculating affordability. Gen 3 model application may provide

#	Measure Name	What would it measure or question to answer?	Current or Forecast	Goals	Staff Target and Level of Effort
					new opportunities to measure cost of travel.
6	**Exposure to Localized Transportation Pollution**	How do environmental indicators related to mobile source emissions, as reported in EPA's EJScreen, perform in the TPB Planning Area?	Current	Environment/resiliency, equity, land use and TOCs, and public health. Additional connection to connectivity.	Advancing for inclusion in Visualize 2045 update. Low effort needed.
7	**Green Infrastructure: Percent Green Land Cover**	What is the percent of impervious surface and/or extent of green cover in the region?	Current	Environment/resiliency, equity, land use and TOCs, and public health.	Advancing for additional evaluation as part of future LRTP. Coordination with COG partners that are updating this measure with improved data.
8	**Density and Open Space: Population-Weighted Density**	Relative density of geographic areas within the region.	Current	Environment/resiliency and land use and AC/TOCs. Additional connections to equity and public health	Advancing for inclusion in Visualize 2045 update. Could include decennial data if available.
9	**Infrastructure Exposed to Flooding**	What transportation infrastructure in the region is near flood risk, flood zones, rising sea levels and storm surges?	Current or Forecast	Environment/resiliency, equity, land use and TOCs, and public health.	Advancing for additional evaluation as part of future LRTP or other resiliency planning activities.
10	**Number of Projects that Improve Resiliency**	To what degree are projects in the LRTP considering resiliency best practices?			Advancing for additional evaluation as part of future LRTP or other resiliency planning activities.