

# USING DATA FROM THE COG/TPB REGIONAL TRAVEL DEMAND FORECASTING MODEL

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Staff recommendations for consultants  
and others who request model outputs

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July 22, 2022



# Introduction

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- TPB staff are frequently called upon as a data resource in furnishing the latest travel demand model, model inputs, and model outputs to various project teams for subarea project planning/alternatives analysis studies.
- Over the past decade, based on these types of requests, staff have noticed a general shift away from traditional travel demand modeling and subsequent post-processing to simplified planning that is generally based on travel demand model outputs created for a different purpose.
- This presentation provides TPB staff's recommendations and preferences for conducting project-level alternatives analysis studies.

# Alternatives Analysis

## Alternatives Analysis IS

- A focused look at alternatives at the “corridor” level
- A means of reaching decisions on the investment strategy to pursue in a particular corridor

*A “corridor” is the geographic area that encompasses the origins, destinations, and primary paths of the majority of trips contributing to and/or affected by the identified transportation problem or need.*

Day 1  
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- Source: “FTA Workshop on Alternatives Analysis, Washington, DC, April 10-12, 2007”



# Tools and Methods

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- Multiple tools can be used in alternatives analysis and scenario planning studies:
  - MPO Models and Data
  - County/City Models
  - State DOT Models/Statewide Models
  - Models Developed by the Feds (e.g., FTA's STOPS model)
  - Scenario Planning Tools (e.g., VisionEval)
- It can be challenging to select tools that are appropriate for each study.
- It is important to consult with the study team, stakeholders, and any applicable state and federal guidelines when selecting tools and methods.
- It is also important to consult with TPB staff if there is a desire to use TPB models and/or data.



# TPB Participation in Project Planning

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- Current Adopted, Production-Use Model: Gen2/Version 2.4 (as of June 15, 2022)
- Gen2/Version 2.3.78 is no longer the latest production-use model although some current project planning studies are using it.
- TPB staff are involved in project planning/alternatives analysis studies:
  - a) Directly: using the state technical assistance funding, staff conduct regional travel demand model runs and deliver outputs to state DOTs, which are then “post-processed” by DOT staff.
  - b) Indirectly: in response to data requests, TPB staff provide the requested data, usually from the “Air Quality Conformity” travel demand runs associated with the most recent Long-Range Transportation Plan (LRTP), and project study team conducts all of the analysis.



# TPB Participation in Project Planning: Direct Participation

- Technical assistance accounts are set up through the TPB Unified Planning Work Program (UPWP) for District of Columbia, Maryland, Virginia and regional transit.
- Technical assistance funding from the UPWP can be used for staff assistance with modeling. The accounts are also used for traffic monitoring, sub-regional studies, and mega studies.
- Project concepts that meet the following requirements will be evaluated and recommended for inclusion in the UPWP by the State Technical Working Group:



- TPB staff have occasionally secured funding from project sponsors outside of the UPWP to conduct modeling activities (e.g., FHWA).



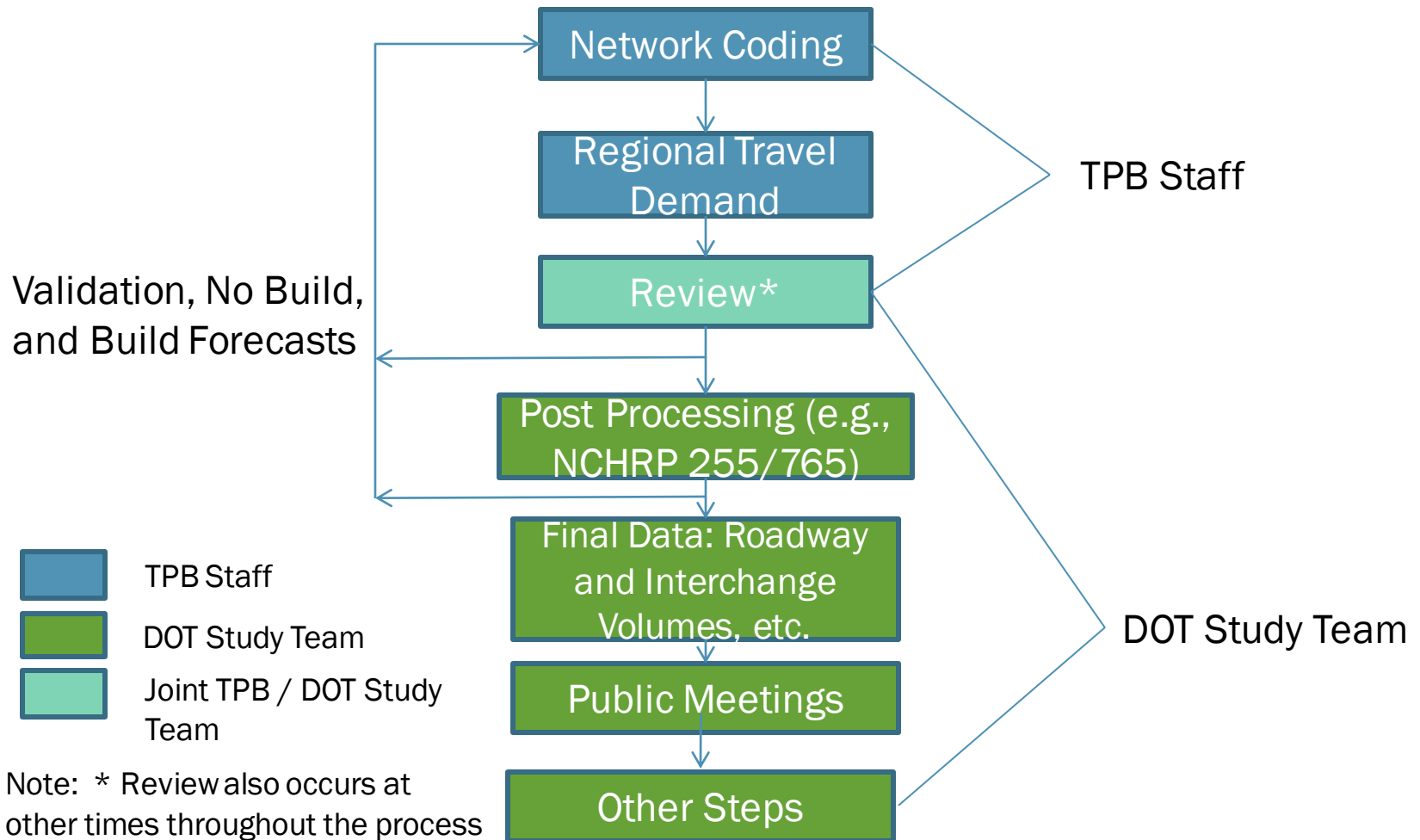
# TPB Participation in Project Planning: Direct Participation (Cont.)

- If a project sponsor intends to use state technical assistance or other funding for modeling activities, it is critical to contact TPB staff early in the scoping process:
  - TPB staff can familiarize themselves with the study and stakeholders well before the initiation of modeling tasks.
  - Staff can provide recommendations as well as outline capacity to provide support, like validating model for the project study area.
  - Validation usually includes modifying the base year networks by adding network detail to the regional networks and checking for errors (the base-year network changes are subsequently carried forward to the future-year networks).
- This type of modeling assistance is provided with the understanding that core UPWP activities (conformity, plan update, etc.) would take precedence over the project planning work if a conflict should arise.



# TPB Participation in Project Planning: Direct Participation

Exhibit 1. Simplified Example of Division of Responsibilities in a Study





# TPB Participation in Project Planning: Indirect Participation – Presentation Focus

- TPB staff most frequently participate in project level work indirectly, by providing requested datasets to state DOTs, local jurisdictions, federal agencies, or project consultants:
  - Travel demand model and inputs (standard transmittal package)
  - Model outputs, including final loaded networks, mode choice and vehicle trip tables
- Depending on the type of a request, TPB staff may request additional funding to fulfill a data request (off-the-shelf versus data processing).
- Even some of the seemingly simple requests can take time to complete, as TPB staff need to take adequate time to ensure that both parties are clear on what is being provided, and to prepare a transmittal letter documenting the data.
- Example: “Can I just get your VMT total?” (questions: Observed or Modeled? LRTP?, Analysis Year?, Geography?, Travel Demand or MOVES?, “Within Boundary”?)

# TPB Participation in Project Planning: Indirect Participation – Recent Trends

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- Over the past decade, TPB staff have observed an increase in the number of data requests for model outputs with following specifications/parameters:
  - Files should be provided in a non-binary format such as txt, csv, or GIS shape file for the networks.
  - Study team does not have access to software that can be used to conduct travel demand modeling or read travel demand model output binary files (or trip tables).
  - Regional level model output will be used in some simplified way, without typical post-processing, for a subarea study/alternatives analysis, such as evaluating transit ridership or evaluating impacts of roadway operations/closures.
  - Additional model validation cannot be conducted due to time constraints - “some data are better than no data.”



# TPB Participation in Project Planning: Indirect Participation - Expectations

- Regarding the model and modeling inputs that are provided to the requesting agency, TPB staff generally expect the following, if the model will be used in the study:
  - Model and inputs are used as specified in model documentation, the same way that TPB staff would conduct the studies.
  - TPB staff do recognize that project sponsors may need to make some changes to the model and model inputs to be able to reflect conditions in the study area more accurately (add roadways and centroid connectors, correct network errors, split TAZs, re-calibrate mode choice, etc.).
  - Staff recognize that the TPB model will likely be used in conjunction with other tools (e.g., conduct volume and speed post-processing, create inputs to FTA's STOPS model for transit studies).
  - Upon conclusion of the study, project sponsor is strongly encouraged to provide TPB staff with a report (e.g., final technical documentation).



# TPB Participation in Project Planning: Indirect Participation - Expectations

- Regarding model outputs, TPB staff generally expect the following:
  - Model outputs, such as trip tables or loaded highway networks, should ideally be used to evaluate trends at the regional level.
  - Model outputs from regional travel demand model runs associated with air quality conformity analysis should not be used to extract TAZ-level or link-level data for a specific project without additional validation and modeling (i.e., the model runs were conducted for an entirely different purpose).
  - Project team needs to have access to software that can read “raw model output” or “binary files” (e.g., TPB staff use CUBE).
- Additional guidance and examples regarding the appropriate use of model outputs can be found in the User’s Guide for the COG/TPB Gen2/Version 2.4 Travel Demand Forecasting Model (please see page 47).



# TPB Participation in Project Planning Studies: Further Observations and Recommendations

- Study teams involved in “subarea alternatives analysis” projects that include evaluations of multiple alternatives should include modelers and have access to tools that can be used to process and read direct modeling output files (binary and network files).
- Additional subarea model validation should be conducted; if technical staff are only able to process csv files, that means that network adjustments, additional data validation, model runs reflecting adjustments, and further post-processing (microsimulation for speeds, volume post-processing) are not likely to occur.
- Being able to post-process volumes and generate operational speeds can be critical in selecting a preferred alternative.
- Modeling is sometimes not necessary – observed data is always best, when available and suitable.
- Use of simplified/scenario planning tools for studies at regional level may be OK but may not be suitable for subarea studies.



# TPB Participation in Project Planning Studies: Caveats

- Travel models, model inputs, and model outputs should be used in a relative manner, e.g., “2040” is not useful, but “2040” and “2040 no-build” is useful, since one is comparing two scenarios from a given project (e.g., LRTP analysis).
- TPB staff typically do not sign off on the modeling approach used by other agencies.
- Staff recognize that most studies could be evaluated using multiple tools and methods.
- These staff recommendations are not prescriptive – they express the TPB staff preferences for conducting subarea alternatives analysis studies.
- TPB staff recognize that project teams make decisions related to modeling tools and methods based on the resources that are available for each project.



# Reading Materials and References

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- Ngo, Ray, Feng Xie, and Mark S. Moran. **“User’s Guide for the COG/TPB Gen2/Version 2.4 Travel Demand Forecasting Model.”** Washington, D.C.: Metropolitan Washington Council of Governments, National Capital Region Transportation Planning Board, March 15, 2021. <https://www.mwcog.org/transportation/data-and-tools/modeling/model-documentation/>.
- National Academies of Sciences, Engineering, and Medicine 2006. **“Fixed-Route Transit Ridership Forecasting and Service Planning Methods.”** Washington, DC: The National Academies Press. <https://doi.org/10.17226/14001>.
- National Academies of Sciences, Engineering, and Medicine 2014. **“NCHRP Report 765: Analytical Travel Forecasting Approaches for Project-Level Planning and Design.”** Washington, DC: The National Academies Press.



# Acknowledgments

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- Mark Moran, Feng Xie, Nicole McCall (COG Staff)





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