



TPB TRAVEL FORECASTING SUBCOMMITTEE

HIGHLIGHTS OF THE JULY 21, 2017 MEETING

Meeting time & location: 9:30 AM to 12:00 noon, Metropolitan Washington Council of Governments

MEETING ATTENDEES

MEMBERS, ALTERNATES, AND PARTICIPANTS

- Jonathan Avner (WRA)
- Melissa Chow (WMATA)
- Nobuhiko Daito (NVTC)
- Robert Griffiths (COG staff consultant)
- Dan Goldfarb (NVTC)
- Dial Keju (Frederick County)
- David Kline (Fairfax County)
- Li Li (Whitman, Requardt & Assoc.)
- Yuanjun Li (M-NCPPC, Montgomery Co.)
- Feng Liu (Cambridge Systematics)
- Regina Moore (VDOT)
- Krishna Patnam (AECOM)
- Maggie Qi (Fairfax County DOT) *
- Harun Rashid (NVTA)
- Amir Shahpar (AECOM)
- Jiaxin Tong (Kimley-Horn & Assoc.)
- Jongsun Won (PTV Group)

COG STAFF

- Willian Bacon
- Tim Canan
- Anant Choudhary
- Wanda Hamlin
- Hamid Humeida
- Ken Joh
- Arianna Koudounas
- Ron Milone
- Dzung Ngo
- Jinchul (JC) Park
- Jane Posey
- Rich Roisman
- Dusan Vuksan
- Feng Xie
- Jim Yin

* Attended the meeting remotely via WebEx/teleconference

This meeting of the Travel Forecasting Subcommittee (TFS) was chaired by Ms. Chow.

1. INTRODUCTIONS AND APPROVAL OF MEETING HIGHLIGHTS FROM THE MAY 19 MEETING

During introductions, Ron introduced Tim Canan, who had recently joined the COG/TPB staff as the Director of the Planning Data and Research Program (the position formerly held by Robert Griffiths). The highlights of the May 19, 2017 meeting of the TFS were approved without change.

2. STATUS REPORT ON THE OUT-OF-CYCLE AIR QUALITY CONFORMITY ANALYSIS OF THE 2016 CLRP

Mr. Vuksan, who spoke from a series of presentation slides, provided a brief status report on the 2016 CLRP out-of-cycle amendment, including information pertaining to modeling tools, model inputs, and project schedule. Mr. Vuksan indicated that the plan amendments and the associated conformity analysis were being undertaken to address new specifications related to some of the regionally significant projects, including the I-66 HOT lanes, I-95 HOT lanes, Governor Nice Bridge and I-270 Innovative Congestion Management. Mr. Vuksan noted that an updated travel demand model was being used for the analysis (Version 2.3.70), but that the model was not substantially different from the current model (Version 2.3.66). Mr. Vuksan discussed the project schedule and indicated that the TPB and the relevant committees would be briefed on the off-cycle conformity findings in September 2017, while the TPB action was scheduled for October 2017. Mr. Vuksan indicated that the off-cycle conformity data transmittal package, which includes the Version 2.3.70 model and inputs, was expected to be available by the end of the calendar year.

Mr. Milone noted that project sponsors conducting planning studies set to begin in the fall should consider using the updated model and inputs (Version 2.3.70).

3. STATUS REPORT ON CONSULTANT-ASSISTED PROJECT TO IMPROVE THE COG/TPB TRAVEL DEMAND FORECASTING MODEL

Mr. Milone, who spoke from a series of presentation slides, informed the subcommittee that COG's three-year contracting arrangement with Cambridge Systematics, Inc. (CS) to assist with improving the TPB's travel modeling methods had ended on June 30. He reported that CS has transmitted an end-of-fiscal year report on FY 2017 work activities to TPB staff. He stated that the report is now under review and he invited TFS members to provide feedback. He reviewed the multi-year strategic plan that is now in place for improving the TPB's travel forecasting methods and he stated that TPB staff is currently working to complete the first phase of three phases, i.e. to improve the existing trip-based travel demand model. He briefly described the central activities jointly undertaken by TPB staff and CS, notably:

- The merging of observed household travel surveys and transit on-board surveys
- The estimation of new non-motorized and mode choice models
- Implementation of highway and transit assignment enhancements
- An updated version of the TPB's currently adopted travel demand model that included the above enhancements

The developmental model is now referred to as Version 2.5. Ron noted several challenges presented by the updated model, including a substantial increase in computation time relative to the currently adopted travel model (by ~1.8 times). Ron stated that staff is reviewing the updated application and is moving ahead on several fronts. Staff will evaluate the performance of the new

model and will conduct sensitivity testing. Necessary changes will be implemented based on the evaluation. Staff will also seek to reduce computation times by possibly streamlining steps. It is currently unclear exactly when the updated travel model will be ready for production use, but the TFS will be apprised of its progress. He added that the next issuance of the consultant task-order contract will be deferred until the end of calendar-year 2017, so that staff can focus on completing the Version 2.5 modeling effort.

Mr. Shahpar remarked that the Version 2.5 model assumes that HBW transit travel occurs exclusively during the peak period while non-HBW transit trips are assumed to occur exclusively during the off-peak period. Realistically, both markets of travel occur, to varying degrees, during both time periods. Ron stated that TPB staff is generally comfortable with the existing assumption for regional travel modeling. Mr. Shahpar asked if TPB has had any success with obtaining observed speed, volume or pricing information from the private operator of the High-Occupancy Toll (HOT) lanes in Virginia. TPB staff has worked with VDOT to collect HOT lane information in recent years, but with limited success. Ron stated that Transurban has shared highly aggregated average toll rate information with TPB staff in the past. TPB staff has met with Transurban representatives in the past and is aware that Transurban conducts sophisticated simulations of the HOT lanes for their internal analysis needs, but is understandably guarded about releasing detailed technical information. Ron added that real-time HOT lane toll rates are available on the web and this type of information source is potentially useful.

4. 2017-2018 REGIONAL HOUSEHOLD TRAVEL SURVEY: STATUS REPORT

Dr. Joh, who spoke from a series of presentation slides, provided a recap of the pre-test survey results from rMove (the mobile app) and rSurvey (the web-based interface). The survey was split into two segments: Segment 1 households included rSurvey and rMove households and Segment 2 households included only rSurvey households. Segment 1 households with qualifying smartphones were asked to complete a 7-day travel survey using the rMove smartphone app, and those without qualifying smartphones were asked to complete a one-day travel survey using rSurvey. All Segment 2 households were asked to complete a one-day travel survey using rSurvey. For recruited households without smartphones, the proportion of households that completed the survey were roughly similar (71.2% complete for Segment 1, 64.2% complete for Segment 2). For recruited households with smartphones, there was a significant difference in survey completion rates between Segment 1 households and Segment 2 households, with a lower completion rate for rMove households in Segment 1 (30.1%) compared to rSurvey households in Segment 2 (67.0%). The overall survey response rate for both segments was 3.3%, which was less than the target of a 5% overall response rate. Dr. Joh then summarized the recommended modifications for the main survey to increase response rates such as revising the mailing schedule, increasing the incentive for participation, and increasing the survey recruitment window. He then described some of the issues with the rSurvey travel day questionnaire such as geocoding issues of workplace and school locations, in addition to issues with the rMove smartphone app. Dr. Joh said the next step would be to make necessary revisions to the survey instrument, and prepare for the main survey launch in September 2017. Dr. Joh said that he would report updated findings to the TFS at the September TFS meeting.

Mr. Milone asked if there may be some resistance to complete the survey using rMove (Slide 8). Dr. Joh confirmed that there may be several reasons for the lower response rate for rMove. Mr. Griffiths said that one-half of the recruited households in Segment 1 with qualifying smartphones did not download the smartphone app, partly because the contractor did not allow Segment 2 households to

opt-in to the smartphone survey, unlike in the Seattle household travel survey which allowed an opt-in for all households with smartphones.

Mr. Patnam asked if households recruited for the pre-test will be included in the main survey. Mr. Griffiths responded that they will be excluded from the main survey. Regarding the reporting of multimodal trips (Slide 11), Mr. Shahpar asked if the survey asked about rideshare mode (e.g., Uber/Lyft). Dr. Joh responded yes.

Mr. Patnam asked if the survey dataset would be available to use by early 2019. Dr. Joh responded that the survey deliverables from the contractor would be received by early 2019, and that some time would be needed to review and clean the data to be ready for distribution. Mr. Griffiths clarified that the survey contract requires the contractor to provide monthly deliverables of the datasets during the survey period so that COG staff will be reviewing and cleaning the dataset while the survey is ongoing, so the final dataset should be available during the first half of 2019. Mr. Milone asked if the survey would include weekends and holidays. Dr. Joh responded that weekends and holidays would be excluded.

Mr. Vuksan asked if the lower responses to surveys since the 2007 COG/TPB Household Travel Survey may be partially due to concerns over data security. Dr. Joh responded that the 2007 survey was a phone-based survey while the 2017 survey is web-based, so the methodology is different, and said that there has been a trend towards web and smartphone travel surveys in recent years. Mr. Griffiths stated that mail recruitment tends to have low response rates because the problem is getting people to open their mail and not discard them, so making the mailing materials stand out by placing state DOT and WMATA logos may help encourage people to open their mail. Mr. Griffiths also noted that the drop out in the web survey can be tracked to the specific page in the survey. The biggest drop point is when the survey asked questions about individual characteristics of the household, and household income. Mr. Griffiths noted that the response rates were higher in the 2007 survey because the incentive was higher compared to the \$10 incentive in the pre-test survey, so increasing the incentive to \$20 should help improve the response rate, in addition to offering an extra incentive for large households.

Ms. Li asked what is the percentage of qualified smartphone households vs. non-qualified households for Segment 2, and how households who participated in the smartphone survey felt about user-friendliness of the app and what may be preventing them from completing the survey. Dr. Joh responded by describing the table on Slide 6 which shows the number of recruited households with smartphones that were not able to take the rMove survey. In response to what factors may be preventing rMove households from completing the survey, Dr. Joh stated that the travel survey period was 7 days for rMove, which may be burdensome particularly for large households. He also said that having every household member record all travel on at least one concurrent day was difficult, which contributed to the lower response rate for rMove. Mr. Griffiths confirmed Dr. Joh's statement about the difficulty of obtaining a completed rMove household, while also stating that conceptually, the smartphone app may be good if everything works well, but there were many technological issues with the app. Finally, Ms. Li asked whether the use of social media was considered for recruiting households to the survey. Mr. Griffiths responded that this would lead to self-selection bias and other issues, which were echoed by Mr. Roisman.

5. DEVELOPMENT OF A MACRO/MESO/MICRO MODELING FRAMEWORK FOR THE I-395 HOT LANE CONVERSION

Ms. Li and Mr. Avner, who spoke from a series of presentation slides, described the development of a multi-scale modeling framework for the I-395 High-Occupancy/Toll (HOT) lane conversion project.

The presentation covered three main areas: 1) Project overview; 2) Challenges; and 3) Modeling approach, including the use of both the COG/TPB regional travel demand model and a post processor to the regional model. Mr. Avner spoke first, then Ms. Li spoke second.

Mr. Avner noted that the project was to convert HOV lanes on I-395, from Edsall Road to Eads Street near the Pentagon, to HOT lanes. WRA's tasks were to develop the traffic forecasts to support the Environmental Assessment and the Interchange Justification Report (IJR). The existing road was three/four general-purpose lanes per direction, with a separated HOV system. The project was to convert the existing two reversible HOV-3+ lanes to three HOT lanes through the entire corridor. A dynamic toll system would be used to manage the demand and, at the same time, maintain the same access points to the corridor. Mr. Avner then explained the challenges, such as the environment, traffic forecasts, the requirement of NEPA, and IJR. He noted what all these challenges meant to the macroscopic regional tool versus to the micro/mesoscopic tools. Mr. Avner noted that it was very important, both to the communities along the corridor and those that use the corridor, to maintain the throughput of the corridor.

Mr. Avner described the current situation of the I-395 corridor today. The HOV facility changes direction at mid-day, from northbound in the morning to southbound in the afternoon. It is a very congested corridor. The peak conditions start early in the morning and last through the mid-day. So, it was necessary to simulate the traffic conditions not only at the regional macroscopic level, but also at the microscopic level, too. Therefore, WRA implemented a microscopic/mesoscopic/macroscopic framework to address the issues. Mr. Avner explained the process, which started with the regional travel demand model, which provides a level of consistency for the three levels of analysis. Then, the demand model fed into the post processor to generate some of the required inputs needed by the meso- and micro-level models. WRA's analysis started with the Ver. 2.3.57a model. A post-processor was used to develop inputs for the meso- and micro-level analyses. The mesoscopic process used VISUM to develop trip tables for the operational analysis.

Then Ms. Li continued the presentation, talking about the COG model. Ms. Li stated the Ver. 2.3.57a was used as the basis for the development of traffic forecasts. The base year was 2015, and the forecasts years were 2020 and 2040. The build scenario was the conversion of two HOV lanes to three HOT lanes. Ms. Li discussed the study area and the review that was performed on the COG networks, including updates that were made to the COG network before model calibration. She also described initial results from the traffic assignment validation (slide 20).

Mr. Vuksan asked whether WRA was trying to validate to time of day or by direction. Ms. Li stated that they were validating to average weekday travel.

Ms. Li summarized several adjustments were made as part of the model calibration (slide 21), such as changing centroid locations, updating centroid connector loading points, and changing the facility type of some links. After all these modifications, a final validation check was conducted (slide 23) and WRA found that the model was performing much better than before. Thus, at that point, Ms. Li stated, the post processor could be run.

Mr. Avner continued the presentation, discussing the post processor (slide 25), the way that slugging was represented (slide 28), and the operational models (slides 30-33). Mr. Patnam asked why WRA chose the VISUM model instead of the COG model. Mr. Avner said that WRA has had better success in applying ODME with VISUM than with Cube. VISUM has better control and better representation of traffic signals. And, by doing the ODME in VISUM, it made it easier to develop the trip tables that VISSIM requires.

Mr. Patnam asked if WRA used static assignment or dynamic assignment in the VISUM model. Mr. Avner stated that, for the environment assessment, they used the mesoscopic tools within VISUM, and for the IJR, he thought that they used dynamic assignment.

Mr. Milone asked if WRA included the fact that hybrid vehicles can get exemptions for using HOT lanes. Mr. Avner noted that this issue was brought up by VDOT, however, in the end, since WRA could get agreement on what rates to use, these exemptions were not included in the analysis. Mr. Avner noted that WRA did, however, do some sensitivity tests, covering, for example, the percentage of hybrid vehicles. However, again, the conclusion was that nobody had a good way to model issues such as hybrid vehicles and HOV cheaters.

Mr. Patnam asked for more information about the post processor (slide 32). Mr. Avner stated that it is a Cube application, where the inputs are the COG trip tables and network. WRA replicated COG assignment procedures, but, instead of using the four time-of-day periods, WRA split the trip tables into 8 periods. Mr. Patnam noted that it seemed like the VISUM study area (purple boundary, slide 31) was not large enough to cover all of the slugging (casual carpool pickup/drop-off) areas. Mr. Avner stated that this was defined with VDOT as the environment project area for the study.

Ms. Li asked how many zones were included in the VISUM study area. Mr. Avner noted that he would need to check to get the answer. Mr. Liu asked if WRA had observed OD data for the study area. Mr. Avner noted they did not. To remedy that, one would have needed to purchase data from a vendor, such as StreetLight Data or AirSage.

Mr. Tong asked if the model considered what was happening on streets parallel to I-395. Mr. Avner stated that the parallel street network was part of the analysis, which was why the VISUM area extended beyond the VISSIM area (slide 31). It was found that the corridor traffic itself grew slightly under build scenario, but there was very little diversion. By offering the HOT lane facility, it took some pressure off of the general purpose (GP) lanes.

Mr. Milone asked who will operate the facility. Mr. Goldfarb noted that Transurban will operate the facility, which should produce about \$15 million per year, which will be provided to both NVTC and PRTC. Mr. Vuksan asked what happens to the traffic on the HOV/HOT lanes. For example, if the HOV/HOT lanes have more traffic, does that result in queues at various entry and exit ramps? Mr. Avner noted that one of the mandates from VDOT is that the traffic on the managed lanes should maintain 45 mph. To maintain such a speed, the facility is price controlled, which would limit the volume on the facility. So, this should help avert queues along the facility. However, Mr. Vuksan noted, you cannot really meter the HOV-3+ traffic, since it cannot be priced. Mr. Avner said that that was one of the challenges of the toll calibration: to balance the HOV-3 and HOT traffic so the speed would stay at 45 mph on the managed lanes.

Mr. Patnam asked if WRA had made any adjustments to river crossing traffic counts. Mr. Avner noted that those counts were, in fact, adjusted, which did improve the loadings on the Potomac River screenline. Mr. Patnam also asked if the WRA model used mode choice or relied on using fixed trip tables. Mr. Avner stated WRA ran the COG model under a build and no-build scenario, so mode choice was run, and the output of mode choice was used by the post processor. Mr. Avner added that trip tables were developed in the COG model under build and no-build conditions, then those were fed into the post processor to re-assign them to a stratified period. Subarea extraction was based on that assignment.

6. ROUNDTABLE DISCUSSION OF CURRENT MODELING EFFORTS AROUND THE REGION

Mr. Patnam stated that AECOM has been working with Prince George's Co./M-NCPPC to develop a process for conducting dynamic traffic assignment. The project has just started. They plan to do a simulation-based DTA. Mr. Milone asked about the schedule of the project. Mr. Patnam noted it was the three-year project.

Ms. Li noted that Montgomery County has contracted with Daniel Consultants, Inc. (DCI) to develop an ArcGIS-based network management tool based on COGTOOLS. The contract was just signed and will probably start after August. Mr. Milone asked if COG could get a copy of the contract. Ms. Li said yes.

Mr. Ngo and Mr. Milone encouraged people who use the COG model and networks to provide COG will feedback on any errors or problems that are found, so that these can be corrected by COG staff. This same point is mentioned on COG's [Data Requests](#) webpage:

What we ask of you:

If your study results in a report or other similar documentation, we would like to get a courtesy copy of this documentation, so that we can better understand how our model/data has been used.

If you find anomalies or errors in the data or model, please let us know about them, so that we can address them as quickly as possible.

7. NEXT MEETING DATE AND OTHER BUSINESS

The next scheduled meeting of the TFS is Friday, September 22, 2017 from 9:30 AM to 12:00 noon. There was no other business. The meeting adjourned around noon.

*** The meeting highlights were prepared by Jim Yin, Mark Moran, and Ron Milone ***