National Capital Region Transportation Planning Board
Metropolitan Washington Council of Governments
777 North Capitol Street, N.E., Suite 300, Washington, D.C. 20002-4290

Highlights of the November 18, 2011 meeting of the Travel Forecasting Subcommittee

Held at the Metropolitan Washington Council of Governments, from 9:30 AM to 12:00 PM
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Meeting attendees

- Erik Dahlberg (WMATA)
- Dan Goldfarb (Cambridge Systematics)
- Jamie Henson (DDOT)
- Bahram Jamei (Virginia DOT)
- Eric Jenkins (M-NCPPC, Prince George's Co.)
- David Kline (Fairfax County DOT)
- Yuanjun Li (M-NCPPC, Montgomery Co.)
- Subrat Mahapatra (MD SHA)
- David Roden (AECOM)
- Phil Shapiro (STC)
- Sashank Singuluri (AECOM)
- Dan Stevens (Fairfax County DOT)

COG/TPB staff in attendance

- Anant Choudhary
- Bob Griffiths
- Eulalie Gower-Lucas
- Wanda Hamlin
- Hamid Humeida
- Ron Kirby
- Mary Martchouk
- Andrew Meese
- Ron Milone
- Mark Moran
- Jinchul (JC) Park
- Wenjing Pu
- Clara Reschovsky
- Rich Roisman
- Meseret Seifu
- Daivamani Sivasailam
- Daniel Son
- Dusan Vuksan
- Feng Xie
- Jim Yin

The meeting was chaired by Jamie Henson of DDOT. Note that item 5 on the agenda was actually presented between items 1 and 2.

1. Introductions and approval of highlights from the previous meeting

The highlights from the September 23 meeting of the Travel Forecasting Subcommittee (TFS) were approved without any changes.

2. TPB Version 2.3 Travel Model on the 3,722-TAZ area system: Status report

This item was presented by Ron Milone of the TPB staff. Mr. Milone informed the attendees that TPB staff has successfully executed the Version 2.3 model for air quality study purposes using 2011 CLRP networks and Round 8.0a land activity. The inputs and technical methods supporting this work, including the Version 2.3 travel model, were adopted by the TPB on November 16, 2011.

Mr. Milone reviewed the key features of the Version 2.3 travel model and addressed the most recent refinements to the model that were implemented by staff. The most important refinement was a re-calibration of the mode choice model. The re-calibration was necessary to address an apparent under-estimation of HOV 3+ trips in the I-95/I-395 corridor that was discovered after a review of Version 2.3.28 model results. Staff addressed this problem by more closely examining the 2007/08 Household Travel Survey-based auto person "targets" which are used as a basis for the mode choice model calibration. Staff found that the auto targets from the survey yielded unreasonable HBW auto occupancies, and therefore a refinement to auto person trip "targets" by occupant group was necessary. The adopted Version 2.3 model is now known as the #36 model (or the Version 2.3.36 model).

Next, Mr. Milone reviewed some model validation results, which he viewed as reasonable and generally comparable with performance results of previous travel models. He also presented some global demographic and travel forecasts resulting from TPB staff's recent application of the Version 2.3.36 model. Some key observations regarding the forecasts results include:

- The total VMT predicted by the Version 2.3 model is greater than that predicted by the Version 2.2 model, which is due, in part, to the fact that trips that used to be intra-zonal are now inter-zonal (hence, assigned to the network).
- The *number* of vehicle trips from the Version 2.3 model is lower than that of the previous Version 2.2 model (i.e., the trip rates are lower), but the Version 2.3-based trip lengths are longer than those of the Version 2.2 model. The longer trip lengths are due to a larger travel survey area studied in 2007 (22 jurisdictions) compared to a more limited survey area studied in 1994 (13 jurisdictions).
- The forecasted VMT per capita produced by the Version 2.3 model in comparison to that of the Version 2.2 forecasts; The Version 2.3 model forecasts do not produce a gradual decline in VMT per capita that did appear with the Version 2.2 forecasts.

Mr. Milone noted that some model issues remain, including excessively long model run times, a limited sample of traffic counts available for validation, and occasional travel model "freezes" that occur during executions. TPB staff is currently re-executing the Version 2.3 model to validate all results and is preparing a transmittal package (the model will be transmitted via the COG FTP site as opposed to a mailed transmittal as was done in the past). Ongoing refinements to the Version 2.3 model are envisioned, but the next production release of the model will take place perhaps in one year. TPB plans to apply the adopted model in the State Implementation Plan (SIP) update, TPB Regional Transportation Priorities Plan (RTPP) study. Staff also looks forward to supporting local project planning studies in cooperation with TPB's partner agencies.

A subcommittee member commented that he had difficulties running the model just by launching the "run model" batch file and was told by a consultant that he needs to open Cube Cluster nodes prior to running the batch file, which solved the problem. Mr. Moran responded that Cube and Cube Cluster should be launched automatically from the batch file. The user might also need to alter the Windows PATH statement. Mr. Milone added that if anyone is experiencing issues with model runs, TPB staff will try to resolve them. Another member inquired whether the TPB plans to hold a training session for the

new model. Mr. Milone responded that this will likely occur over the summer. She also asked what differences there are between Round 8.0 and Round 8.0a of the Cooperative Forecasts. Mr. Griffiths responded that Round 8.0a incorporates Baltimore-area updates. There are essentially no differences between Round 8.0 and Round 8.0a land use forecasts for COG-member jurisdictions.

3. Status report on the consultant contract for assistance with development and application of the TPB travel demand model

This item was presented by both Mark Moran of TPB staff and David Roden of AECOM. Mr. Moran presented an overview of this ongoing consultant assistance project, while David Roden gave a status report on one of the FY 2012 task orders. Mr. Moran mentioned that this project is being carried out via a task-order contract, with the goal of advising TPB staff on specific travel modeling methods, as well as conducting focused research in travel modeling practice at other MPOs across the country. TPB staff has maintained this technical assistance project for the past six years (COG/TPB has previously contracted with Vanasse Hangen Brustlin and Cambridge Systematics). This year AECOM was selected as the winning consultant. Mr. Moran then discussed the task orders for the current fiscal year (FY-2012). Task 1 entails attending meetings and responding to technical questions relating to models development activities. Two additional tasks have recently been authorized related to improving the Version 2.3 Travel Model: Task Order 2 (consultant recommendations for improving mode choice modeling) and Task Order 4 (reducing the time needed to run the travel model). Mr. Moran also mentioned that the TPB staff is currently reviewing prior consultant guidance and plan on producing a report documenting TPB staff comments on consultant recommendations in January 2012.

Mr. Roden discussed AECOM's progress on Task Order 4. He began with the caveat that the strategies developed by AECOM for speeding up model runs are preliminary and have not yet been reviewed by the TPB staff. Then, he described how the various model steps can be parallelized in order to decrease the model run times. Steps that were identified for parallelization included highway and transit skims, trip distribution, mode choice, highway assignment, and transit assignment.

During the presentation Mr. Moran asked Mr. Roden whether the parallelized model structure requires 8 processors to run. Mr. Roden responded that to take full advantage of the parallel processing it does. However, some improvement in the performance can be achieved even with 4 cores, via Hyper-Threading Technology, Intel's term for simultaneous multithreading, a feature that is turned on by default in some CPUs. After the presentation Mr. Milone inquired whether modelers with less powerful machines can use the parallelized model. Mr. Roden confirmed that they can, the model will just run slower than if 8 cores are available. Sashank Singuluri of AECOM also added that there is a parameter in the code that provides the option of running the model sequentially instead of in parallel.

4. Ongoing refinement activities for the Version 2.3 Travel Model

Mr. Milone stated that Phil Shapiro has been retained by the TPB to provide technical assistance with Version 2.3 model refinement. One of the tasks that Mr. Shapiro is involved in is reassessment of the current area type designations in the modeled region, based on aerial photos. In addition, Mr. Shapiro is investigating sources of traffic data other than the HPMS, which is currently used by the TPB staff. The HPMS contains only 1,700 hourly counts and more counts are needed for better model validation by

time period. There was a brief discussion as to the other possible sources of count data, including counts collected by the counties and local projects.

5. Results of FY 2011 Congestion Monitoring Survey Programs

This item was presented by Daivamani Sivasailam of TPB staff. The purpose of the congestion monitoring survey program is to collect speed and volume data on a regular basis to use for identifying congestion locations and as a source of observed data that could be used for validating the travel demand model and the emissions post-processor.[1] The data for the entire freeway system is collected by Skycomp every 3 years. The survey involves taking four days of overlapping pictures covering 3 hours of the AM and PM peak periods, calculating the vehicle density, and inferring the corresponding speed and volume. Then, the level of service (LOS) is calculated and the top ten congested locations are identified based on density and travel time. The results are also compared to the INRIX speed data. After providing the background on the congestion monitoring program, Mr. Sivasailam showed plots of the FY-2011 AM and PM peak performance of the freeway system and pointed out the top ten bottlenecks. Then, he discussed the top ten congested locations determined by INRIX and compared the two datasets, commenting that the locations where congestion occurs are similar. Mr. Sivasailam also showed the AM and PM longest delay corridors and compared the performance in FY-2011 to the results from FY-2005 and FY-2008. He noted that improvements to the Wilson Bridge and changes to I-295 at Kenilworth Avenue have resulted in a better flow of traffic, while the I-395 and I-66 corridors experienced more congestion due to higher demand. Mr. Sivasailam then summarized the findings and discussed the projects in the CLRP/TIP that address some of the bottlenecks and congested corridors on the freeway system.

Next, Mr. Sivasailam discussed the surveys done on the arterial highways. This program monitors 57 major arterial highway routes (430 centerline miles) on an annual basis. The survey is conducted by deploying four cars equipped with GPS receivers to record travel time and speed data on each route between 1 PM and 8 PM. In addition, in FY-2011, Bluetooth readers were deployed on two of the routes to collect travel time data. The speed obtained from the floating cars is then used to calculate the LOS of the routes. Mr. Sivasailam then showed tables describing the monitored routes, and a summary of the locations with LOS E/F, which is considered very congested. Mr. Sivasailam also discussed traffic conditions on a number of arterial segments in FY-2005, FY-2008, and FY-2011. Overall, he concluded that 40 percent of the lane miles surveyed were congested during the PM peak hour. He added that there are a number of projects that should alleviate some of the congestion in the monitored corridors. Mr. Sivasailam concluded his presentation by encouraging the TFS to provide suggestions and ideas on how the program can be improved.

Following the presentation, a subcommittee member inquired whether reliability will be used as one of the congestion indicators in the future. Mr. Sivasailam responded that it is an important metric and will be considered in future studies. A member of TPB staff suggested presenting the coefficient of variation

[1] The regional travel model is currently validated to link *volumes* summed over screenlines. Although there is currently no systematic validation of link *speeds*, the observed speed data is used to develop the volume-delay curves used by the model, which describe how link speeds drop with increasing congestion.

of the speed on each segment in addition to the standard deviation because it is easier to understand a percentage metric.

A subcommittee attendee commented that based on the presented results, the peak period sometimes has worse performance than the peak hour, thus the TPB may want to consider modeling the peak period conditions instead of the peak hour conditions. He also asked how the TPB plans on using the data obtained from the congestion management program in the modeling process. Mr. Sivasailam responded that the data collected is very micro-level and thus cannot be easily used in the macro-level model. However, it is currently used to calibrate the post processor network speeds used in the emissions calculation process. Mr. Milone added that the collected arterial data would be more useful if it included volumes in addition to speeds. TPB staff is still exploring all the ways in which the collected information can be used.

A member of the TPB staff inquired why the Skycomp average speed was lower than the INRIX average speed. Mr. Sivasailam responded that the differences stem from using different methodologies to calculate the average speed. Skycomp calculates the average speed for the most congested hour over four days. INRIX defines congested conditions to be those in which the travel time exceeds 1.3 times the free flow travel time and calculates the average speed for all hours experiencing congested conditions. However, it is possible to extract the average speed from INRIX that is equivalent to the Skycomp speed.

Ron Kirby of TPB staff commented on how the Skycomp data can sometimes be more useful than INRIX, because it is easier to see the extent of congestion on the entire network. It is also simpler to convey the traffic conditions using Skycomp aerial photos to public officials. The Skycomp representative mentioned that both Skycomp and INRIX are good sources of data and it would be ideal to combine the visual layer obtained by Skycomp with the detailed INRIX data.

6. Recognition of outgoing chair of the TFS and announcement of new chair for 2012

Mr. Moran mentioned that the chair of the TFS rotates on an annual basis, each January, between DC, Maryland, Virginia, and WMATA. Since it is the last meeting in 2011, a new chair was to be appointed. He then thanked Jamie Henson for serving on the subcommittee and presented him with a certificate of appreciation. Mr. Moran then announced that Bahram Jamei from VDOT will be the new chair for calendar year 2012.

7. Round-table discussion

8. Other business

There was no other business. The next proposed meeting of the TFS is Friday, January 20, 2012 from 9:30 AM to 12:00 noon. The meeting adjourned at about 12:00 PM.

The highlights were written by Mary Martchouk.