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 May 18, 2012 meeting of the Travel Forecasting Subcommittee

Held at the Metropolitan Washington Council of Governments, from 9:30 AM to 12:00 noon
Status of highlights: Approved as of 7/20/12

Meeting attendees

- Dan Goldfarb (Cambridge Systematics)
- Eric Graye (M-NCPPC, Montgomery Co.)
- Bahram Jamei (Virginia DOT)
- Eric Jenkins (M-NCPPC, Prince George's Co.)
- Bob Josef (RK&K)
- Vaibhavi Kamdar (Prince William Co.)
- Dial J. Keju (Frederick Co.)
- Rick Kiegel (Maryland Transit Administration)
- Yuanjun Li (M-NCPPC, Montgomery Co.)
- Subrat Mahapatra (MD SHA)
- David Roden (AECOM)
- Phil Shapiro (STC)

COG/TPB staff in attendance

- William Bacon
- Joe Davis
- Charles Grier
- Bob Griffiths
- Wanda Hamlin
- Hamid Humeida
- Mary Martchouk
- Ron Milone
- Mark Moran
- Jinchul (JC) Park
- Jane Posey
- Clara Reschovsky
- Rich Roisman
- Meseret Seifu
- Daniel Son
- Dusan Vuksan
- Feng Xie
- Jim Yin

The meeting was chaired by Bahram Jamei of VDOT.

1. Introduction and approval of meeting highlights

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

2. Status report on the Version 2.3 Travel Model

This item was presented by Ron Milone of TPB staff. Mr. Milone first reviewed the schedule for the 2012 CLRP/FY-2013-18 TIP Air Quality Conformity Determination. He mentioned that the regional modeling work was proceeding on schedule and staff anticipates that the air quality results will be adopted by the TPB in July. He reviewed some background regarding the recently prepared inputs to the Version 2.3 Travel Model and pointed out that external and through auto trip forecasts have been moderated. He explained that staff has recently updated the base-year traffic counts at external stations from 2007 to 2010. The 2010 counts reflect an approximately 3% *decrease* in volume over the period. Staff had previously assumed that traffic between 2007 and 2010 would be growing. Such a decrease in traffic is

unusual, but not surprising, given that the economy has slowed and given the recent volatility in fuel prices. The moderated external and through trip forecasts will effect a small reduction in the regional VMT forecasts in comparison with last year's modeling results. Lastly, Mr. Milone mentioned that two minor updates have been made to the model including an increase in the precision of trip tables produced by three scripts and modifications to the LineSum transit assignment summary program. The updated model version is now referred to as the Version 2.3.39 Travel Model.

Following the presentation, a TFS member inquired whether any changes were made to the external station volume growth rates. Mr. Milone responded that the growth rates have not been changed. In general, external traffic growth is assumed to keep pace with growth in land activity. Another committee attendee inquired whether the downward trend in the external counts observed between 2007 and 2010 was present before 2007. Mr. Milone responded that this trend was not observed prior to 2007 and there has generally been a 2% annual growth. The decrease in traffic counts is reminiscent of what happened in the early 1990's, when the area was affected by a relatively small recession.

3. TPB staff review of six years of consultant recommendations from the ongoing consultant assistance project for models development

This item was presented by Mark Moran of TPB staff. Mr. Moran distributed a copy of the draft report to the attendees. Mr. Moran first reminded the attendees that the TPB has maintained a consultant-assisted project to evaluate the travel forecasting practices used by the TPB since FY-2006. The report that was issued summarizes the recommendations from the first six years of the consultant review and will be used to update the TPB work program. Mr. Moran then discussed the review of the TPB's travel demand forecasting process conducted by TRB in 2002. This review resulted in several updates to the travel model. Following this review, TPB chose to conduct future reviews using consultant help.

Next, Mr. Moran described the report organization and mentioned that within each modeling topic the report includes a summary of the consultant findings and recommendations, as well as discussion and TPB staff response. Since the report covers over 100 recommendations in 25 areas, Mr. Moran's presentation included only a sample of the recommendations, touching upon trip generation, trip distribution, modeling transit, time-of-day/peak spreading, traffic assignment, and activity-based models (ABMs). He pointed out that TPB staff has already fully or partially implemented 30% of the recommendations and staff are currently planning to implement an additional 15%. Of the remaining 55%, staff either agrees with the recommendation but needs more investigation (22%), has not yet acted upon the recommendation but is considering it (24%), or is in disagreement with the recommendation (7%). Mr. Moran also pointed out that the most turbulent area of recommendations is the ABMs, with a wide range of recommendations made by the consultants. As of now, TPB staff remains unconvinced that the benefits of ABMs outweigh the costs. Mr. Moran concluded his presentation by requesting that the TFS review the report and send written comments within 30 days. After this time, the report will be finalized and TPB staff will develop short-term and long-term models development work plans.

A TFS attendee asked for clarification regarding Mr. Moran's comment that the TPB staff did not agree that speeds resulting from the assignment process should be rigorously validated against observed

speeds. Mr. Milone responded that speeds resulting from a static traffic assignment process cannot be fairly compared with real-world speeds because a static assignment allows for V/C ratios to exceed a value of 1.0. TPB, like many other MPOs, employs a special post-processor to develop hourly link volumes and speeds from the loaded network for the purposes of calculating mobile emissions. He suggested that post processed speeds should be compared with real-world speeds to arrive at a fairer and more reasonable comparison. Mr. Moran added that unlike the dynamic traffic assignment (DTA), the static traffic assignment assigns each trip to the entire path for the duration of the time-of-day period and thus cannot accurately represent operational speeds. He also mentioned that one of the main reasons for getting involved in activity based modeling is that it provides input for a DTA. He noted, however, that none of the MPOs have yet integrated an ABM with DTA.

Another TFS member inquired whether the AMPO study compared the trip-based models (TBMs) with ABMs and issued recommendations on which to use. Mr. Moran responded that the first phase of the AMPO study looked at 21 places that have to some extent implemented ABMs. However, no direct head-to-head comparison between the TBMs and ABMs was conducted. He added that a good generic comparison between a TBM and an ABM is available in NCHRP Synthesis 206. Rich Roisman commented that it was the intent of the AMPO report to produce a direct comparison between a TBM and an ABM, but this was not possible within the context of the AMPO study. Such comparisons, however, were conducted for Columbus, Ohio and Sacramento, California (see, for example Ferdous et al. (2011) and Griesenbeck (2007)). A consultant noted that the full benefit of ABMs is not realized unless they are combined with DTA. An attendee inquired whether the TPB has ever looked into implementing DTA. Mr. Moran responded that in 2006 the TPB purchased a Citilabs microsimulation package as well as a Citilabs DTA package. Unfortunately, when the TPB attempted to conduct tests on these, there were a number of technical issues with them. In addition, feeding the microsimulation (even just for the small area around Tysons Corner) proved to be an onerous task. Thus, the effort was abandoned.

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

This item was presented by David Roden of AECOM. Mr. Roden listed all the task orders for FY-2012 and then proceeded to discuss the outstanding work items. For Task Order 1, AECOM plans to brief MWCOG on the new WMATA post-processing model, review the assignment convergence tests completed by the TPB, and prepare a document summarizing all task reports. For Task Order 3, AECOM will update the LineSum software and propose new coding rules to capture access to Metrorail stations. The new LineSum program will be an open-source, C++ console-based software with added functionality. For Task Order 5, AECOM will create total link ridership summaries including performance statistics and bandwidth plots. They will also begin the conversion from TRNBUILD to PT by re-building the MWCOG transit access generation tools and testing path building options. For Task Order 6, AECOM, with the help from subcontractor Stump Hausman and Bill Allen, will model Metrorail air passenger trips, external Metrorail trips, and Metrorail visitor travel. Next, Mr. Roden showed a summary of the 2007 Metrorail survey including external trips, visitor trips and air passenger trips. He mentioned that a Fratar-type process will be used for modeling external Metrorail trips, with special provisions made to accommodate demand at future Metrorail stations. Mr. Roden mentioned that the next steps include

delivering the new LineSum program and documentation, meeting with TPB staff, responding to comments on the draft model for external and visitor trips, and preparing the final report.

An attendee inquired how the load factors were developed for the LineSum program. Mr. Roden responded that AECOM uses different capacities for different modes. They use 120 persons per car for Metrorail with seven or eight car trains and 115 persons per streetcar with three cars per train. For light rail, 140 persons per car is used, while for buses the number is 40-45 per bus. Mr. Roden then discussed how the load factors are affected by the capacity constraints and headways. Another committee attendee inquired whether there is actual data to compare the transit loadings to and whether the estimated volumes match the observed. Mr. Roden responded that Metrorail counts are available by hour of the day. Based on AECOM's work, the estimated volumes match these counts reasonably well. Following this, there was a brief discussion regarding the airport trip model.

5. Traffic assignment convergence testing

This item was presented by Mary Martchouk of TPB staff. She reminded the attendees that the current convergence criteria used in the traffic assignment for regional analyses is a 10^{-3} relative gap or 300 user equilibrium iterations, whichever is attained first. However, TPB staff noted, for corridor-level analyses, a tighter criterion, such as a 10^{-4} relative gap, may be needed to reduce the noise found in volume difference plots. However, when staff reduced the relative gap tolerance to 10^{-4} and plotted the relative gap values by user equilibrium, the function was noted to exhibit large fluctuations and even increases. The gap parameter was also found to drop to zero for some iterations. TPB staff contacted Citilabs in October 2011 regarding these convergence issues. After a few weeks, Citilabs responded that the observed gap values of zero occur due to limitations in the software precision and the plateau in the relative gap that is observed because a solution very close to equilibrium has been found. As part of their response, Citilabs transmitted relative gap plots from their tests. Upon taking a look at the response, TPB staff noted that the relative gap plots obtained from Citilabs did not match those produced by the TPB despite using the same version of the model. TPB staff once again transmitted a newer version of the traffic assignment process to Citilabs and requested that they replicate the relative gap plots obtained by TPB. TPB staff also requested that if Citilabs suggest any improvements, they should transmit the corresponding scripts. In March 2012 Citilabs communicated that they have replicated the TPB results and made three suggestions including explicitly defining the COST function in the traffic assignment script, calculating tolls prior to the LINKREAD phase in the script, and changing the volume-delay function (VDF) from a lookup table to a functional form. TPB staff then proceeded to test the three suggestions. They found that explicitly defining the COST function did indeed improve convergence and thus will be considered for future updates to the travel model (since this change also increased traffic assignment run time by about 50%, staff will need to make sure that the change is worth the added run time). Pre-calculating tolls did not significantly reduce run times and was found to alter the relative gap plots and thus will not be included in the updated script. Lastly, the continuous VDF function did not dramatically improve convergence and increased the run time by 15% and thus will not be added to the new version of the highway assignment script.

A subcommittee member inquired whether all three improvements were tested together. Ms. Martchouk responded that the TPB did not conduct this test.

6. Demonstration of the internet-based Regional Transportation Data Clearinghouse web viewer

This demonstration was given by Charles Grier of TPB staff. Mr. Grier provided the link to the website used to access the Clearinghouse viewer. He mentioned that a login and password will be required in the future and asked the TFS attendees not to share the link with others, until the security issues are resolved. He also added that, as of today, the hourly count tool is not available, but will be added after the next update. Then, he showed how to use the identify tool and the enhanced search tool available within the viewer to obtain count data.

A committee attendee inquired about the source of the base map. Mr. Grier responded that the tool uses ESRI base map. The attendee asked whether the network was matched to the map, which Mr. Grier answered in the affirmative. He added that the Clearinghouse network was conflated to NAVTEQ. Another committee attendee asked whether the count shapefiles are available for pairs of AB nodes. Mr. Grier responded that these are available and can be exported from the tool as a shapefile or a geodatabase.

7. Developing a traffic count database for the year-2010 validation of the travel model

This item was presented by Mr. Milone, who began by discussing recent U.S. trends in VMT, such as the decline in VMT due to the 2008 economic recession. At the local level, however, the regional VMT for the Washington, D.C. area was found to have remained relatively flat between 2007 and 2010, based on counts in the Highway Performance Monitoring System (HPMS) program, which includes permanent and program counts around the region. Mr. Milone then showed maps with locations of the 6,450 daily (directional) counts and the 1,700 hourly (directional) counts. He also mentioned some caveats with the collected counts, including the fact that the program stations are surveyed in 3-year cycles, the counts are non-directional, and multiple counts exist on some links. Mr. Milone then discussed how many of the counts were actually collected in each year and how many were factored from prior years. Lastly, Mr. Milone presented scatterplots of 2010 count data versus the 2007, 2008, and 2009 count data. He pointed out that some of the outliers that are seen could indicate issues with the collected count information. Mr. Milone concluded his presentation by mentioning that time-of-day counts are still lacking and some screenline links are still missing count data.

Bob Griffiths pointed out that the outliers in the count scatter plots could be due to road work. He also commented that the name “counts” is somewhat misleading because the numbers have been adjusted for seasonal and weekday effects. He mentioned that the 2010 volume estimates should be the best source of data because of the new methodology that uses GPS technology, which ensures consistency in the count location and enables georeferencing the count. In addition, a 2010 HPMS re-assessment made it necessary to count every link instead of grouping some of the links. There was a discussion regarding the quality of the count data.

A subcommittee member suggested supplementing the HPMS counts with data from traffic.com, which was discussed at a previous meeting by Wenjing Pu. Mr. Milone agreed that TPB should take a look at it.

8. Geographically focused household travel survey: Briefing on household travel characteristics in ten subareas of the region

This item was presented by Bob Griffith of TPB staff. Mr. Griffiths mentioned that the geographically focused surveys are aimed at analyzing travel behavior in communities with different densities or transportation options in order to assist with local planning. In spring 2010, three areas in Arlington County were surveyed including Jefferson Davis Highway/Crystal City/ Pentagon City, Village of Shirlington, and Columbia Pike corridor. The fall 2010 survey areas were Logan Circle, the Purple Line Corridor, White Flint area, Largo area, Reston area, Woodbridge area, and the City of Frederick. After outlining the areas where the add-on surveys were conducted, Mr. Griffiths discussed the modal shares in the ten areas. He pointed out the high walk share in Logan Circle, Crystal City, and the Purple Line Corridor as well as the high bike share in Logan Circle and Crystal City. He also noted the prevalence of 1-person households in Logan Circle, Crystal City, and Shirlington areas. In addition to the large number of smaller households, these three areas were found to have a high number of persons in the 18-34 age group.

Next, Mr. Griffiths listed the seven areas that are being surveyed in spring 2012: Friendship Heights, New York Avenue Corridor, St. Charles, National Harbor, Beauregard Corridor, East Falls Church and West Falls Church, and the Dulles North area. The fall 2012 data collection will include Federal Center/Southwest/Navy Yard, H Street NE Corridor, Silver Spring, US 1/Green Line, City of Fairfax, and City of Manassas. Additional areas which may be surveyed in fall 2013 include Tysons Corner, St. Elizabeth/Anacostia, and Greenbelt.

A subcommittee member inquired how the areas for the focused surveys were selected. Mr. Griffiths responded that the process started with the Regional Activity Centers (RACCs). But the final say in which areas were chosen for surveying was up to the TPB Technical Committee.

9. Round-table discussion

The round-table discussion was postponed until the next TFS meeting.

10. Other business

There was no other business. The next proposed meeting of the TFS is Friday, July 20, 2012 from 9:30 AM to 12:00 noon. The meeting adjourned at about 12:05 PM.

The highlights were written by Mary Martchouk.