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## National Capital Region Transportation Planning Board

Metropolitan Washington Council of Governments  
777 North Capitol Street, N.E., Suite 300, Washington, D.C. 20002-4290

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# Travel Forecasting Subcommittee Meeting Highlights

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*Friday, January 21, 2011, 9:30 AM to 12:00 noon*

## Meeting attendees

- Erik Dahlberg (WMATA)
- John (Jay) Evans (Cambridge Systematics)
- Dan Goldfarb (Cambridge Systematics)
- Eric Graye (M-NCPPC, Montgomery Co.)
- Jamie Henson (DDOT)
- Tony Hofmann (Michael Baker Corp.)
- Dial J. Keju (Frederick Co.)
- David Kline (Fairfax County DOT)
- Li Li (Whitman, Requardt & Associates)
- Yuanjun Li (M-NCPPC, Montgomery Co.)
- Subrat Mahapatra (MD SHA)
- Bob Moore (VDOT)
- Jaak Pedak (Fairfax Co. DOT)
- Dante Perez-Bravo (CH2M HILL)
- Rich Roisman (VHB)
- Phil Shapiro (STC)
- Dan Stevens (Fairfax County DOT)
- Gregg Steverson (Prince William Co.)
- Scott Thompson-Graver (Whitman, Requardt & Associates)

## COG/TPB staff in attendance

- William Bacon
- Elena Constantine
- Joe Davis
- Charles Grier
- Bob Griffiths
- Wanda Hamlin
- Charlene Howard
- Hamid Humeida
- Mary Martchouk
- Ron Milone
- Mark Moran
- Jinchul Park
- Jane Posey
- Clara Reschovsky
- Meseret Seifu
- Dusan Vuksan
- Jim Yin

The meeting was chaired by Jamie Henson of DDOT.

### **1. Introductions and approval of highlights from the previous meeting**

The highlights from the November 19, 2010 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, Mary Martchouk, and Mark Moran of TPB staff. They distributed a copy of their presentation slides to the attendees. Mr. Milone began the presentation by informing the TFS of delays in the release of the Version 2.3 model. The original release date was to have been January 21, 2011, however, now it has been postponed due to model application difficulties encountered by staff. Mr. Milone suggested that an additional month of work should be sufficient for

resolving the problems and proposed holding a special meeting at the end of February to release the new model and its documentation. The TFS attendees selected February 28 as the preferred date for the special meeting. Next, Mr. Milone discussed model calibration progress since the November TFS meeting, including refinement of the traffic assignment process, calibration work on the trip distribution and mode choice steps, establishing the code to apply the model, and beginning the documentation process. He also mentioned that the TPB was apprised of the Version 2.3 model progress and schedule at its January 19 meeting.

Ms. Martchouk conducted the next part of the presentation regarding traffic assignment updates. She described the traffic assignment parameters used in the Version 2.2 travel model, which include conical volume delay functions with a queuing delay function on freeways and ramps and a convergence criterion of 60 iterations for the Frank-Wolfe user equilibrium assignment. At the last TFS in November, TPB staff proposed adding a queuing delay function to all facilities, using a relative gap of  $10^{-2}$  instead of a maximum number of iterations in the user equilibrium assignment, and running the bi-conjugate Frank-Wolfe algorithm instead of Frank-Wolfe. Since November, additional changes were implemented. One of them included removing the queuing delay function from all facilities, which resulted in a better match of speeds as compared to INRIX and probe vehicle data, as well as more reasonable travel time contours. In addition, free-flow capacities and speeds were increased in order for the assigned volumes to better match the count volumes across different facility types. Lastly, because removal of the queuing delay function resulted in faster assignment run times, the relative gap convergence criterion was changed to  $10^{-3}$ . After the presentation an attendee inquired which version of Voyager was used for the bi-conjugate Frank-Wolfe assignment. Ms. Martchouk responded that Voyager version 5.1 was used. Another subcommittee attendee commented that the travel times and speeds that are resulting from the new version of the model appear to be more reasonable than before.

Next Mr. Milone presented results of the trip distribution calibration process. He mentioned that a gravity model will be used for trip distribution, which was calibrated based on the 2007/2008 HTS. A total of 14 trip distribution models were calibrated (HBW stratified by 4 income levels, HBS stratified by 4 income levels, HBO stratified by 4 income levels, NHW, and NHO). He mentioned that after the f-factor calibration, Potomac River crossings were over-estimated by 70% and thus k-factoring was used to address the over-estimations.

After Mr. Milone's presentation, a subcommittee attendee inquired how the k-factoring in Version 2.3 model compares to the Version 2.2. Mr. Milone responded that this comparison has not been done yet. Another attendee asked how well the estimates compare to the observed volumes for other screenlines. Mr. Milone stated that if there is no k-factor shown, the results are reasonable. Another attendee commented that special attention needs to be paid to the long-distance commutes because, in the past, there was an underrepresentation of those. Mr. Milone agreed and pointed out that on slide 23, the estimated trip lengths are 35 minutes for low income and up to 52 minutes with the average being 47 minutes. These times are substantially longer than 35-40 minutes that are seen in Version 2.2 model.

The final part of the presentation regarding mode choice calibration was conducted by Mr. Moran. He mentioned that his presentation will discuss the mode choice model that has been calibrated with the

observed 2007/2008 HTS data, however, it will be re-run with simulated trips before Version 2.3 model is released. The mode choice calibration process is done using an automated calibration routine, CALIBMS, and the model is applied using the AEMS Fortran program, both of which were developed by AECOM Consult, Inc. The nested logit model choice model consists of four parts:

1. A set of available modes/choices (15) and a nesting structure
2. Rules for market segmentation (e.g., 4 HH income levels & 20 geographic areas)
3. A set of utility equations, which include time/cost coefficients and also income constants
4. A set of nesting *coefficients* and nesting *constants*

An attendee asked whether the model considers parking capacity limitations at the Metrorail stations when considering mode of access. Mr. Moran responded that the TPB uses a file that contains parking capacity and cost information, but, as of now, it is not used to constrain the demand. He went on to say that AECOM built in the capability to add shadow pricing to stations, but TPB staff have not used it. Mr. Moran added that there are, however, some inherent limitations on the parking demand at Metrorail stations because PNR access is limited to zones within a set distance of the station (15 miles for terminal stations; 5 miles for intermediate stations; and 3 miles for stations close to the CBD or with only kiss-and-ride access).

Another attendee made a comment that care needs to be taken not to have too many prescriptive geographical constraints on the constants. The attendee said that there are tradeoffs with including a lot of geography; while it results in better model fit, it can also restrict the flexibility of the model. He recommended that the TPB staff look at the magnitude of the constants and equivalent vehicle time and, if they're, excessive, it is recommended that the supply side be modified rather than the constants themselves. A subcommittee member asked whether the market segments are sensitive to changes in the employment and population densities. For example, if Tysons Corner is developed in the next 20 or 30 years, will it become a part of a different market segment since the constants estimated for the current market segment may no longer be valid? Mr. Moran responded that the TPB has retained AECOM's market segmentation, which is constant through time. However, AECOM has moved on to introduce a pedestrian environment factor, which allows one to reduce the number of alternative-specific constants to 4 or 5 and is able to account for land use changes. The TPB staff haven't incorporated this measure in the model due to the model release deadline approaching, but plans to consider it in the future.

Mr. Milone concluded the presentation by reviewing a timeline for completion of Version 2.3 travel model. He stated that the Version 2.3 model along with the documentation will be released on February 28. The model will continue to be tested and refined through October, and hopefully will be approved by the TPB in November at which point in time it will become the adopted model.

### **3. Delineation of TAZs for the 2010 Census Transportation Planning Products (CTPP)**

This item was presented by Bob Griffiths of TPB staff, who distributed a copy of his slides to the attendees. Mr. Griffiths mentioned that the delineation of CTPP traffic analysis zones and districts is

necessary for tabulation of the 3-year and 5-year Census American Community Survey (ACS). The ACS is a continuous nationwide survey that replaces the long form used in the decennial census. Unlike the census long form, the ACS is continuous year round (not conducted at a single point in time), has a lower annual sampling rate of about 1 in 40 (compared to 1 in 6 for the long form), and is only available in 5-year aggregate format for small area geography. The 1-year aggregate data is available from the ACS for places with 65,000+ population, the 3-year aggregate data is available for place with 20,000+ population, the 5-year aggregate data is available for places with population <20,000, and all levels of aggregation are available for PUMAs with 100,000+ population. Mr. Griffiths next went on to discuss the TAZ delineation, which will be used to summarize 5-year data. Some of the rules for the delineation included the requirement that TAZs must nest within counties and a recommended threshold of 1200 resident population or 600 workers. He also mentioned that for TAZs below the minimum threshold, there is a risk of data suppression to avoid disclosure of data that could be traced back to individual households. The TAZ delineation will begin with a TRB workshop, followed by delineation software deployment in March-April, and the process will be completed in early June. The TAZ delineation process will be coordinated with DDOT, MDOT, VDOT, BMC, and FAMPO. TPB will begin the process and the results will be presented to the TFS in May.

An attendee asked whether the travel demand model TAZs will be changed after the new TAZs are created for the ACS. Mr. Griffiths clarified that the new TAZs will only be used for the CTPP data collection. Hence, the current model TAZ system will be retained.

#### **4. Regional Transportation Data Clearinghouse - Transit Data**

This item was presented by Charles Grier of TPB staff. Mr. Grier mentioned that the RTDC was released with the highway volume information (AADT and AWDT), and the current updates are being made to add transit data. He mentioned that transit data has been collected by transit line and month from FY03 through FY10 for local buses, commuter buses, Metrorail, and commuter rail, although not all services have data for every year (available data was shown in a table that can be retrieved from the TFS website). The collected data was attached to the 2009 transit network in the RTDC and the route information of interest can be retrieved from the RTDC by opening the map and interactively selecting the desired transit route. Mr. Grier then discussed some future developments that include incorporating data into current ArcGIS-based RTDC Viewer, providing support to WMATA's Regional Transit Data Collection project through Regional Bus Subcommittee, and developing web-based viewer and Google Earth viewer.

A subcommittee attendee inquired whether the different transit agencies provide data in a standard format. Mr. Grier responded that they do not and he has to create a unique identifier and compile the data himself.

#### **5. TPB Assistance on Travel Demand Model Development and Application: FY 2011 task orders for Cambridge Systematics, Inc.**

This item was presented by John (Jay) Evans of Cambridge Systematics. He outlined the four tasks that Cambridge Systematics will be working on in FY 2011.

- Task 1 (Continued) – Attend Meetings and Provide Technical Support
- Task 11 – Provide Guidance and Support Pertaining to Transit Assignment for the Version 2.3 Travel Model
- Task 12 – Perform Services to Support Consideration of Available Travel Demand Forecasting Software Packages
- Task 13 – Perform Review of Potential Model, Methods, and Script Enhancements for the Version 2.3 Travel Model

Mr. Evans mentioned that the transit assignment is the last step of the model after mode choice and highway assignment. Thus the work on this task can begin after Version 2.3 model is released. For task 12, Cambridge Systematics plans to conduct an inventory of software used by larger MPOs and assist in development of evaluation criteria. Mr. Evans emphasized that no suggestions with regard to which software should be selected will be made by the consultant. For task 13, Cambridge Systematics plans to review the existing scripts and propose ways to optimize them, review the possibility of implementing Cube Cluster and Cube PT module, and look into the tolling methodologies. He said that they don't have much time, but expect a substantial amount of the report done by May TFS.

A subcommittee member inquired how long the run times are for the model. Mr. Milone responded that this is still an open question depending on the number of iterations used in traffic assignment and speed feedback.

## **6. Round-table discussion**

The round-table discussion is an opportunity for subcommittee members to share current activities of interest. Mr. Evans of Cambridge Systematics provided an update on the Transaction 2040 study since he is the project manager on the consultant side. He mentioned that there is a committee that manages the project, which includes many of the Northern Virginia jurisdictions as well as the state of Virginia. The committee held a kick-off meeting in December and is currently finalizing work plans. They also had discussions about the public information program. According to Mr. Evans, initially Transaction 2040 was an ambitious project, which had to be scaled back, by the elected officials, to less than half of the original budget. Some of the budget cuts came from scaling back the public information program. Meanwhile, most of the analytical work and prioritization process was retained. Next Mr. Evans briefly discussed the timeline for the study. The analytical work is expected to proceed from March through the summer and will use the new Version 2.3 travel model. Their goal is to have an open house in November with draft results so that they can receive comments. Mr. Milone asked whether there was any purpose and need information to share. Mr. Evans responded that the overarching goal is to develop a set of prioritized projects related to the Northern Virginia region; however, more specific objectives will be discussed in March. He also added that there is a particular interest in multimodal projects and those that affect many parts of the region.

Subrat Mahapatra of MDSHA mentioned that they are working on updating the I-270 forecast for multimodal project since the last update was done 3-4 years ago. FHWA requested updated numbers bringing all Draft Environmental Impact Statement (DEIS) alternatives that looked at HOVs and Environment Assessment (EA) alternatives that looked at the toll lanes for consistent comparison across

alternatives. In addition, MDSHA is preparing for an ICC before and after study after the freeway opens next year. They are also looking at a broader analysis framework that integrates operations and planning by developing a mesoscopic model for the Baltimore Washington region. The operational analysis would allow one to look at emergency evacuation planning and homeland security issues. On the travel demand side, MDSHA is putting together a statewide travel model that will allow to examine broad policy impacts and will improve freight modeling. The state is currently recalibrating the model with the combined HTS data, with the assistance of Bob Griffiths, and will present findings to the TFS in the coming months.

Jamie Henson of DDOT shared that they are working on developing a travel model for Washington, D.C. using TransCAD. DDOT is receiving assistance from CH2M HILL in this process and hopes to complete the effort in February. The model will include a more refined TAZ system and network in order to perform more detailed project analysis. A subcommittee attendee asked whether they had a specific project in mind when they decided to develop the model. Mr. Henson responded that they did not, though, they would like to make project decisions based on technical analysis rather than simply a policy basis. Another subcommittee member asked whether they are focusing on walk trips in the District. Mr. Henson stated that they are still focusing on developing the overall model and not focusing on the specific elements.

## **7. Other business**

There was no other business. The next proposed meeting of the TFS is Monday, February 28, 2011 from 9:30 AM to 12:00 noon. The meeting adjourned at about 11:45 PM.

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The highlights were written by Mary Martchouk.