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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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# Highlights of the May 23, 2014 meeting of the Travel Forecasting Subcommittee

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

Status of highlights: Approved on 7/18/14

### Meeting attendees

- Jay Evans (Cambridge Systematics)
- Charles Freeman (Sabra, Wang & Assoc.)
- Dan Goldfarb (VHB)
- Eric Graye (M-NCPPC, Montgomery Co.)
- Keith Jasper (No. Va. Transp. Authority)
- Eric Jenkins (M-NCPPC, Prince George's Co.)
- Wendy Jia (WMATA)
- Robert Josef (VDOT)
- Dial J. Keju (Frederick Co.)
- Yuanjun Li (M-NCPPC, Montgomery Co.)
- Feng Liu (Cambridge Systematics)
- Krishna Patnam (AECOM)
- David Roden (AECOM)
- Dan Stevens (Fairfax County DOT)
- Stephen Weller (CH2M HILL)

### COG/TPB staff in attendance

- Anant Choudhary
- Elena Constantine
- Gregory Goodwin
- Robert Griffiths
- Charlene Howard
- Hamid Humeida
- John Kent
- Nicole McCall
- Ron Milone
- Jessica Mirr
- Mark Moran
- Dzung Ngo
- Jinchul (JC) Park
- Jane Posey
- Rich Roisman
- Meseret Seifu
- Daniel Son
- C. Patrick Zilliacus

The meeting was chaired by Dial Keju of Frederick County, Maryland.

## 1. Introductions and approval of meeting highlights from the March 21 meeting

The highlights from the March 21, 2014 meeting of the Travel Forecasting Subcommittee (TFS) were approved without change.

## 2. Status report on the consultant-assisted project for development of the TPB travel model

This item was presented by David Roden of AECOM, who also distributed copies of his presentation. Mr. Roden's presentation was about the four task orders for FY 2014:

- Task Order 10: Meetings and general support

- Task Order 11: Cube-based walkshed process
- Task Order 12: HOT/HOV highway assignment
- Task Order 13: Mode choice and transit modeling

Mr. Roden announced that the draft final report for FY 2014, covering all four task orders, would be delivered to COG/TPB staff by June 30. Prior to that, AECOM had sent COG/TPB staff draft copies of the chapters dealing with Task Orders 11, 12, and 13. COG/TPB staff has reviewed these three chapters and provided comments to AECOM. AECOM is now incorporating COG/TPB staff comments into the final draft report. It is expected that the draft final report will be presented to the TFS in July.

Regarding Task Order 11, Mr. Roden discussed how AECOM intended to respond to the COG/TPB comments. He mentioned also that COG/TPB staff was currently testing the new transit walkshed/percent-walk-to-transit process, adding that staff was even testing its use in model runs being conducted for the current air quality conformity analysis.

Regarding Task Order 12, Mr. Roden discussed the revised HOV-choice model, the integrated toll-setting and toll choice model used in traffic assignment, and the software and documentation that was sent to COG/TPB staff on May 22. Mr. Roden clarified that the toll setting process can be enabled or disabled at the option of the end user. AECOM's proposed modeling process eliminates the current multi-run process used for modeling HOT lanes. The multi-run process requires both a "base" and a "final" scenario for each year with HOT lanes. In AECOM's revised process, there is now only one scenario per year (called "EC" for "existing plus committed"). According to AECOM, the elimination of the multi-run process for HOT-lane modeling cuts model execution times by 50%.

Regarding Task Order 13, Mr. Roden described the work done by AECOM to migrate from the TRNBUILD transit path builder to the Public Transport (PT) transit path builder. He also described the work done by AECOM to migrate from the AEMS mode choice application program to the ModeChoice mode choice application program. AECOM then put the new walkshed process, mode choice process, and HOV/HOT-lane modeling process in a model set derived from the Ver. 2.3.52 travel model. COG/TPB staff will be testing this revised model over the next few months. Mr. Roden reported that the estimated model run times were 24 hours when toll-setting was turned off and a few days or longer when toll-setting was turned on. He clarified that the toll choice model, based on values of time, splits the trip tables into toll and non-toll groups, which means that each O-D combination has two paths for SOV and HOV.

Jinchul (JC) Park asked how well the new/proposed process preserves HOV volumes on the HOT lanes. Mr. Roden answered that there were six vehicle classes, each with its own set of value of time curves, for both peak and off-peak time periods, which should allow the model to handle the balance between HOV and paying LOV traffic on the HOT lane, but he agreed that it was a difficult balance to maintain.

Regarding the migration to from TRNBUILD to PT that is part of Task Order 13, Mr. Roden described some of the recent work done by AECOM since the March TFS meeting. In general, transit paths are built using perceived times, which are derived from clock times using a series of weighting factors. Mr. Roden said that AECOM transferred the existing time factors, as is, from TRNBUILD to PT. Despite this transfer of time factors, the paths produced by TRNBUILD and PT are different and Mr. Roden provided

two examples of this. In the first example, TRNBUILD produced a walk-only path between a given origin and destination pair. By contrast, PT produced a bus path between the two points (with walk access and egress legs). In general, PT paths were longer than TRNBUILD paths, but the real question was which path was closer to observed behavior. Mr. Roden said that, ideally, the time factors would be adjusted (calibrated), based on observed behavior, but, in this case, there was insufficient time to do so.

Mr. Roden also said that one approach for ensuring reasonable transit paths would be to build a walk path for each O-D pair, and use this path only if the walk path is shorter than the transit path. This would affect the mode choice, he said. Although, in general, the average transit skims were longer in PT, compared to TRNBUILD, there was variation by transit submode. Specifically, the PT transit skims for local bus and express bus were longer than the comparable TRNBUILD skims, but the PT-based Metrorail skims were shorter than the comparable TRNBUILD skims. Mr. Roden said that these differences should be investigated further. Mr. Roden suggested some options, such as controlling maximum distance or time for the walk-access leg, or adding a walk-choice model to the mode choice model for walking, biking or taking transit options. He said PT process needed to be calibrated with the boarding, wait and transfer factors and penalties to represent reasonable paths. Mr. Roden concluded his discussion of PT with some recommendations for further work.

Wendy Jia asked how AECOM proposed building the walk path in PT. Mr. Roden said that PT should be able to build walk paths in the denser parts of the region where the street network is dense (since walking in the model occurs on non-freeway street segments). For areas, where the highway network is less dense, it may be necessary to add walk links that represent walk opportunities that are not present in the current highway network.

Next, Mr. Roden discussed the work AECOM had done to migrate from the existing mode choice program, AEMS, to a newer, faster mode choice program called ModeChoice. He began with a discussion of the motivation behind the migration, such as faster run times and the fact that it is difficult to support AEMS, now that the person who wrote it no longer works for AECOM. He also mentioned that the source code for AEMS is proprietary, whereas ModeChoice is open source. Lastly, the automated calibration process that comes with ModeChoice is superior to the process that comes with AEMS (known as CALIBMS), since the ModeChoice calibration routine is able to constrain constant values.

Mr. Roden discussed that, without calibration, the ModeChoice program was able to replicate the results produced from AEMS. As a second proof of concept, the mode choice model, implemented using ModeChoice, was re-calibrated using new trip targets. Since this was simply a proof of concept, and due to time limitations, the new targets were based on a combination of survey data and existing (estimated) mode choice results. Again, the automated calibration routine in the ModeChoice program has the ability to constrain estimated constant values, which was not possible using AEMS/CALIBMS. The ModeChoice calibration was set to be terminated after 35 iterations or a %RMSE of 1%. Mr. Roden then discussed some of the results of the proof-of-concept calibration. He noted some discrepancies between the re-calibrated mode choice model using ModeChoice and the previous model using AEMS.

For future work, he recommended re-doing the calibration with better data, including, possibly, more information about income distributions.

Ms. Jia noted that the last few rounds of transit on-board surveys included an income question, but she wondered how this question was addressed in other surveys, such as the HTS, that might be used for non-transit trips. Mr. Milone responded that there is a household income question on the HTS. Mr. Roden countered, however, that the HTS did not have enough samples to get this information for the 20 geographic market segments. Mr. Griffiths also drew a distinction between household income and personal income.

### **3. A primer on EPA MOVES model**

The item was presented by Elena Constantine, COG/TPB staff, who also distributed a copy of her presentation. She mentioned that her team is responsible for the annual air quality conformity analysis, noting that this year's cycle will be the second one using the MOVES model developed by the U.S. Environmental Protection Agency (EPA). The purpose of her presentation was to introduce the MOVES model, its structure, and its use at COG. Ms. Constantine said the MOVES model uses default values derived from a large number of case studies throughout the U.S., and they were intended to be used where local data is not available. She added that MOVES allows doing an analysis across multiple dimensions, including spatial, temporal, and vehicle type. For agencies that do not have complete input data, the model comes with some default data that can be used. The input data includes a broad range of variable, such as travel demand model outputs, e.g., VMT and VHT.

Next, Ms. Constantine introduced the chronology of versions of MOVES, whose predecessor is the MOBILE6.2 model. She said that the primary applications of MOVES at COG are 1) The air quality conformity determination; 2) Estimating greenhouse gas emissions; 3) State Implementation Plans; and 4) Project-level ("hot spot") analysis, which is done primarily by consultants. COG also uses MOVES model at the county level to test the effectiveness of strategy scenarios. Ms. Constantine concluded her presentation by discussing the modeling process of the MOVES model.

Krishna Patnam asked whether COG has a strategy for evaluating the emission reduction effect of Bike-to-Work day. Ms. Constantine said that COG has not yet come up with such a strategy. Ms. Jia asked how COG's modeling process deals with through traffic. COG/TPB staff responded that through trips are one of several "exogenous" travel markets that are estimated by COG/TPB staff and used as inputs to the travel demand model, whose output is then used by the mobile emissions model. Mr. Roden mentioned that he encountered this problem when he was working with the EPA: Since vehicle attributes were assigned by county, a vehicle trip from external county X, to external county Y, via internal county Z, would get attributes based on county Z, not X or Y. Mr. Milone asked how the emission rates for MOVES compared with those from MOBILE6.2. According to Ms. Constantine, in the case of ozone and VOC, the rates are slightly lower than MOBILE6.2. However, MOVES results in an increase in fine particles, including PM2.5 and precursor NOx, because MOVES does a better job at capturing the different processes generating fine particles. This increase in fine particles puts COG in a difficult situation, since the conformity is done using MOVES, but the mobile source budgets were designed using MOBILE6.2.

#### **4. Data and application enhancements to the TPB Regional Transportation Data Clearinghouse**

Charlene Howard and Martha Kile of COG/TPB staff presented the item and distributed copies of the presentation. Ms. Howard gave an overview of the Regional Transportation Data Clearinghouse (RTDC), which is as a web-based transportation data viewer that offers tools for data display, query, analysis and download. She announced that beside the updates to current data layers, the newly added data layers include external station traffic volumes, year-2012 vehicle classification counts, Central Employment Core Cordon Count data from 1993 to the present, the 2011 Washington-Baltimore Air Passenger Survey, and the 2012 Metrorail Passenger Survey. In the near future, COG/TPB staff hopes to include aggregated INRIX speed data. Ms. Howard highlighted that since there were many data layers, the popup menus and related records would make it easier to access the data. Also, the option of PDF reports highlighting selected data for some data layers provides data and charts. Ms. Howard added that new data layer tools have been developed for interacting with certain data layers.

Next, Ms. Kile continued with a description of various data layers and some demonstrations of the RTDC. She noted the traffic count data of West Virginia was added and said that staff would soon add a tool to query vehicle classification data. A meeting attendee asked how many vehicle classifications there were in the RTDC. Ms. Kile responded that there are 13. She mentioned that COG received permission from the I-95 Corridor Coalition to display some aggregated speed (INRIX) data. Ms. Howard said that COG staff solicits average weekday ridership data, by month, from the various transit providers. However, each provider breaks out the data somewhat differently. Mr. Griffith asked whether the RTDC contained average weekday transit ridership by month by individual line, as opposed to system-wide averages. Ms. Howard confirmed that, yes, in general the transit data is by line, but may not differentiate between line variant or line direction (inbound versus outbound). Meseret Seifu asked whether the RTDC would include regional HOV count data. Patrick Zilliacus said that he could provide Ms. Howard the data, and Ms. Howard indicated that she could then include this data in the RTDC. Ms. Howard noted that it is no longer necessary to sign in to access the data. Ms. Howard and Ms. Kile continued with a demonstration of some of the tools of the RTDC.

Regarding permanent count stations, Mr. Milone asked whether the RTDC had hourly counts for all days of the year or, at least, for all days where the permanent count station was working. Ms. Kile said that it did. Mr. Milone also asked whether the program counts in the RTDC included the date when the count was taken. Ms. Kile said that it did. Lastly, Mr. Milone asked whether there was a plan to include highway inventory data, such as number of lanes, in the RTDC. Ms. Kile said that such data could be added, if the data is available. Mr. Griffiths thought that some of that information existed in the HPMS data. Ms. Kile added that it could be a challenge to add this data since the HPMS network links are generally longer than the links in the COG network. On the subject of HOV counts, Mr. Griffiths said that it was important to remind the user that the counts are one-day counts, especially given the large day-to-day variability that can occur, and it would be good to include in the RTDC the date that the count was conducted. Mr. Zilliacus asked whether there was a plan to add toll transaction data to the RTDC. Ms. Howard replied that staff is open to adding the data if it is available. Mr. Patnam asked if the RTDC data was open to anyone, or just public agencies. COG/TPB staff indicated that it is available to

everyone, and no password is required. Ms. Kile stated that the INRIX data would be added soon, aggregated by quarter. A subcommittee attendee asked whether one could get to the RTDC website from the COG website. Ms. Howard said it was a currently a standalone website, but this may change as COG develops its new website.

## **5. Round 8.3 Cooperative Forecasts of Future Growth**

Gregory Goodwin of COG staff opened his presentation by providing some background about COG's Cooperative Forecasts. Each year COG provides the local jurisdictions the opportunity to make updates to past forecasts, and, in a typical year, three or four jurisdictions choose to make updates. The Round 8.3 Cooperative Forecasts will be used for the 2014 Air Quality Conformity Analysis, the TPB's CLRP analysis, and COG's activity center analysis. Mr. Goodwin stated that, over the last two years, COG has developed approximately 141 activity centers. The analysis boundaries of these activity centers are based on TAZ boundaries. He described the process used to reconcile the jurisdictional forecasts with the projections from the regional econometric model.

Mr. Goodwin highlighted some of the major differences between the Round 8.3 and Round 8.2 forecasts, including numerical comparisons between the two rounds of forecasts at the regional and jurisdictional level. Mr. Moran asked what the analysis area was for slide 22 ("Round 8.3 Forecast Growth within Activity Centers"). Staff indicated that the numbers were for the TPB planning area, not the modeled area.

Mr. Goodwin announced that the Round 8.3 forecasts were approved by the COG Board in February. Mr. Griffiths stated that the Round 8.3 forecasts were approved by the TPB in February for use in the upcoming air quality conformity analysis. The forecasts will not be officially adopted by the TPB until the TPB has approved the air quality conformity findings, probably in October. Mr. Keju asked if the next update to the Cooperative Forecasts would be an interim update, such as Round 8.2 or 8.3, or a major update, such as Round 9.0. Mr. Goodwin thought that the next major update (Round 9.0) would happen at the end of 2015 or beginning of 2016. Mr. Griffiths said that this fall, there would be the possibility of an interim update (Round 8.4). Based on the charts on slides 19 and 21 for Anne Arundel County, Ms. Li suggested it appears that there will be a large increase in household size, if one compares Round 8.3 to Round 8.2. She also asked if Anne Arundel County still needs an adjustment factor applied to its employment forecasts to ensure that they are consistent with other jurisdictions in the modeled area. Mr. Griffiths responded that Anne Arundel County still requires an adjustment factor, but the size of the factor has been reduced (from 0.85 to 0.94). Eric Jenkins asked whether the CTPP-based employment adjustment factors had changed recently. Mr. Griffiths responded that factors for three of the modeled jurisdictions had changed and said that we could transmit a memo that lists the values of all the adjustment factors.

Mr. Milone asked what the difference was between a major round (such as 9.0) and an interim or minor round (such as 8.4). Mr. Goodwin explained that a major update was indicated by changing the number before the decimal point, and would be necessitated when major changes occur, such as we move to a new econometric model. By contrast, a minor or interim update occurs when one or a few jurisdictions

offer updates to their forecasts. Mr. Roden asked what level of disaggregation is used for the control total(s) from the econometric model (e.g., regional, county). Mr. Griffiths said there is just one regional control total for the entire TPB planning area for each of the three variables (households, population, and employment). Numbers are considered to be reconciled if they are within 3% of the requisite benchmark. Bob Josef asked whether a new Census would automatically trigger a new round of land activity forecasts. Mr. Griffiths responded that it would. Charles Freeman asked COG/TPB staff to confirm that, before using zone-level land use data in the travel model, the employment data needs to be adjusted in some jurisdictions to ensure that a consistent employment definition is used throughout the modeled area. COG/TPB staff concurred. Mr. Freeman then asked how soon external parties could get the land use data after it is approved by the COG Board and the TPB. Staff indicated that the land use data and the travel model would be available for release about a month after the CLRP and air quality conformity results are approved by the TPB.

## **6. Transportation Impacts of the October 1-16, 2013 Federal Government Shutdown**

Mr. Zilliacus began by presenting regional trends in population, employment, and daily VMT from 2000 to 2012 for the TPB planning area. He noted that peak-period congestion decreased from 2010 to 2013. He explained that the impact of the Federal Government shutdown from October 1 to October 16, 2013 was analyzed by comparing conditions before, during, and after the event. He stated that the average traffic volumes on segments of I-395 and I-295 in DC did decrease during the shutdown. The shutdown resulted in a decrease in both daily average Metrorail ridership and the observed regional travel time index from INRIX. He also showed maps of the highway links that showed the largest improvements in travel time index during the shutdown.

Mr. Roden asked if COG had an estimate of the number of employees affected by the shutdown. Mr. Zilliacus said that there will be a technical memo or report that summarizes this information, but he added that the bigger challenge was identifying the number of Federal contractors who were also affected. Mr. Zilliacus and Mr. Griffiths added that some Federal agencies and some employees from the closed agencies were still working during the shutdown. Mr. Griffiths commented that one of the best indications about the effect of the shutdown was seen at Metrorail stations dominated by federal workers, such as Federal Triangle and Federal Center Southwest.

## **7. Round-table discussion about current projects and activities in the region**

Due to the limited time of the meeting, Mr. Keju stated that item would be discussed in the next meeting.

## **8. Next meeting date and other business**

The next scheduled meeting of the TFS is Friday, July 18, 2014 from 9:30 AM to 12:00 noon.

\*\*\* The meeting highlights were prepared by Dzung Ngo and Mark Moran \*\*\*