

Metropolitan Washington Council of Governments
National Capital Region Transportation Planning Board

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Meeting Highlights
Travel Forecasting Subcommittee

Friday, March 20, 2009

9:30 AM to 12:00 noon

This document summarizes the Travel Forecasting Subcommittee (TFS) meeting held on March 20, 2009 at COG. A list of the meeting attendees can be found at the end of the highlights. The meeting was chaired by Wendy Jia, Washington Metropolitan Area Transit Authority (WMATA).

Item 1: Introductions and approval of meeting highlights from January 23, 2009 meeting

The highlights were approved as written.

Item 2: Recent staff changes at COG/TPB

Ron Milone mentioned that Jim Hogan had retired from COG, after 36 years of dedicated service. His last day was February 27. Some organizational changes have been implemented within the COG/TPB's Department of Transportation Planning (DTP) as a result of Mr. Hogan's retirement. Before the departure, Mr. Hogan was a team leader responsible for nine people arranged in three primary areas: network development (headed by Bobby Snead), models development (headed by Mr. Milone), and cordon counts and Virginia technical assistance (headed by Patrick Zilliacus). Following Mr. Hogan's departure, Mr. Milone has been made the acting team leader and will be responsible for six people arranged two primary areas: network development (headed by Mr. Snead) and models development (headed by Mark Moran). The cordon counts and Virginia technical assistance work headed by Mr. Zilliacus has been moved to Bob Griffiths' team, under the supervision of Tim Canan. Mr. Milone added that he hoped to structure the administrative duties of his team in such a way that he could remain involved in all the technical work of the team.

Item 2: Status report on development of the Version 2.3 travel model

This item was presented by Mr. Milone and Mr. Moran. There were two handouts: 1) a presentation entitled "TPB Models Development Status Report," and 2) a timeline entitled, "Timeline for developing the Version 2.3 travel model on the new 3,700-zone system." The focus of the status report was on approaches for reducing model run times of the Version 2.3 travel model. Before getting into the report, Mr. Milone mentioned some of the activities related to models development that have been underway since the last meeting: 1) the imminent release of the Round 7.2 Cooperative Forecasts on the 2,191-zone system; 2) the preparation of the 2007 Metrorail Survey, the 2007/2008 Household Travel Survey, and 2008 Regional Bus Survey; 3) the new roughly 3,700-zone TAZ system; 4) the project to use GIS more effectively to manage and update travel demand forecasting networks. Next, Mr. Milone discussed the timeline for developing the Version 2.3 travel model on the new, 3,700-TAZ zone system, using the new surveys, with the new land-use data (Round 7.2). The goal is to have the new travel model ready for use in the 2010 update of the Constrained Long-Range Plan (CLRP). Unfortunately, the Round 7.2 land use data will not initially be developed on the new zone system, so TPB staff will

use an area pro-rata, or other similar technique, to sub-allocate the Round 7.2 land use from 2,191 TAZs to 3,700 TAZs. By contrast, Round 8.0 land use, to be developed in late 2009 or early 2010, will be developed on the new 3,700-TAZ zone system, but this will be after the initial calibration of the Version 2.3 travel model (July 2009 through March 2010). It is hoped that the Version 2.3 model will be ready for production use in August 2010.

On the subject of speeding up model run times, Mr. Milone mentioned that one of the main reasons for concern, is the fact that the number of TAZs is expected to nearly double (i.e., by a factor of about 1.86), which could cause the model run times to increase from their current 18 hours to about 63 hours, or 2.6 days. The TPB staff would like to keep model run times down to no more than 18 hours, so that runs may be conducted with an overnight turnaround. Mr. Moran then gave a status report on using distributed processing (DP) in Cube Cluster to speed up model run times. He reviewed the findings presented at the previous meeting, including 1) traffic assignment takes about 50% of the total run time for the travel model, and 2) TPB staff was able to implement intra-step distributed processing (IDP) on traffic assignment and obtain a 50% time savings in traffic assignment, or a 25% time savings in the total run time for the travel model. He mentioned that TPB staff has not yet been able to implement the second flavor of distributed processing – multi-step distributed processing (MDP) – but that staff had instead developed a plan for where to use MDP and/or IDP in the regional travel model. He concluded with some caveats on using distributed processing and some possible next steps.

A subcommittee member asked what hardware and software changes would occur as a result of implementing distributed processing to the regional model. Mr. Moran indicated that it is the intention of TPB staff to make any distributed processing enhancements such that they will work on all reasonable hardware configurations, without making modification to the scripts or batch files. Nonetheless, distributed processing is available only under Cube Voyager (not TP+), so TPB staff is planning to execute the regional model using Cube Voyager. Some of the subcommittee members indicated that their agencies did not yet have Cube Voyager (only TP+), so several members wanted to know when the transition from TP+ to Voyager would occur. TPB staff indicated that this would occur by the summer of 2010. Finally, a subcommittee member asked whether one could get different modeled results on two different computer architectures (e.g., on an 8-processor computer vs. a single-processor computer), due to the way that the distributed processing splits up the processing job. TPB staff indicated that this should not occur.

Mr. Milone reviewed the new traffic assignment algorithms that are being offered in upcoming software by Citilabs. TPB staff has received and tested an “alpha” release of the software (Voyager 5.1.0 alpha) which contains two new link-based algorithms in addition to the standard Frank-Wolfe algorithm: Frank-Wolfe conjugate and Frank-Wolfe bi-conjugate. The two new algorithms performed similarly, so Mr. Milone’s presentation focused on comparing one of them (FW conjugate) with the traditional Frank-Wolfe. For 60 user-equilibrium iterations of traffic assignment, which is the number of iterations used in the regional travel model, the new conjugate method achieved a relative gap that was 47-65% smaller than that with the Frank-Wolfe method. For 200 user-equilibrium iterations of traffic assignment, the relative gaps for the new conjugate method were 64-81% smaller. Stated another way, in the AM peak period assignment, it took the Frank-Wolfe method about 170 minutes to reach a relative gap of 0.001

(10^{-3}). By contrast, the new conjugate method reached the same relative gap after about 100 minutes. Mr. Milone concluded with two caveats: 1) these new assignment algorithms will not be publically available until the next release of Citilabs' software (sometime this spring), and 2) the alpha version of the software provided to TPB staff was unable to match exactly the existing results for our current model (Citilabs has been asked to look into this discrepancy).

Item 4: Status report on the new transportation analysis zone system

This item was presented by Charlene Howard, of TPB staff, who distributed a hand-out entitled "TPB/COG Transportation Analysis Zone (TAZ) Refinement: Status report." The current TAZ system has 2,191 zones, of which 1,972 are internal TAZs, i.e., polygons (47 are external stations and 172 are unused, reserved for project planning studies). By contrast, the new zone system, which is sometimes referred to as the "3,700-TAZ system," currently has 3,659 internal TAZs (polygons), which represents almost a doubling of zones (a factor of 1.86). Ms. Howard went over the project objectives and the timeline for the project. The starting point for the new zone system was the set of zone structures used by the local jurisdictions. She presented several maps showing both the old and new zone systems. It is planned that the new zone system should be finalized by the end of March.

Looking at one of the maps presented in Ms. Howard's presentation, a subcommittee member remarked that the TAZs in Fauquier County, Virginia did not seem small enough and that he thought more TAZs might be needed to conduct upcoming studies, particularly given the fact that it is right on the boarder with Prince William County, which is experiencing rapid growth. Ms. Howard indicated that Fauquier County wanted only a minimal expansion in the number of zones in the county (nonetheless, the number of zones went up by almost a factor of 5, from 11 in the 2,191-zone system to 50 zones in the new system). TPB staff added that we are relying on the local planners to give us land activity forecasts, so, although TPB staff may want many zones per jurisdiction, this number is dependent, to some degree, upon the local planners. Another subcommittee member suggested that TPB staff make sure that the new zone system in Jefferson County, West Virginia be reviewed by the Hagerstown/Eastern Panhandle Metropolitan Planning Organization, and not just the county itself.

There was discussion by the subcommittee members about land use forecasts on the new zone system. Round 8.0, due in early 2010, would incorporate the new TAZs. Round 7.2 would be done using the current TAZ system and then sub-allocated, using an area pro-ration technique, to the new zone system for model calibration. It was pointed out that the Round 8.0 forecasts will project out to 2040 (the current horizon year is 2030). TPB staff also pointed out that the new zone system would not necessarily nest with the old system, a fact that had been pointed out at previous meetings. The major reason for this was that the activity center boundaries often did not match the zone boundaries in the old/current TAZ system. A subcommittee participant asked when the Round 7.2 land activity forecasts would be adopted. TPB staff indicated that this would occur as of the next air quality conformity analysis, which is July 2009. This would also be the point in time when there is a new adopted travel model, which would be the latest release of the Version 2.2 travel model. The participant then asked whether there would be any changes to the Version 2.2 travel model, other than the updated land use data. TPB staff indicated that there may be some minor updates to the model, as well as updates to the transportation networks that are inputs to the travel model. A member of the subcommittee suggested that COG should

consider developing new TADs (transportation analysis districts), that would aggregate groups of the new TAZs (it used to be the practice to develop TADs along with the TAZs, especially since some travel model steps were conducted at the TAD level). TPB staff agreed to consider that suggestion. As a final comment, TPB staff noted that some of the 3,659 TAZs might have to be merged because some zones may be below the grain of the highway system. TPB staff is also working on re-numbering the nodes in the highway network, since, currently, the first node number starts at 3,000, but this number would be part of the new zone system. TPB staff suggested that it might report on this work at the next meeting.

Item 5: Status report on using GIS to improve the coding and management of travel forecasting networks

Mr. Milone presented this item and handed out a one-page status report for the project. The purpose of this project is to improve the way that TPB staff develops and maintains its travel forecasting networks, principally through the development, via a consultant, of a GIS-based application. The project is in its second of two years, with a funding level of \$75k per year. Mr. Milone thanked WMATA for funding two-thirds of this year's budget. The project should result in a GIS application, built on ArcGIS, that facilitates editing highway and transit networks, making use of a spatial database ("geodatabase"). The consultant developing the application is Daniel Consultants, Inc. (DCI). After the first phase (year 1), a prototype GIS application was developed for editing and managing highway networks. In phase 2 (year 2), which is underway now, the scope of the application is being expanded to incorporate transit networks. The last steps of phase 2, which should end June 30, would include debugging and testing of the ArcGIS application by TPB staff and preparation of documentation and training materials. As for the current status, three versions of the populated geodatabase and ArcGIS application have been delivered to TPB staff. TPB staff has reviewed the highway and transit network elements of the geodatabase for completeness and accuracy. Planned features of the new application that remain outstanding include batch updating and multi-user capabilities of the application.

A subcommittee member asked whether the new 3,700-TAZ highway networks would include some of the non-freeway interchanges and ramps that are missing from the 2,191-TAZ networks. TPB staff responded that the new 3,700-TAZ highway networks will have more links/roads and more detail, but also added that it is not now planned to have excessive detail, in terms of detailed ramp coding, collector/distributor lanes, and the like. We are trying to keep the maximum node number below 60,000 to 70,000. A member asked when the new 3,700-TAZ networks would be completed. TPB staff is hoping to have the base-year (2007) network completed by the end of September 2009 and the forecast-year networks completed by the end of November 2009, but added that there is uncertainty, in particular due to the dependency between coding the new 3,700-TAZ networks and the completion of the DCI/ArcGIS application. TPB staff mentioned that an effort to conflate the regional highway network to NAVTEQ street centerlines is underway. Staff is also investigating ways to automate network coding steps (e.g., developing centroid locations for the new TAZs, developing new centroid connectors), but cautioned that, even with such automation, one still has to do a lot of manual checking to make sure the networks are correctly coded.

Item 6: Status report on surveys

This item was presented by Bob Griffiths. TPB staff is currently working on processing three surveys: 1) the 2007 Metrorail Survey, 2) the 2007/2008 Household Travel Survey, and 3) the 2008 Regional Bus Survey. Mr. Griffiths began with the Metrorail Survey. Last spring, the survey was geocoded to TAZ. TPB staff has recently adjusted the factors in the survey file to account for respondents who did not report a destination station or a trip purpose. Staff is currently working on documentation. Within two weeks, there will be a public-release version of the geocoded survey file with the adjusted factors available to consultants and other interested parties. The public release file will have the factors and the geocoded TAZ for each record, but, for confidentiality reasons, the file will not contain the actual home address of the respondent. We have given the geocoded file with the home address information to WMATA for their review.

Regarding the 2007/2008 Household Travel Survey, Mr. Griffiths made a presentation, entitled “2007/2008 Household Travel Survey, Presentation of Additional Findings,” dated March 18, 2009. The presentation addressed some of the major travel trends found in the survey, such as the increase in the use of transit for commuting trips and the drop in the use of carpooling. The presentation also discussed several external factors that might have influenced the travel trends seen in the survey, such as the growth in transit service from 1994-2007, the growth in transit subsidies (e.g., SmartBenefits, formerly known as Metrochek), and the growth in flexible work hours. Mr. Griffiths presented several slides showing the change in work-trip mode shares, 1994 vs. 2007/2008, for residents of the 1983 Metropolitan Statistical Area (MSA), a set of jurisdictions that was common to the two surveys.

A subcommittee participant noted that, if you add up the transit and auto passenger percentages in slides 9-11, the total is about the same in 1994 vs. 2007/2008, so it appears that the region has simply moved people from one high-occupancy mode (carpool) to another (transit), not from a low-occupancy mode to a high-occupancy mode. TPB staff indicated that that may be the case for the region (1983 MSA), but when one looks at individual jurisdictions, one can see more significant changes. The same participant asked how transit and carpooling changed in terms of absolute numbers, since the share of carpooling could be going down, while the absolute number of carpooling trips could be going up. TPB staff noted that the definition of “carpool” has changed slightly, comparing the 1994 survey to the 2007/2008 survey, which is why all the comparisons in the presentation referred to auto passengers, not carpools, since that definition is consistent across surveys. TPB staff went on to say that the total number of auto passenger trips has, in fact, dropped, by about 100,000 auto passenger trips, from 1994 to 2007/2008. TPB staff added that the American Community Survey (ACS) is showing a higher rate of carpooling than the 2007/2008 COG/TPB Household Travel Survey, but that is due, in part, to the way carpools are defined in the two surveys. TPB staff added that the trend of decreasing carpooling shown in the 2007/2008 HTS was consistent with changes found in the latest State of The Commute Survey, which is conducted by COG’s Commuter Connections program every two years. TPB staff said it would do a special analysis on this issue, particularly for Prince William County. TPB staff said that for the next meeting, we would try to have jurisdiction-to-jurisdiction trip tables to show the subcommittee. On a slide showing the walk/bike commuting mode share by jurisdiction, a subcommittee participant said that it would be interesting to see this data broken out by age and income level. TPB staff said that we do plan to do that, and present the

information at the May meeting of the Bicycle and Pedestrian Subcommittee. Regarding the status of the four HTS survey files (person, trip, household, and vehicle), TPB staff indicated that we are performing the final edits and consistency checks. A subcommittee member asked when the HTS would be released to the public. TPB staff responded that a public use file would be released between the end of May and the end of June.

TPB staff is currently conducting data cleaning on the 2008 Regional Bus Survey. The quality of data found in the bus survey is better than that from the previous bus survey in 2000, but is still presenting challenges. For example, the way that the contractor assigned staff to distribute surveys on various bus routes caused some biases, since the contractor let the interviewers pick areas they were familiar with, which resulted in some areas being under surveyed. This was particularly an issue with Montgomery County Ride-On bus (especially “up county”) and the Prince Georges TheBus. Consequently, one will have to use the survey data cautiously, particularly when making summaries at a scale below that of the jurisdiction. TPB staff will be presenting the factored results to the Regional Bus Subcommittee next Tuesday. A final factored data file is planned for release by the end of March.

Item 7: Draft findings from the spring 2008 aerial survey of the regional freeway system

This item was presented by Daivamani Sivasailam (Siva), who handed out a presentation entitled “Findings of the Spring 2008 Aerial Survey of the Washington Area Freeway System.” The survey is conducted once every three years, covers about 300 miles of freeways, and is conducted by a contractor, Skycomp, Inc. The survey covers three hours in the AM peak period and three hours in the PM peak period. This is the sixth time the survey was conducted, with the previous survey having been done in 2005 and the first survey completed in 1993. Photographs are taken from a low-flying aircraft on multiple days (minimum of three). Vehicle density, measured in passenger cars per mile per lane for each freeway segment, is used to identify congestion. A freeway “segment” is defined as the length of freeway between two interchanges.

A member asked about the footnote on page 9 indicating that “free flow travel is based on speed of 60 mph” and wondered whether this might indicate that the COG/Skycomp analysis is underestimating delay, given that many drivers go faster than 60 mph. A representative from Skycomp indicated that the speed of 60 mph is used nationally as a reference speed or benchmark, with the assumption that when you are travelling at 60 mph, you do not feel like you are being delayed.

TPB staff will accept comments on the findings until March 27, and plans to present the data to the Technical Committee in April. TPB staff hopes to have the final report available in mid-April. There is also an interactive presentation of the data that can be presented to any interested parties after today’s meeting. A representative from Skycomp indicated that they have produced for COG an interactive map with the colored arrows and links to the actual aerial photos. There is also a similar map for the entire map done for MD SHA for the entire state of Maryland and a map with aerial freeway data for parts of Virginia, near the Capital Beltway and I-95. A member asked whether the information for Virginia, particularly around Tysons Corner, would be available on a web site. The representative from Skycomp said that the Maryland and Virginia

area survey data are suitable for posting on a web site, but it is up to the project sponsors to determine how they want to disseminate the information.

Item 8: Round-table discussion: An opportunity for subcommittee members to share current activities of interest

Due to limited time, this item was deferred to the next meeting.

Item 9: Other business

Mr. Moran mentioned that Citilabs is going to be offering several training courses the last week of July, which will take place at COG, and suggested that interested parties consult the Citilabs web page under the heading of Training.

Item 10: Adjournment

The meeting adjourned at 12:00 noon. The next meeting of the TFS is scheduled for May 22, 2009 at 9:30 AM

Meeting attendees

Dan Goldfarb, Cambridge Systematics, Inc.
Eric Graye, M-NCPPC, Montgomery County
Elizabeth Harper, PB
Bahram Jamei, Virginia DOT, No. Va. Office
Eric Jenkins, M-NCPPC, Prince George's County
Wendy Jia, WMATA
Greg Jordan, Skycomp
Dial S. Keju, Frederick County
David Kline, Fairfax County
Yuanjun Li, M-NCPPC, Montgomery County
Feng Liu, Michael Baker Corp.
Subrat Mahapatra, Maryland State Highway Admin.
Bill Mann, Virginia DOT, No. Va. Office
Joe Mehra, MCV Associates, Inc.
Jaak Pedak, Fairfax County DOT
Maggie Qi, VHB
Dan Stevens, Fairfax County DOT
Gregg Steverson, Prince William County DOT

TPB staff in attendance

Tim Canan	Hamid Humeida	Meseret Seifu
Mike Clifford	Ron Milone	Daivamani Sivasailam
Joe Davis	Mark Moran	(Siva)
Toni Giardini	Jinchul (JC) Park	Robert Snead
Bob Griffiths	Jane Posey	Dusan Vuksan
Wanda Hamlin	Wenjing Pu	
Charlene Howard	Clara Reschovsky	

These highlights were written by Mark Moran.