

Highlights of the TPB Travel Forecasting Subcommittee Meeting Held on September 19, 2008

Item 1: Approval of July 18, 2008 Meeting Highlights

The highlights were approved as written.

Item 2: TPB FY2008 Task Orders Report

Mr. Shapiro and Mr. Roisman of VHB presented the results of the FY2008 travel forecasting research. There were two research topics for this year: expanded evaluation of peak spreading, and estimating the impact of exurban commuters on travel demand. The slides and the full report are available on the COG website.

Mr. Shapiro discussed the expanded evaluation of peak spreading. The evaluation found a significant relationship between ADT per lane and percentage of peak hour volume per lane for selected freeways in the Maryland parts of the TPB region. The relationship breaks down at ADT greater than 29,000. This relationship can be helpful for developing forecasts for project planning. Recommended future steps for TPB include obtaining more good hourly count and ADT data, particularly in Virginia and the District of Columbia, and testing other freeway and arterial locations.

Mr. Roisman discussed estimating the impact of exurban commuters on travel demand. The analysis developed some regression equations for use in estimating external-internal trips. The analysis looked at journey-to-work data from both the Census Bureau and the Bureau of Economic Analysis and included time-series analysis.

Questions and Comments:

Staff asked if the available capacity at external stations was a factor in slowing the rate of future growth in external-internal travel. Mr. Shapiro responded that this was the case, but another response seen in the Fredericksburg area is earlier departure times, which then contributes to peak spreading on the regional highway network.

A question was asked if there were any data available on the mode split for the external-internal commuters. Mr. Roisman responded that the data were not available at disaggregate enough level for the analysis performed, but he thought the transit mode share for the external-internal trips was fairly low. Mr. Shapiro noted that some analysis might be performed by drilling down into the CTPP data. Staff noted that a significant portion of the external-internal trips were not destined for downtown and therefore were less likely to be served by transit; looking at different market segments would be illustrative. Staff cautioned against relying too heavily on Census and BEA data for this type of analysis, as it is not a substitute for a good household travel survey. Some of the extreme commuters may be construction workers or others who happened to have a long-distance commute during the reference week of the Census survey. Mr. Shapiro noted that the analysis did specifically eliminate some of the nonsensical responses (commuters

from California to the TPB region, etc.). Staff observed that in 2000 the Baltimore City to Downtown DC market experienced significant growth, largely due to the availability of commuter rail service. Mr. Shapiro noted that the analysis tried to mitigate some of those effects.

Another participant asked if the predictive equations for external-internal trips looked at both trip generation and distribution or generation only. Mr. Roisman responded that distribution was considered on the work end of the trip only. Mr. Shapiro added that analyzing distribution on the home end would be a good opportunity for future analysis. Mr. Shapiro emphasized the practical nature of both analyses, rather than being purely theoretical.

Staff noted that although TPB will not be doing another cordon expansion, the movement to a more refined zone system (and corresponding new model set) in the near future will aid with the estimation of external travel. Furthermore, the expanded household travel survey data will also aid greatly, especially since the TPB region and the Baltimore region will have consistent data using the same survey instrument.

Item 3: Version 2.3 Travel Demand Model Update

Ron Milone distributed a handout entitled, 'Version 2.3 Travel Model Update.' He reminded the subcommittee that the Version 2.3 model was released in draft at the July TFS meeting and comments relating to the release are welcomed. The model features the inclusion of a Nested Logit (NL) mode choice model and revised truck models, and it currently remains in development. Since July, TPB staff has been actively involved with: 1) implementing modifications to the model, 2) undertaking sensitivity tests of the model, and 3) formulating thoughts regarding a method for reflecting employer-based transit fare subsidies into the modeling process.

Mr. Milone then described recent refinements to the model. In comparing base year Version 2.3 model results with those of the currently adopted Version 2.2 model, it was noted that total vehicle trips increased by 1.4% while simulated VMT increased by 4%. The increase in vehicle trips was explainable given the model refinements made to the Version 2.3 model, but the disproportionate change in VMT was not readily explainable. Upon closer examination, it became apparent that Version 2.3 vehicle trips had a smaller number, and smaller proportion, of intra-zonal trips relative to Version 2.2. It follows, therefore, that the proportion of Version 2.3 trips loaded on the highway network was higher than that of Version 2.2, and so the disproportionate increase in VMT noted above was now explained. The solution to the problem was found in a combination of adjustments involving trip generation, mode choice, and intra-zonal impedances applied in trip distribution. Taken together, these changes to the model yielded reasonable estimated and observed matches as per VMT and as per screenline crossings.

Three sensitivity tests were subsequently undertaken using the refined Version 2.3 model. First, TPB staff examined the effect of raising auto operating costs by 30%. The test resulted in logical and reasonable changes, specifically, a 1.6% decrease in auto drivers, a

5.9% increase in auto passengers, and a 1.1% increase in transit trips. Staff also tested two system alternatives for the year 2005, a two-lane reduction on the American Legion Bridge and a complete removal of the John Phillip Sousa Bridge (the Pennsylvania Avenue crossing of the Anacostia River). Both system tests produced virtually negligible changes in terms of global metrics (VMT and transit use). However, localized traffic changes, as indicated by bandwidth plots showing volume changes, were found to be substantial and generally reasonable. Sensitivity testing of the model will continue in the coming months.

Mr. Milone also shared TPB staff's thoughts regarding a proposed method for reflecting employer-based transit subsidies in the Version 2.3 modeling process. Transit fare matrices are one of the fundamental inputs to the NL mode choice model. The zonal fare between a given i/j includes explicit fare calculations for Metrorail and non-Metrorail segments, as formulated in the transit path building process. It is well recognized that the January 2008 increase in transit fares has not been met with reductions in ridership as one would expect, but rather, ridership levels have increased. An important factor in the ridership increase is due to the prevalence of employer-provided transit benefit programs that have emerged in recent years, including SmartBenefits or Metrocheks. These programs have arguably served to dampen the effect of the fare increase. The level of subsidy varies directly with the level of employee expenditures. For many employees, the subsidy covers 100 percent of commuting costs on transit.

The 2007 Metrorail on-board survey has, for the first time, included a question that inquires about participation in these types of programs. The survey indicates that 60 percent of all commuters receive transit subsidies from employers. Mr. Milone added that the station associated with the highest level of work trip subsidy is Smithsonian (84% of work attractions are subsidized). At this point in time TPB staff is considering discounting the normal Metrorail station to station fares used in the travel model based on the subsidy information from the survey. The discount would be applied to the AM peak fares (i.e., applied to HBW travel only). However, other questions still remain: How will subsidies for non-Metrorail related work trips be addressed? How will the existing subsidy levels be developed in the future? How will fare subsidies be assumed for future Metrorail stations? Approaches for addressing these details will be formalized and documented in the coming weeks.

Questions and Comments:

One member of the audience commented that recent survey data suggests that the level of transit subsidies for VRE riders is considerable, around 70%. Another member added that many factors have contributed to the ridership increase in spite of the recent transit fare increase. Besides transit fare subsidies, rising gas prices and the growth of non-work development around stations have also served to increase ridership. It was suggested that TPB might consider a destination station-based approach, as opposed to station interchange-based approach, for discounting commuter fares. Another audience member advised TPB staff to be aware that the i/j based discount is most likely being applied to disparate travel markets. There was also discussion about the importance of adjusting not

only Metrorail fares, but also bus and commuter rail fares as well. TPB staff plans to use the soon-to-be-available 2008 regional on-board bus survey for this purpose. The point was also made that TPB staff strives to refine model inputs as opposed to adjusting the travel model to compensate for inaccurate inputs. The adjustment of the transit fare matrix to better reflect what's happening in the real world is a prime example of such a refinement.

Item 4: Network Development Report

Mr. Snead distributed a draft network report entitled "FY-2008 Network Documentation: Highway and Transit Network Development" and narrated a power point presentation. He stated the network report documented work activities completed by COG/TPB staff in accordance with the transportation network development element identified in the FY-2008 Unified Planning Work Program (UPWP).

Mr. Snead presented an overview of the network development program and noted the program supports models development and modeling that the TPB undertakes each year to determine how well the CLRP and TIP meet air quality objectives in accordance with federal requirements. He noted that due to the importance and regularity of the annual air quality conformity assessment, network development has evolved into a cycle of activities around this yearly event and as a result, transportation networks are developed in one fiscal year and adopted in the next. He also stated that the report documented networks and data files that were developed to Version 2.2 model specifications and were inputs to the 2007 CLRP and FY2008-2013 TIP that were approved by the TPB on January 16, 2008.

Mr. Snead provided an overview of the network development report and highlighted enhancements added and changes to the network development process. He concluded his presentation with a discussion of the "Looking Ahead" chapter of the report that described an initiative to streamline the transfer of transit data between transit providers and COG/TPB staff and the GIS/network development project initiated to focus on improving GIS-based applications used to manage and develop transportation networks. .

Questions and Comments:

Will local jurisdictions' networks be used as part of the new networks or will COG develop networks based on new TAZ? Mr. Snead stated that issue has not been discussed and would be determined based on staff and subcommittee recommendations.

It was asked if node ranges in TPB's node numbering system would be defined for local planning studies only. Mr. Snead stated that issue has not been discussed and also would be determined based on staff and subcommittee recommendations.

Charlene Howard gave the second half of this presentation, entitled "Improving GIS Applications in TPB's Network Development." Ms. Howard provided an overview and status report of a consultant project that improves and extends the existing TPB Master

Highway Network editing and maintenance procedures by better leveraging GIS technology. The resulting set of products—an ArcGIS data model, geodatabase, and application tools will 1) replicate existing functionality of TPB’s legacy highway network editing application; 2) allow multiple concurrent users to interact with the database application; 3) integrate transit network features and create a comprehensive master network editing interface; 4) improve highway network feature editing by expanding functionality and enhancing current processes; and 5) facilitate TIP project tracking.

The project began in September 2007 and is currently in the second of two identified phases. TPB has contracted with Daniel Consultants, Inc. (DCI) for this project, which has a budget of \$150,000, spread equally over the two phases. The first phase wrapped up at the end of FY 2008 (30 June 2008), and the second phase has a deadline of the end of FY2009. The current work agreement between TPB and DCI, however, requires that the major deliverables for phase two be provided to the project managers by the end of January 2009.

Ms. Howard provided a brief re-cap of Phase One. Products from the first phase include the data model and geodatabase. The main technical product of the first phase was a custom toolbar used in ArcGIS. Additionally, DCI provided a report entitled “GIS Database Applications and Protocols to Develop and Manage Transportation Networks.”

In the second phase, DCI will 1) review and test the existing prototype delivered under phase one; 2) implement additional features identified; and 3) expand the toolbar to provide tools to edit transit network features within ArcGIS. As noted previously, the target completion date for this phase is the end of January 2009.

In closing, Ms. Howard reiterated that we are in the second phase of a (for now) two-part project that upgrades and improves our current master network editing and maintenance procedures. The end product will be a multi-year geodatabase and ArcGIS application that supports multiple concurrent users and allows for editing and integration of both highway and transit network features.

Questions and Comments:

Will the final GIS application be available for local jurisdiction members, and if so, when? It is yet to be determined how the application can/will be deployed to the member jurisdictions. The application’s custom tools are built to interact with the TPB master network. It is not clear how easily the tools will be transferable to another database or datasets. Those wishing to use the application tools developed would have to format their own network datasets in a way that is consistent with our data model and geodatabase in order to take advantage of the custom tools. Currently, there isn’t any timeline when the application will be available. TPB staff will be extensively testing the final application, and then, after we are satisfied with its performance, we can determine the best way to possibly share with local jurisdictions.

Since the CUBE Version 5 includes ESRI's ArcEngine technology, would part III of COG/TPB's project include integration of the two systems? The integration of ESRI and Citilabs products has improved and now includes a Cube version of the geodatabase. The structure of this geodatabase, however, is not nearly as comprehensive as a standard ESRI geodatabase. Many of the relationships, behaviors and database options that are available in the standard geodatabase are not available in the Cube geodatabase version. Therefore, at this time, we envision keeping the master network geodatabase in ArcGIS. However, staff is interested in providing as tight an integration as possible with Cube, but without sacrificing functionality.

Item 5: Household Travel Survey Update

Data collection for the Household Travel Survey is complete, and an initial review of the data show that it is comprehensive and looks to be fairly good. A description of the survey methodology was provided as review. The original intent was to obtain the data for ten thousand households in the TPB modeled region. Since Baltimore Metropolitan Council (BMC) joined the survey, the end result was eleven thousand households in the TPB modeled region. Data collection was scheduled for one year, but interviewing was conducted for fourteen months, mostly between February 2007 and March 2008. As a result, nearly all jurisdictions met or exceeded the targeted number of households. A special effort was made to target mixed-use areas, in order to obtain good transit data. Transit data in suburban areas has traditionally been very thin and not very reliable.

Overall, 21 percent of the sample was recruited to participate in the survey. Of the recruited households, 76 percent completed the survey. Preliminary numbers show 11,578 households yielding 25,515 person records. Collectively, the respondents have 16,678 vehicles available, and the respondents made 132,383 trips (by all modes). The number of trips made will drop as part of the trip linking process. 97 percent of all locations visited have been geocoded to x,y coordinates.

One of the concerns addressed with the survey methodology is households that do not have traditional landline phones. Using an address-based sample frame (instead of random-digit dialing), approximately 10 percent of households are cell-phone only households. When looking at trip rates for all households, the average household makes 9.2 daily trips and people make an average of 4.3 trips. These numbers are higher than in the past. 6 percent of households had zero trips, and 12 percent of persons did not make any trips. These numbers look reasonable.

The GPS component of the survey was randomly selected. Beginning in the second quarter when BMC joined the survey, the logistics of delivering and retrieving the GPS devices extended the time the devices were in the possession of the responding households. As a result, multiple days worth of GPS data were collected, although the diary was only collected for the one official survey day. The extra data will enable us to look at variability in trips and routing of those trips. Additionally, the extra data will give us a better estimate of VMT and potentially missing auto trips from the 15 thousand vehicle trips made by 900 households. The GPS does have its flaws, including missing

data points resulting from cold starts while the unit is finding its bearings from the satellites and gaps in the data from urban canyon effects. About 15 percent of auto trips are missing from the diaries, however they are usually part of a trip chain. Despite the data challenges, the GPS data will be useful for informing the adjustment factors.

For the Non-Response Follow-up Survey (NRFS) attempts were made to contact a sample for both households with and without published phone numbers who did not participate in the survey. For non-respondents with phone numbers, a rest and re-call tactic was employed in quarters 2 and 3. For households that were still unreachable, an in-person visit was made in quarter 4. Additionally, 500 households without published phone numbers were visited in quarters 2-4. A last effort was made to find out about non-responsive households by doing a public records search for the number of persons in the households and number of vehicles available, etc. The purpose of finding out basic information about the non-responding households is to inform the weighting process.

The data processing schedule began with receipt of the data in August 2008. Review of the data and geocoding occurred in September. The trip linking and weighting will occur in October and November followed by survey analysis in November and December. The resulting files are due to the modeling team on December 31, 2008. Subsequently, a findings report will be produced in January 2009. The files will be made publicly available after the modeling team reviews and approves them. Through this process, we will be working closely with BMC, particularly on the editing, weighting, and trip linking processes.

Questions and Comments:

When will the data be available? Mr. Griffiths responded that this would occur at some point after January 1, 2009, once Ron Milone approves the files for models development. How will the GPS data be integrated with the regular data? The GPS data will be used as an adjustment factor.

Item 6: Adjourn

The meeting was adjourned at 11:56 A.M.