

**Highlights of the TPB Travel Forecasting Subcommittee Meeting
Held on March 17, 2006**

Item 1: Approval of the January 20, 2006 Meeting Highlights

The highlights were amended to reflect a change in the questions and comments section for Item 4.

“Mr. Moran commented that the survey contractor obtained to do the survey should be familiar with activity-based surveys. You *can* take a traditional HTS and develop tour-based models. The key question is what exactly is different about the survey instrument and what is the activity-based model going to be.”

The highlights were approved as amended.

Item 2: Overview of the M-NCPPC Prince George’s County Traffic Model

Mr. Eric Foster began the presentation with a brief background of the Prince George’s County traffic model. He stated that a number of limitations were identified in the model and a RFP was prepared in 2000 for model assessment and development. A goal of the model assessment and development process was to add and incorporate the System II level detail in Prince George’s County to the COG/TPB model for the surrounding jurisdictions, and transition to a more GIS-friendly model with modern visualization capabilities.

Mr. Howard Slavin distributed a hardcopy of his presentation entitled “TransForM – A New Regional Travel Demand Model Developed for Prince George’s County”. He explained that the objectives of the project were to develop a regional model with greater detail and accuracy in Prince George’s County which would include modeling refinements with year 2000 updates and validation. The development of this model included conversion of the COG/TPB model to TransCAD, the addition of traffic zones, the creation of year 2000 trip generation and trip distribution models, year 2000 mode choice analysis, traffic assignment, along with model calibration and validation. The results of the model were fairly close although some discrepancies in transit pathfinding and model convergence were evident.

The model consisted of 2,523 zones (2,476 internal and 47 external). Demographics were derived from population synthesis and employment was disaggregated using COG’s employment estimates. A new regional highway network was used that was geographically aligned over aerial photography throughout the entire region. Divided highways were “dualized” and ramps and connectors were added. The prior System II network for Prince George’s County was also realigned and augmented. New centroid connectors were created and the resulting network has 36,272 links and 22,284 nodes. The transit network was refined and developed using GPS points from WMATA. Links were added to the highway network for transit. A separate route system was created for rail. Access and egress links used streets for walking and roads for park and ride.

Trip generation was based on year 2000 “wave 3” COG/TPB Panel Survey. Trip rates were classified by jurisdiction and cross classification was done by worker status, auto availability, and number of persons sixteen years of age or older per household. Attraction rates were obtained from the COG/TPB model along with the latest demographic information. The trip distribution model is based on updated friction factors consistent with panel survey trip lengths, and contains no K-factors for person trips. The mode choice models retained the two-step logit models. Preliminary estimation tests suggested that the coefficients were reasonable. Traffic assignment consisted of five classes and three time periods. The 2000 HCM suggested BPR coefficients by functional class with some adjustments; and calibration was performed with a relative gap of .001 (80-60 iterations). Full model feedback was produced with MSA flow combinations (skim difference RMSE < .01). Model run

times were 1.5 hours per loop or six hours for four loops on a laptop. In conclusion, Mr. Slavin stated that there will be further checks of the networks and model results. Minor adjustments and calibration will be made. The 'draft' final report and user's guide will be completed by the end of June. The overall RMSE for Prince George's County is 35.74 for all functional classes and 12.69 for freeways within the county.

The TransForm Model will provide the support needed in Prince George's County for detailed analysis of land use and network changes, including master and small area plans, county roads and transit strategic planning.

Questions and Comments

Mr. Milone questioned whether trip lengths were longer once additional sub-zones were added to Prince George's County. Mr. Slavin replied that the trip lengths were shorter and the information that was used was obtained from the panel survey. He commented that the sample is quite small, but the approach was to start out with these numbers and see what would happen.

Mr. Hogan asked if forecast tests would be done before the validation of the model is completed. Mr. Slavin replied yes, absolutely.

Item 3: Montgomery County Travel Forecasting Model Validation – Status Report

Mr. Eric Graye distributed a handout entitled "Base Year 2000 Validation of the Montgomery County Travel/3 Transportation Demand Model". He explained that the Travel 3/transportation demand model is a Montgomery County focused refinement and adaptation of the regionally adopted COG/TPB Version 2.1D #50 transportation demand model. The Travel/3 model validation effort reflects a limited expansion of work carried out by MWCOG staff, consultants and the ICC Travel Demand Task Force during 2003 in support of the ICC DEIS. That effort focused on validating the adopted regional travel demand model at that time within the ICC corridor study area of Montgomery and Prince George's Counties using a variety of refinements to: (1) speed and capacity parameters, (2) K-factors, (3) impedance penalties, and (4) network characteristics in order to improve travel simulation in the ICC corridor. Many of the refinements introduced as a result of that work were incorporated as key elements in the creation of the currently adopted COG/TPB regional transportation demand model.

The model validation focused on the expansion of the geographical scope of the network refinements to cover all of Montgomery County, as well as selected areas just beyond the county boundaries. These network updates include refinements to the following elements of the Montgomery County network: (1) network attributes; (2) traffic zone centroid connectors; and (3) traffic count database. The result of this effort is a regional travel demand model with improved simulation performance within Montgomery County.

Some of the benefits of adopting the COG/TPB benefits include but are not limited to:

- Cost savings and more sharing of resources. As the MPO of the region, COG is federally funded and has the ability to devote more resources (staff and funds) in support of travel forecasting than Montgomery County.
- Consistency with the regional process. Montgomery County would have direct access to regional networks and data prepared for other jurisdictions in the region. As a result, staff would not have to code updates to the regional CLRP network. In addition, by using the same general assumptions as COG, comparisons with the COG/TPB model should be easier and more useful.

- More input to COG's process. As a user of the COG/TPB model, staff would have more of an opportunity to develop and check inputs into the COG modeling process and review results.
- Creditability. COG goes through a very rigorous peer review process and must meet federal requirements for travel demand modeling. In response to the recent review of the COG modeling process by TRB, COG staff has developed a multi-year models development work program that Montgomery County can benefit from.
- Better integration with GIS. TP+ has the built-in capability to read ArcView shape files. COG has developed numerous tools and databases that would allow staff to more easily exchange data between travel models and GIS. Citilabs is constantly enhancing its software capabilities to include improved linkages to GIS.
- Technical knowledge and data sharing. A base of local users, including COG, BMC and several local jurisdictions, would facilitate the sharing of techniques and knowledge.

The key objectives of the Travel/3 model validation included maintaining consistency with the current COG/TPB travel demand modeling process, streamlining the level of effort required to adopt revised versions of the COG/TPB modeling process in the future (which my shift between 2000 Census Transportation Package (CTPP) and the 2006 Household Travel Survey (HTS) validation techniques), maximizing the potential for acceptance by external agencies – including Montgomery County DPWT, Maryland SHA and federal agencies, and retaining the department's investment of resources in support of county-focused transportation networks.

The Travel/3 year 2000 model validation assumed Round 6.4a Cooperative Forecast land use inputs. The validation of the COG/TPB model assumed year 2000 Round 6.4 Cooperative Forecasts as the land activity input for the Washington metropolitan region. At the regional level, there are theoretically no differences between Round 6.4 and Round 6.4a Cooperative Forecasts for the 2000 base year. However, some marginal differences exist in these datasets as they have been applied in support of the Travel/3 and COG/TPB models. These differences can be explained by the fact that the department's travel demand modeling efforts traditionally assume Montgomery County land activity inputs which are provided "in-house" by county demographers and directly input into the model based on the county's 318 TAZ system. These same data are subsequently provided to COG as part of the Cooperative Forecasting process. In support of the validation of the COG/TPB model, these data are then reallocated by COG staff in the context of COG's 308 TAZ definition for Montgomery County. The result of this land use reallocation process is reflected in the slightly different year 2000 base year land use totals.

Montgomery County staff performed a series of network inputs to improve travel simulation. A number of roadway plots displaying structure of the year 2000 COG/TPB model network showing number of lanes and facility type link attributes were reviewed. As a result of this review, a number of refinements to the network were made, including: (1) additional links – particularly in the upper I-270 corridor and northeastern rural areas of the county; (2) corrections to the number of lane attributes coded on selected links; and (3) changes to facility type attributes coded on selected links. These changes were made in an effort to improve travel model simulation performance in Montgomery County as well as to be more consistent with the application of the department's current travel demand model, Travel/2. Subsequent to the implementation of these highway network refinements, the corresponding year 2000 transit network was also updated accordingly.

Staff also reviewed specific centroid loading points onto the network, and additional connections were added and/or modifications were made in order to improve traffic assignment performance. Updates to observed traffic counts were made at several locations throughout the county, resulting from additional data obtained from MDSHA and MCDPWT.

In conclusion, validation results from the Travel/3 model were compared to the COG/TPB model results. Land use, vehicle trips by purpose and mode, and VMT were observed for each model. Differences in the various vehicle trip tables are marginal, indicating that the application of Travel/3 is consistent with the COG/TPB model. The results also show a modest improvement in the ratio of estimated-to-observed VMT in Montgomery County compared to the COG/TPB model. In general, the estimated-to-observed screenline ratios for each model yield comparable results. The results also show a region-wide percent RMSE of 48% for Travel/3 as compared to a percent RMSE of 47% for the COG/TPB model.

Questions and Comments

Mr. Milone questioned why there was a land use difference between the Montgomery County Travel/3 model and the COG/TPB model. Ms. Li replied that it was nearly impossible to split TAZ 650 between Montgomery County and Prince George's County; therefore, the region total was not applied.

Mr. Jamei asked if Montgomery County planned to subdivide zones. Mr. Graye replied yes.

Mr. Mann suggested that COG staff update their work program to incorporate creating a unified zone system for the entire modeled region. Mr. Hogan replied that this type of activity was done back in the 1990's. He expressed the view that a new zone system will be in place when the new HTS is completed and ready for geo-coding.

Item 4: Update on Household Travel Survey

Mr. Griffiths handed out a hardcopy of the "External Commutershed" for the TPB modeled area that showed the number of workers commuting to the COG/TPB modeled region from external areas. This "External Commutershed" was developed from Mr. Griffiths' analysis of the 2000 Census Transportation Planning Package (CTPP). He noted that about half of the external workers commuting to the TPB modeled area came from Baltimore County and City and areas north and east of Baltimore City/County.

Mr. Griffiths reported that he had made some changes to the CTPP adjustment factors that he had presented at the last TFS meeting. Originally, he had factored daily worker absenteeism by major travel mode, but after some further thought he realized that it was better to adjust the CTPP data for absenteeism by geographic area type rather than by travel mode. He noted that further review of the 1994 Household Travel Survey (HTS) data showed that worker absenteeism was more highly correlated with where the workers worked rather than travel mode. He noted that core area workers tended to have less absenteeism than workers in the surrounding counties regardless of travel mode used to commute to work. He added that this was primarily a full-time/part-time worker issue. Because a greater proportion of jobs in the core area are full-time compared to the proportion of jobs that are full time in suburban areas, daily worker absenteeism is less for core area workers. Mr. Griffiths also reported that he had increased the CTPP transit undercount adjustment factor from 13% to 18% to more closely match estimated 2000 HBW transit ridership for the entire TPB modeled area.

Mr. Griffiths reported that plans for the regional new household travel survey were moving along and that he was currently in the process of recruiting additional staff to work on this project. He also noted that the TPB had just approved the recommended carry over of some of the FY 2006 funding into FY 2007 for the pre-test of the new household survey which was scheduled to begin in July, 2006.

Mr. Griffiths reported that recently he and members of models development talked to Atlanta Regional Council (ARC) staff about their 2001 HTS. He stated he thought their 2001 HTS was one of the better designed activity-based travel surveys, but wanted to ask ARC staff the question, "now that

they had some time to work with the 2001 HTS data, what things might they do differently if they had the opportunity to re-do this survey now?" Their response to this question identified the following issues and/or findings: (a) not having enough detailed information on the travel of pre-school aged children; (b) the need to determine differences between mandatory and discretionary trips (i.e. information on the characteristics of workers) (c) by using a two-day travel diary, reporting on the second day fell off tremendously; (d) letting another agency (e.g. the CDC) add additional questions to the survey increased complexity and respondent burden and reduced the overall survey response rate, and (e) referring to the survey as a household travel survey instead of an activity based survey did not seem to have any affect on the survey response rate.

Mr. Griffiths commented that in addition to the trip and activity data obtained from the HTS travel diary reports, there will be a need to get more detailed information through the person interviews on such issues as multiple job holding, eligibility to telecommute, and alternative work week schedules for activity-based modeling purposes.

Question and Comments

Mr. Noble asked if the additional funds carried over FY 2006 for the new HTS would allow a larger sample size than originally planned.

Mr. Griffiths responded that no, the FY 2006 funds being carried over to FY 2007 were for the survey pre-test. The lessons learned from pre-test would result in better quality data being collected in the main survey, but would not necessarily result in a larger total sample size.

Mr. Shapiro asked if the pre-test could include more than one version of a HTS questionnaire. He suggested that it would be useful to test both a short HTS travel diary questionnaire like ARC's and a longer much more detailed survey questionnaire that asked more questions than ARC's to see how much a longer questionnaire would impact survey response rates.

Mr. Griffiths replied that it was possible to test more than one version of questionnaire in a survey pre-test, but cautioned not to burden respondents with a travel diary much more complicated than Atlanta's. If too many detailed questions are asked about each individual trip or activity, people will start to fatigue and not report all of their daily activities and trips.

Ms. Li commented that if the survey questionnaire became too complicated, people will simplify it themselves resulting in useless data. It is best to keep the survey instrument as simple as possible.

The next meeting of the TFS is scheduled for May 19, 2006.