Item #2

Status report on the Version 2.3 Travel Model

Presentation
to the
TPB Travel Forecasting Subcommittee

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Recent events

- July: TPB approval of AQC process & findings
  - Network: 2012 CLRP and the FY 2013-18 TIP
  - Model: Version 2.3.39
  - Land use: Round 8.1 Cooperative Forecasts
  - Six scenarios: 2007, ’13, ’17, ’20, ’30, ’40

- August/September activities included:
  - Version 2.3.39 model transmittal prepared
  - Seven model requests serviced (…and counting)

Current events

- Recent requirements issued by EPA have necessitated additional modeling work
  - Washington D.C. metro area now designated as *marginal nonattainment* for ozone
  - New scenario year: 2015
  - Based on existing network, land activity assumptions

- Schedule for the next AQC cycle formulated
  - Study of the 2013 CLRP/2014-19 TIP
  - Version 2.3 travel model & EPA Mobile model

Analysis schedule of the 2013 CLRP & FY2014-19 TIP

Year	Month	Event
2012	September	TPB briefed on draft call for projects
	October	TPB releases final call for projects
	December	Deadline for submission of draft project inputs
2013	January	Technical review of draft CLRP/TIP submissions and AQC scope of work
		Draft CLRP/TIP submissions and AQC scope of work released for public comment
		TPB is briefed on CLRP/TIP submissions and AQC scope of work
	February	Public comment period ends
		TPB reviews public comments and is asked to approve CLRP/TIP submissions and AQC scope of work
	April/May	Travel modeling and mobile emissions modeling
	June	Draft CLRP & TIP and conformity assessment released for public comment at citizens advisory committee
		TPB is briefed on draft CLTP/TIP and conformity assessment
	July	Public comment period ends
		TPB reviews public comments and responds to comments
		TPB is presented draft CLRP & TIP and conformity assessment for adoption

Current development activities

1. Consultant-assisted tasks (next presentation)
2. Ongoing base year (2010) highway network refinement
3. Testing options to reduce model running time
4. Progress and issues with the Census Transportation Planning Package (CTPP) and American Community Survey (ACS)

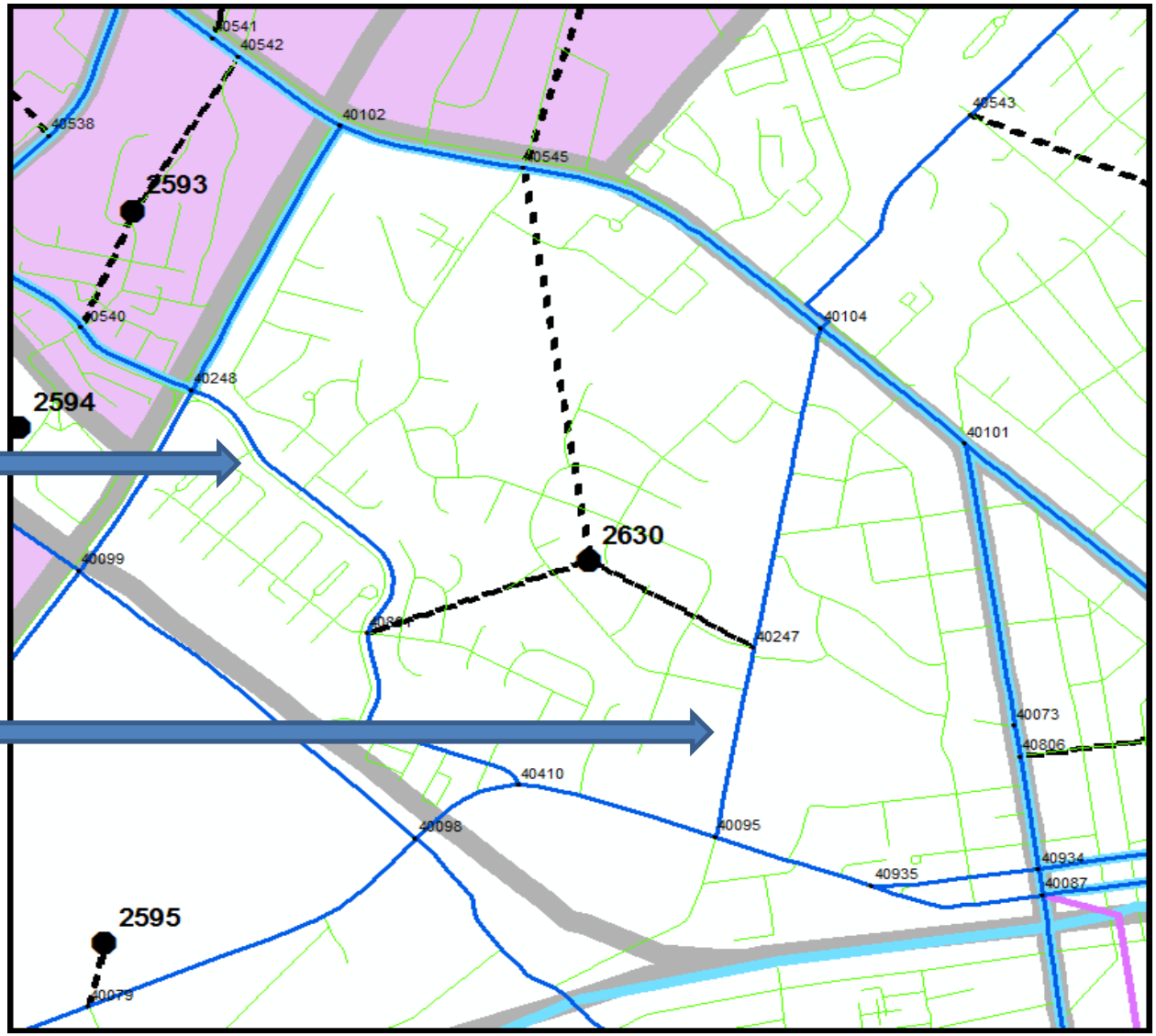
~ Highway network refinement ~

Highway network refinement

- Base year 2010 network under evaluation
- Refinement focused in two areas:
  1. Facility type coding of lower arterial, collectors
     - Federal Functional Classification data (shape files) from state DOTs are used as a basis for evaluation
  2. Zonal access to the highway system:
     - Centroid connectors
     - Addition /deletion of lower facilities around TAZs

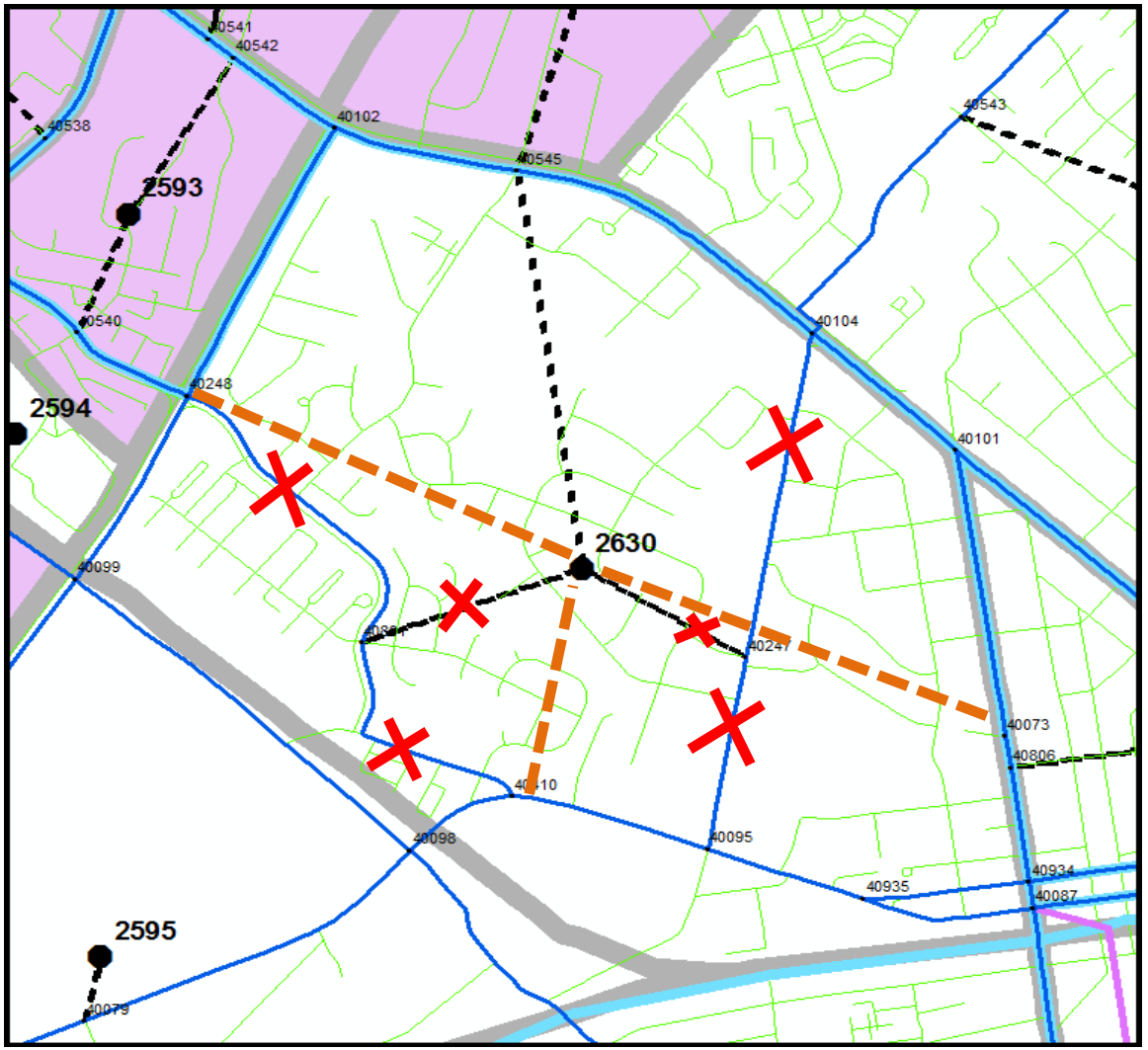
Example Refinement: Prince William County- TAZ 2630 Before

Issue: Highway facilities are below the zone grain



Prince William County- TAZ 2630 After with edits shown

Resolution: Highway facilities below the zone grain are removed and centroid connectors are modified



Add Centroid Connectors
Remove Link

Effect of the network refinements on regional VMT

- Facility type refinements:
  - Major arterial, collector lane miles decreased
  - Minor arterials increased
  - 2010 VMT reduced by 0.3%
- Facility type and centroid refinements:
  - Not yet known
- Main benefits of this work:
  - Improved model performance for lower facilities
  - Improved project planning results
- 2010 Census affect on FFC coding will prompt a reassessment of facility types in the regional network

~ Work on reducing running times ~

Model Parallelization

- TPB staff requested AECOM's assistance in speeding up model runs under Task Order 4 of the consultant contract in FY 2012.
- AECOM proposed several options to reduce running times by parallelizing different steps of the model using:
  - Batch files
  - Multistep Distributed Processing (MDP)
  - Intrastep Distributed Process (IDP)
- Options would complement existing IDP steps already implemented by TPB staff.

Concerns about parallelization

- Complexity – Do added features overly complicate application and are code-related problems harder to trace?
- Stability – Do added features increase risk of random model stoppages?
- Replication – Do added features change results?
- Core scalability – Will added features work on any machine/core configuration?

Model Parallelization- Tests

Three “accumulative” tests were investigated:

1. Batch file use only: affecting transit skims, mode choice, and transit assignment steps
2. Batch file use with MDP in highway assignment
   - Parallelized same steps as test 1 plus highway assignment
3. Batch file use with MDP in highway assignment, highway skimming and trip distribution steps

Results

Run	Description	Run Time (hr:min:sec)	Run Time Saved (hrs.)
Base	Ver2.3.39	27:43:39	--
Test 1	Parallelized +	22:53:59	4.82
Test 2*	Parallelized ++	17:49:48	9.88
Test 3*	Parallelized +++	18:19:14	9.40

*Note: These results were obtained assuming 8 cores are available for highway assignment. A model run on a machine with 4 cores will not experience the same time savings.

Findings

- Parallelizing model steps did not alter model results
  - VMT and transit trips remained constant across the tests
- The highest run time savings were obtained in test 2.
- TPB recommends implementing parallelizations in the transit skims, mode choice, highway assignment, and transit assignment steps.

~ 2010 Validation and the CTPP ~

The CTPP/UTPP: 1970-2000

- What is the CTPP, historically?
  - Special tabulations from the decennial Census
    - At residence, at workplace, flows between home/work
  - Single data collection period every ten years
  - Composed of two forms:
    - Short form: to obtain basic demographic and housing information
    - Long form: to obtain much more in-depth information
  - Highly reliable data due to large sample
  - A critical data source to transportation planners

2005: The ACS is born

- What is the ACS?
  - A continuous survey that is used to describe demographic and travel characteristics over a specified *period*
    - 1-year, 3-year, and 5-year estimates will be released for geographic areas that meet specific population thresholds
  - The Census Bureau has replaced the decennial census long form with the ACS; All future CTPP data will be based on the ACS

Implications

- The first CTPP data release will occur in Spring of 2013 reflecting the period from 2005-2009
- A CTPP Oversight Board has been established by AASHTO to oversee the development and use of the new CTPP data
- It's not currently clear how MPO's will use the new CTPP

Current Activities

- Comparisons of HHs and population at the jurisdiction level: Round 8.1 vs. 2010 Census households and population
- Comparison of demographic (HH size, HH income, and HH Vehicle availability) distributions at the jurisdiction level: Version 2.3 model vs. ACS
- Results will be presented at next TFS meeting

Conclusions

- Recent activities have focused on fundamentals:
  - Refining the highway networks
  - Reducing excessive running times
- TPB staff will continue to monitor how other MPO's are planning to use the 2010 CTPP