Status report on COG/TPB's travel demand modeling improvement efforts

presented to

Travel Forecasting Subcommittee

presented by

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Agenda

- FY15 work program – quick refresher
- FY16 work program – to date
- Short-term implementation plan for trip-based model improvement
- Discussion

Relevant activities and products of the FY 2015 work program

- Stakeholder survey, meeting, and summary report
- National MPO survey and summary report
- Draft seven-year strategic plan for model improvement

What's been learned from stakeholders?

- Nonmotorized travel should be improved
- Transit submodes need to be better distinguished
- Transit speeds need to be better linked to highway congestion
- Managed lanes are of strong interest and handling in the model could be improved

Key concepts from the strategic plan

- Developed with mindfulness of both stakeholder interests and the state of the practice
- Plan consists of three main phases of work:
  - » FY16–17: Version 2.5 – Trip-based model improvements
  - » FY18–20: Version 3.0 – Activity-based model with existing data
  - » FY21-22: Version 3.2 – Enhanced activity-based model with updated data

Since the September TFS meeting…

- TPB staff formulated a task list for short-term modeling improvements (based on consultant recommendations)
- Workshop was held with CS to vet tasks and set priorities
- TPB staff and CS formulated an implementation plan for trip-based modeling improvements

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Implementation plan for trip-based model improvements

- Transmitted on 11/13 as a memorandum.
- Incorporated tasks identified by both TPB and CS staff
  - » Task Order 16.2 – Advice and Testing
  - » Task Order 16.3 – Managed Lanes
  - » Task Order 16.4 – Non-Motorized Model Enhancement
  - » Task Order 16.5 – Mode Choice Model Enhancement

Task Order 16.2 – Advice and Testing

- Software/Scripts
  - » Version control and bug-tracking software
    - CS will advise; TPB staff will implement, as warranted
- Model Structure/Components
  - » Non-resident trips update: special generators, airports, visitors
    - CS will offer input on approach; TPB staff will implement
  - » Screenline/cutlines update
    - TPB staff will lead this work
  - » Speed/travel time validation improvement
    - CS will adjust freeway volume delay functions using input data to be supplied by TPB staff

Task Order 16.2 – Advice and Testing (continued)

- Transit
  - » Migration of the path-building software
  - » Perform transit network coding enhancements
  - » Include transit drive access trips into highway assignment
  - » Add external-to-internal transit trips
  - » Revise bus speed linkage to highway speeds
  - » Migration of mode choice application software
  - » Walk access script enhancement

Significant CS role in performing

Primarily performed by TPB staff

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Task Order 16.2 – Advice and Testing (continued)

- Data Preparation
  - » Develop parcel-level development database
  - » Develop Census and Household Travel Survey database
  - » Prepare non-motorized GIS database

Task Order 16.3 – Managed Lanes

- CS will explore options, offer design decisions that can be acted on, and begin to implement methods that improve HOT/HOV/managed lane modeling
- TPB staff will confirm the availability of supporting data
- Application experience in other regions will be used to inform recommendations
- COG/TPB staff plans to continue to review and test the revised modeling scripts that AECOM delivered to COG at the end of FY 14 to enhance toll and HOT modeling
- Implementation will be completed in FY17

Task Order 16.4 – Non-Motorized Model Enhancement

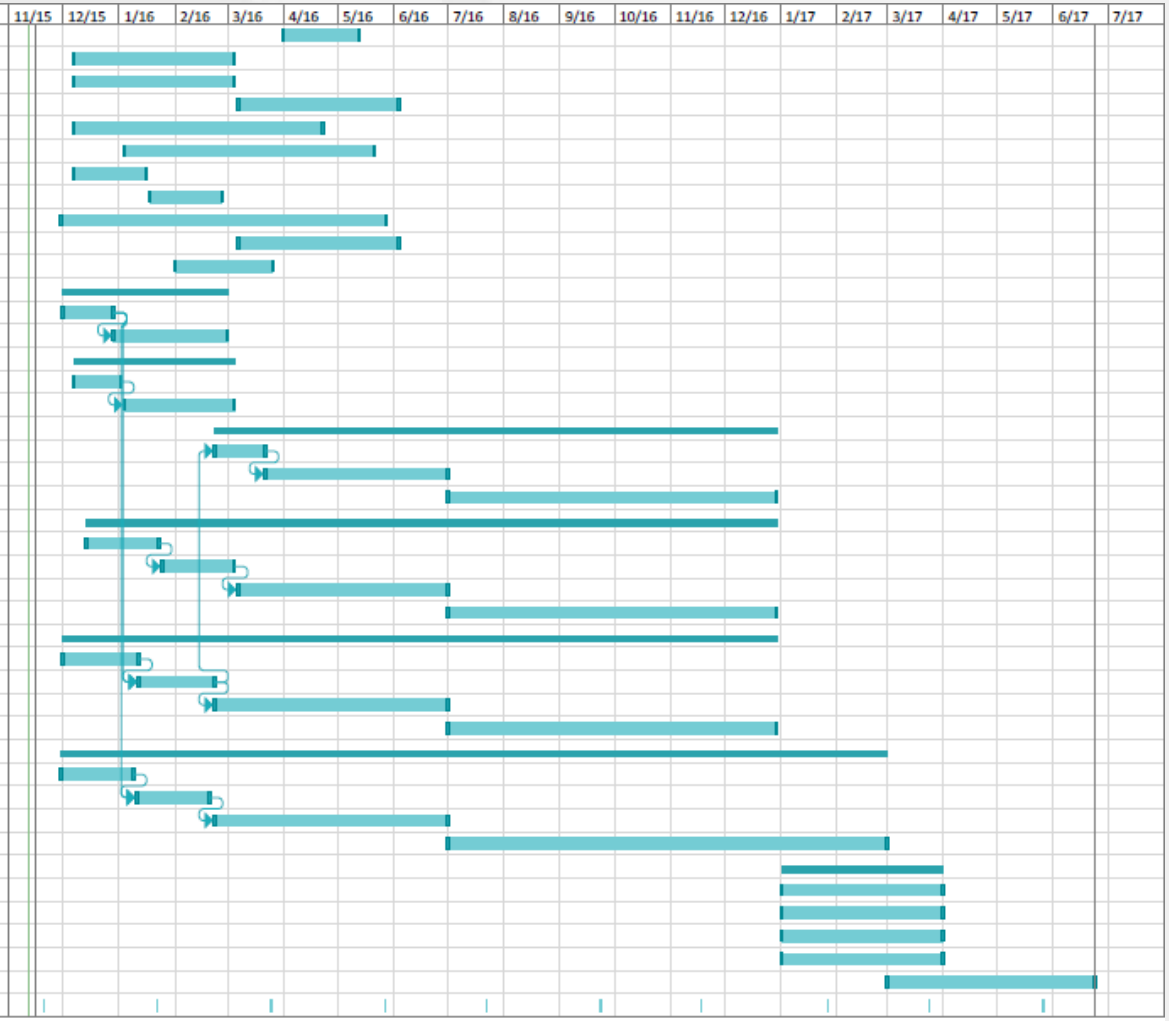
- Providing information and supporting design decision
- Possibilities include
  - » improving the existing non-motorized trip generation
  - » adopting a separate accessibility-based tool
  - » improving supply-side data (e.g., facilities database)
- Trip -based model enhancements would be completed in FY17

Task Order 16.5 – Mode Choice Model Enhancement

- Develop the model specifications for a new mode choice model and begin work to implement it.
  - » Use **parcel level database** and **new pathbuilding capabilities** would be available
  - » Improved representation of **non-motorized access** and **reduced reliance on geographic constants** (such as via inclusion of land-use and built-environment variables)
  - » Potentially less specificity of transit sub-modes in the mode choice step ("**flattened mode choice model**"), but more specificity in transit path-building and assignment
  - » Differential weights on in-vehicle travel time could be used in path-building to reflect the amenities associated with modes
  - » New mode codes and network coding instructions

Work Program Schedule
Overview

CS	WBS	Task Name	Duration
16.2	2.1.A	Version control and bug-tracking software	6 wks
16.2	2.2.A	Non-resident trips update	13 wks
16.2	2.2.B	Screenlines/cutlines	13 wks
16.2	2.2.C	Speed/travel time validation improvement	13 wks
16.2	2.3.A	Migration of transit path-building software	20 wks
16.2	2.3.B	Perform transit network coding enhancements	20 wks
16.2	2.3.C	Include transit drive access trips into highway assignment	6 wks
16.2	2.3.D	Adding external-to-internal transit trips	6 wks
16.2	2.3.E	Revise bus speed linkage to highway speeds	26 wks
16.2	2.3.F	Migration of mode choice application software (AEMS => ModeChoice	13 wks
16.2	2.3.G	Walk access script enhancement	8 wks
16.2	**2.4.A**	**Develop parcel-level development database**	
16.2	2.4.A	Create Specifications	4 wks
16.2	2.4.A	Assemble Database	9 wks
16.2	**2.4.B**	**Develop Census and household travel survey database**	
16.2	2.4.B	Create Specifications	4 wks
16.2	2.4.B	Assemble Database	9 wks
16.2	**2.4.C**	**Prepare non-motorized GIS database**	
16.2	2.4.C	Create Specifications	4 wks
16.2	2.4.C	Begin implementation	14.6 wks
17.x		Complete implementation of enhancements	26 wks
16.3	**3.1.A**	**Enhance managed lanes modeling**	
16.3	3.1.A	Review alternative approaches/confirm/assemble input data	6 wks
16.3	3.1.A	Determine/design improvement approach/schedule	6 wks
16.3	3.1.A	Begin implementation	16.8 wks
17.x		Complete implementation of enhancements	26 wks
16.4	**4.1.A**	**Enhance treatment of non-motorized trips**	
16.4	4.1.A	Review alternative approaches/confirm/assemble input data	6 wks
16.4	4.1.A	Determine/design improvement approach/schedule	6 wks
16.4	4.1.A	Begin implementation	18.6 wks
17.x		Complete implementation of enhancements	26 wks
16.5	**5.1.A**	**Improve the trip-based mode choice model**	
16.5	5.1.A	Review alternative approaches/confirm/assemble input data	6 wks
16.5	5.1.A	Determine/design improvement approach/schedule	6 wks
16.5	5.1.A	Begin implementation	18.6 wks
17.x		Complete implementation of enhancements	34.6 wks
17.x	**6.1.A**	**General enhancements**	
17.x	6.1.A	Reducing model run times	13 wks
17.x	6.1.A	Ease of use and adaptability	13 wks
17.x	6.1.A	Error checking automation	13 wks
17.x	6.1.A	Review modeling scripts to improve efficiencies	13 wks
17.x	6.2.C	Sensitivity testing of the regional travel model	16.6 wks
		TFS Meetings	



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Work Program Schedule
Task Order 16.2

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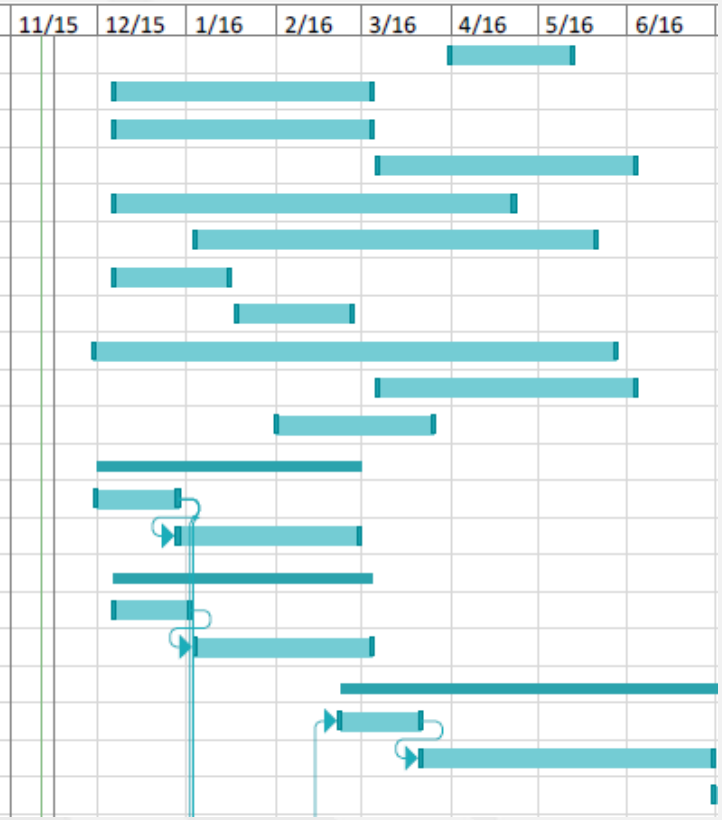

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Work Program Schedule
Task Orders 16.3, 16.4, and 16.5

16.3	**3.1.A**	**Enhance managed lanes modeling**	
16.3	3.1.A	Review alternative approaches/confirm/assemble input data	6 wks
16.3	3.1.A	Determine/design improvement approach/schedule	6 wks
16.3	3.1.A	Begin implementation	16.8 wks
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16.4	**4.1.A**	**Enhance treatment of non-motorized trips**	
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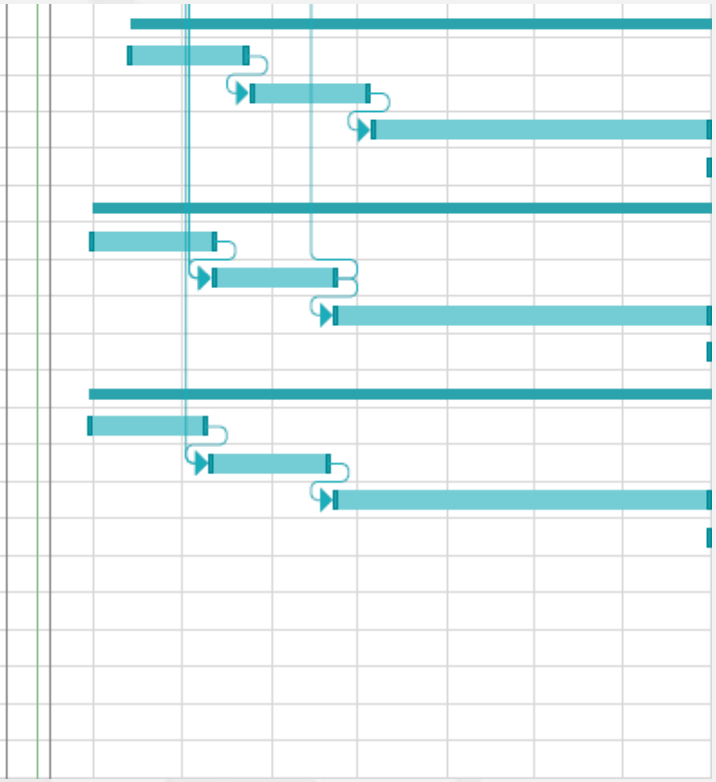

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Next Steps

- Move forward with the implementation program
  - » Commence the FY16 CS task orders
  - » Continue TPB staff activities that support the program
- Continue to gather stakeholder feedback
- Maintain regular reporting at the TFS meetings

Discussion and Questions

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